Renewable Energy Zones
National Consultation 2022

BlueFloat ENERGY

Elemental Group

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About our partnership

BlueFloat Energy, Energy Estate and Elemental Group have formed a partnership to develop offshore wind farms in New Zealand.

Our partnership brings together complementary skill sets and experience in the global offshore wind industry and deep understanding of the New Zealand energy sector. Our projects will accelerate decarbonisation by supporting new reliable and low-cost generation, providing 24/7 power for industry, encouraging new industry and creating skilled and enduring jobs in Taranaki, Waikato and other regions.

Our development principles are based on partnerships – with iwi, government, other industry participants and local stakeholders. We are committed to fostering the growth of a NZ offshore wind industry and local supply chain.

BlueFloat ENERGY

A leading offshore wind developer with a global pipeline of fixed and floating projects

energy estate

An experienced developer & accelerator of renewable energy, storage and green hydrogen projects

Elemental Group

A pioneer in the offshore wind sector in New Zealand

Haumoana: Capacity building report

In November '21 Energy Estate, Elemental Group and BlueFloat Energy, published a report which highlighted New Zealand's untapped potential for offshore wind development

Key themes were:

Fostering regional & national economic development

- Facilitate trans-Tasman collaboration in manufacturing & establishing world-class expertise and training
- Long term employment opportunities for locals + transfer of complimentary technical expertise & skills from offshore oil, gas & marine industries
- Establish a broader ecosystem of regional economic development

Delivering broader benefits for Aotearoa and its communities

- Opportunity to design the regulatory framework & development standards so as to deliver wider benefits to Iwi & local communities
- Accelerate NZ's progress towards achieving its net zero target
- Re-purpose existing infrastructure (such as offshore oil & gas infrastructure, ports)
- Build close to demand centre& reduce the dependency on SI generation

Supporting innovation

- Opportunity to create low-cost competitive green hydrogen & e-fuels for domestic & export markets
- Enable corporate energy users to meet their increasing demand for renewable energy
- Local businesses partner with experienced international offshore wind players to create a skill base

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Executive summary

We are excited to submit a response to the Renewable Energy Zones National Consultation.

BlueFloat Energy, Energy Estate and Elemental Group are developing offshore wind projects in Aotearoa and exploring the opportunities to integrate offshore wind with PtX and storage.

We strongly support the development of REZs in New Zealand which we view as a critical enabler for rapid decarbonisation and a vehicle to change the vision from the status quo- which is locking in high prices and energy insecurity to a future of 600% renewables as well as a thriving domestic industry and export markets.

We also think that the REZ concept needs to consider the use of substation hubs with associated power cable exports in offshore areas of high quality wind resource to minimise impacts and overall system costs.

In our submission we have provided responses for the questions posed in the REZNC and included background material and further analysis which you may find helpful.

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Q1. Do you agree that the first mover disadvantage and high connection costs can be challenges for connecting new renewable generation and/or large electricity loads to the electricity network?

Yes we agree.

This is an issue in New Zealand and other markets globally. High connection costs for new generation is a major concern for achieving net zero and deep decarbonisation as existing thermal generators benefit from connection which were often funded in a different regulatory environment and their connection costs were smeared across the energy system rather than being directly incurred by the generator and adding to the LCOE of the generation asset.

The first mover disadvantage is a challenge for new generation and new loads in a New Zealand context. This is a disincentive in the context of areas where there are potential renewable energy zones (such as Northland). This also applies in the case of new large loads where there are other potential energy users such as new or growing industrial clusters such as Marsden Point or Kowhai Park (new cluster located next to Christchurch International Airport).

We believe that the speed and scale of the energy transition means that the existing rules for the sector which were designed for a different time need to be transformed. We are strong proponents of the need for collaboration between onshore and offshore renewable generators and storage providers in order to efficiently design and deliver the new and augmented transmission infrastructure that is required to connect new generation to the transmission grid.

A good example of what has generally happened with new **offshore wind connections globally** is that there has been a focus on connecting the new large offshore wind farm to the grid but no consideration of the opportunity to connect new onshore generation to the hub that is created. This has resulted in the offshore wind farm bearing the upfront costs and new solar, storage and onshore wind projects connecting to the hub without appropriate cost sharing or co-ordination being put in place.

Furthermore, the REZ design should consider the infrastructure needs of offshore transmission which runs from offshore platform substations to shore. This infrastructure is generally 6-10 times more expensive than onshore transmission on a per km basis and synergies between generation projects can help deliver lower energy prices for new and existing domestic loads and renewable energy export opportunities.

Q2. Do you think the concept of a Renewable Energy Zone could be beneficial in a New Zealand context?

Bluefloat Energy, Energy Estate and Elemental Group believe renewable energy zones can play a significant part in the New Zealand energy system.

Energy Estate and Elemental have been actively promoting the REZ concept over the last year including submissions to InfraCom. A copy of our submission to Infracom is attached with the separate submission made by Energy Estate and Elemental Group (the Kākāriki submission) and includes details of potential challenges and how they can be mitigated.

Renewable Energy Zones must be part of the toolbox used to drive down the cost of energy in NZ. We believe that large new generators are needed in NZ to increase competition and reduce prices for consumers. We made this point to the recent Downstream 22 conference.

REZs in NZ can result in a wider range of benefits of:

- Better social outcomes due to less infrastructure being built near New Zealand dwellings
- Cheaper competitive energy by removing costs out of the transmission and connection capital costs as outlined in the consultation document
- New regional investment opportunities in generation and load
- New jobs from capital spend and ongoing jobs in new businesses which take load including helping to transition existing oil and gas workforces in Northland (Marsden Point) and Taranaki
- Improved resilience in electricity supply and potential for enhanced demand response from new load
- Accelerating development of large scale renewbale energy including offshore wind
- Attracting new entrants into the New Zealand market such as BlueFloat Energy
- Creating new local supply chains
- Reducing reliance on hydropower and the mitigating dry year risk by creating new 24/7 supply through REZ design prioritising complimentary resources such as solar, storage, offshore and onshore wind and firming such as hydro and geothermal

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Q3. What region(s) do you think would be suited to Renewable Energy Zones?

We have undertaken extensively analysis of the opportunities in New Zealand, taking into account key factors such as

- Renewable energy resource
- Existing transmission and distribution networks
- Existing and potential new load
- Replacement of thermal generation
- Fuel switching opportunities including gas, oil, aviation and shipping fuel, LPG
- Potential for partnerships with iwi
- Buildability of transmission and new renewable energy zones
- Competing land use including farming, horticulture and forestry and
- Ability to build and maintain social licence for new transmission and new renewable generation and storage assets

We support the development of the first REZ in Northland.

The other regions we would suggest to prioritise are:

- **Taranaki** – world class offshore wind resource, existing infrastructure and load, significant PtX opportunities
- **Southland** – world class offshore wind resource, smelter demand, PtX potential
- **Waikato –** world class wind resource and proximity to robust infrastructure

Q4. What benefits do you think should be considered in the decision-making process for Renewable Energy Zones in New Zealand?

The benefits we suggest should be considered include:

- System design rather than responding to individual connection enquiries
- Reduced costs to consumers through efficiencies of design and use of new and augmented transmission infrastructure
- Ability to embed development principles into the connection process – this is the approach being taken in NSW where the NSW Government has indicated through the Roadmap process that generators wishing to connect to a REZ will need to show how they have engaged with hosts/affected communities over and above the requirements under the planning regime
- Enduring employment opportunities for a region
- Encouraging developers to look at shared infrastructure such as storage rather than each developer pursuing their own approach regardless of the impacts on and benefits for the wider system
- Co-ordination of community engagement and trying to avoid consultation fatigue
- Pooling of community benefits and ability to focus on high impact benefits from the REZ rather than one offs such as "roundabouts"'
- Attracting new entrants and low cost capital into the sector to drive down the WACC for new generation and bring new competition in the market. This is a key issue in a net zero scenario when New Zealand will become reliant on imported fuels post Marsden Point closure until such time as new generation sources are built and e-fuels solutions are delivered at scale.
- Attracting new loads – we have started to see this in other regions globally. Although NZ has high levels of renewable electricity a well designed REZ can attract new energy intensive loads which want access to secure renewable energy not just electricity such as food processing and sustainable building materials.
- Energy solutions for large long term energy users such as airports – a good example is Frankfurt airport entering into a long term PPA with a German offshore wind farm - https://www.passengerterminaltoday.com/news/sustainability/frankfurt-airport-to-be-largely-powered-by-wind-energy-from-2026.html

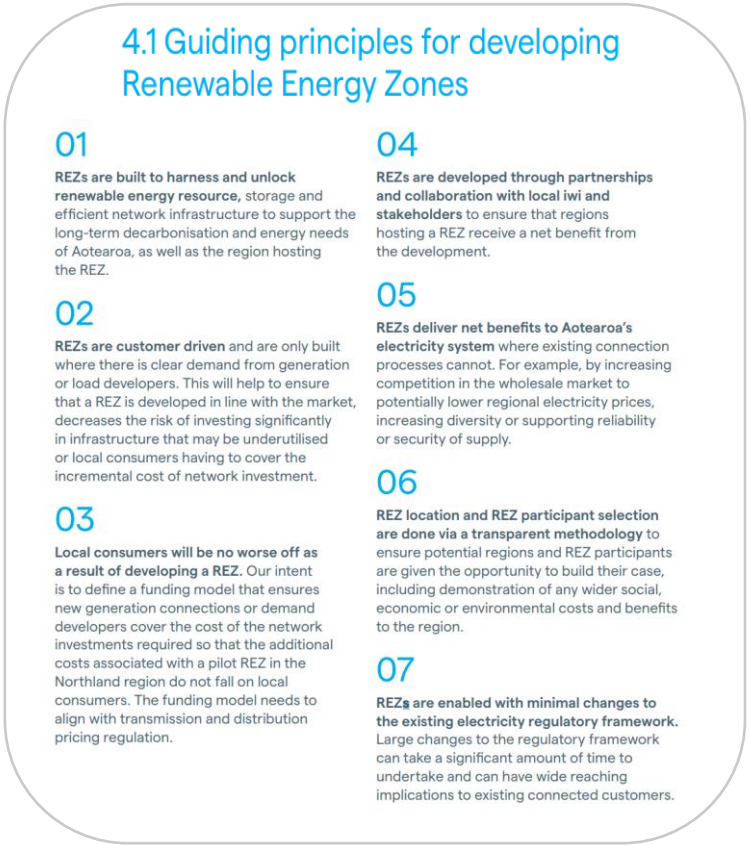
Q5. Do you agree with the proposed guiding principles? Are there any that you would change or add? (1/2)

We have commented below on the proposed principles and on the following page suggested some additional principles can be incorporated into the REZ design and delivery strategy for New Zealand

We agree with **GP01** and note that REZs should not just focus on unlocking new RE resources for Aotearoa but also focus on unlocking energy experts from New Zealand. **The scale of the developable offshore wind resources should be taken into account when designing REZs**

We do not agree with **GP02.** This is harking back to the 'market knows best' principles which underpinned the first wave of liberalization and corporation of power markets globally. The concept of REZs must involve a strong element of system planning rather than being entirely driven by generators seeking extra capacity or users looking for low cost solutions' for their demand but which impact our energy users in the system. The focus should be on delivering low cost **secure** energy for NZ and export markets

We strongly agree with **GP03** from the perspective of ensuring that REZs benefit the local energy users. It is important the potential benefits for a region are taken into account – for example **industrial development and new dispatchable assets in the Taranaki region which benefit PowerCo and local users** should be taken into account rather than the lines company seeking to put all the costs on to the REZ as in the long term benefits should flow to the consumers through better utilisation of the existing assets and growth in the region.



4.1 Guiding principles for developing Renewable Energy Zones

01

REZs are built to harness and unlock renewable energy resource, storage and efficient network infrastructure to support the long-term decarbonisation and energy needs of Aotearoa, as well as the region hosting the REZ.

02

REZs are customer driven and are only built where there is clear demand from generation or load developers. This will help to ensure that a REZ is developed in line with the market, decreases the risk of investing significantly in infrastructure that may be underutilised or local consumers having to cover the incremental cost of network investment.

03

Local consumers will be no worse off as a result of developing a REZ. Our intent is to define a funding model that ensures new generation connections or demand developers cover the cost of the network investments required so that the additional costs associated with a pilot REZ in the Northland region do not fall on local consumers. The funding model needs to align with transmission and distribution pricing regulation.

04

REZs are developed through partnerships and collaboration with local iwi and stakeholders to ensure that regions hosting a REZ receive a net benefit from the development.

05

REZs deliver net benefits to Aotearoa's electricity system where existing connection processes cannot. For example, by increasing competition in the wholesale market to potentially lower regional electricity prices, increasing diversity or supporting reliability or security of supply.

06

REZ location and REZ participant selection are done via a transparent methodology to ensure potential regions and REZ participants are given the opportunity to build their case, including demonstration of any wider social, economic or environmental costs and benefits to the region.

07

REZs are enabled with minimal changes to the existing electricity regulatory framework. Large changes to the regulatory framework can take a significant amount of time to undertake and can have wide reaching implications to existing connected customers.

GP04 is one of the key guiding principles for our joint venture. If NZ fails to move to new ownership models for transmission and new generation this is a lost opportunity taking into account, the precedents already established in the geothermal sector and the global examples such as Fort McMurray to Edmonton in Alberta. ww.atco.com/en-ca/about-us/news/2019/122488-indigenous-communities-acquire-40-per-cent-interest-in-award-win.

We agree with **GP05** and note that one of the benefits of developing REZs is increasing global interest in the NZ energy sector which brings in new sources of capital **(such as BlueFloat Energy and other offshore wind players)** and can increase delivery capacity (a major limiting factor for NZ which is currently seen as having high construction and delivery risk and costs)

We strongly agree with **GP06**. The original ISP in Australia is a good example of REZ selection which involved too much desktop analysis and insufficient stakeholder engagement. There is no point locating a REZ based on abundant RE resources if the host communities are adamantly opposed to the designation. **This is why we submit offshore wind resources should be taken into account at the outset rather than as an afterthought**

We agree with the sentiments of **GP07** but note that tinkering with market design when power prices are consistently high and NZ is facing new pressures from climate change, decarbonisation and energy security may require more holistic changes in the energy system regulation in the near future.

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Q5. Do you agree with the proposed guiding principles? Are there any that you would change or add? (2/2)

We have set out below some additional proposed guiding principles:

- **Load:** We believe a renewable energy zone works best when there is existing and/or anticipated future load within or proximate to the REZ. In the case of our proposed REZs with excellent offshore wind resources there is major existing load and potential future load such as:

    - **Taranaki** – existing industry such as dairy and substantial PtX opportunities as confirmed through VT's PtX report – https://www.venture.org.nz/assets/Power-to-X-Report-Nov-2021.pdf

    - **Waikato** – replacing existing thermal generation, growing local load and servicing Auckland demand centre, decarbonising dairy industry

    - **Southland** – smelter (we believe the forecast closure is unlikely to actually happen) and/or new green hydrogen users plus diversification through da ta centres and other clean manufacturing including food procissing

- **Overall system efficiency:** While it is appealing to design REZs to capture the best resources, we advocate having a sharp focus on the overall system efficiency. REZs bring back a strong element of central system planning to the transmission system (and the wider energy system with the rapid move to decarbonise the economy more generally). This is very relevant when contemplating connecting large new assets such as offshore wind as otherwise there is a risk of high cost connections being borne by consumers/energy users.

- **What is the goal** – we strongly believe that the guiding principles should include delivering clean, affordable energy solutions for all New Zealand energy consumers, addressing energy poverty and creating new export industries for New Zealand.

- **Shared benefits** – this principle is embedded in the NSW Electricity Infrastructure Roadmap and we are passionate advocates of the need for REZs to deliver enduring local benefits – for example by mandating local employment, local content requirements, local training and iwi/local ownership of renewable energy assets and new transmission infrastructure.

- **Consistency with regional plans:** The regional plans promulgated by the regional councils in New Zealand are a key part of the planning framework and are based upon engagement with the local communities. We believe that there needs to be close interaction with the regional plans during the REZ design phase.

Q6. Do you agree with the proposed criteria for selecting suitable regions for REZ development? Are there any that you would change or add? (1/2)

We have commented below on the proposed criteria and on the following page suggested some additional criteria to be considered when selecting suitable regions

We believe this criteria is only part of the picture when analysing potential regions. Many of the REZs being developed around the world are focussing on unlocking the RE potential rather than just creating access for developers who spotted a region. **The interest in the Taranaki and Waikato regions for offshore wind do underscore the need to take offshore wind resources into account.**

REZs are often located in areas of relatively low population density with correspondingly weak distribution grids in the absence of significant local industry (with dairy and forestry being the swing factor in NZ). We believe that REZs need to be transmission connected and then consideration needs to be given as to how you can utilize existing local network corridors to upgrade and augment the local capacity. **In the case of offshore wind they can replace existing large fossil fueled generation such as Huntly and Stratford which reduces the need to build new transmission capacity in other parts of the country.**

We strongly agree with the criteria. This is why designing REZs to benefit the system and not just the connecting generators is a critical selection and design criteria. The REZ design process needs to encourage storage, PtX solutions and dispatchable generation alongside VRE.

4.3 Selecting regions for REZ development

- **Generation developer demand:** Are there already significant numbers of renewable generation developers seeking to build in the area?
- **Economically efficient network investment:** Is the estimated cost of network investment per unit of generation capacity ($/MW) lower in a REZ compared to connecting generation to the grid via current connection processes?
- **Network capacity in the region:** Are areas on the local network nearing capacity?

Other proposed criteria that could be considered:

- **Access to good renewable resource:** Does the region have high levels of wind, solar and/or other renewable resources in areas where lower cost land is available?
- **Potential added benefits to the grid:** Would additional generation and storage improve network resilience, diversity or enable interconnection investment deferrals?
- **Additional economic and social benefits:** Is there a socioeconomic case for investment in the region? For example, by enabling a just transition following departure of large industry.

We generally agree with this criteria but this is a blunt tool which does not take into account wider benefits including facilitating new load, **diversification of RE resources (such as offshore wind)** and the additional social and economic benefits highlighted below. You may also wish to develop a REZ to reduce overall energy costs by pairing, say, wind with existing hydro even if the connection costs are higher than another region which is a wind only region closer to load with cheaper connections. **The higher connection costs of technologies such as offshore wind need to balanced with the overall benefits for the country as well as the system. There are useful precedents from Europe around how to efficiently integrate offshore wind into the network to achieve optimised outcomes for consumers.**

You have raised two issues – Quality of resource and availability of low cost land. Addressing the second issue - NZ has relatively high land costs and there are many competing land uses in most parts of the country. If you limit REZs to places with comparatively lower cost land you will not have many REZs! **We do agree that selection of REZs must take into account competing uses for land and we submit this will encourage stakeholders to look at the offshore wind opportunities in order to replace large scale thermal generation and provide resiliency against dry year risk**

This is a key criteria with Taranaki, Northland and Southland being obvious examples in NZ. REZs offer New Zealand the opportunity to diversify the economy away from the major population centres and Auckland in particular and build on the decentralized nature of the agricultural and forestry industries **and regional strengths such as the offshore oil and gas industry in Taranaki**

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Q6. Do you agree with the proposed criteria for selecting suitable regions for REZ development? Are there any that you would change or add? (2/2)

We have set out some additional proposed criteria for selecting suitable regions for REZ development below.

- Social licence – this is the key criteria for us particularly in a New Zealand context. In several countries we have REZs proposed in order to access high quality wind and/or solar resources without understanding the social values of the existing landscape. In a NZ context Māori views need to embedded into all aspect of the REZ development design and implementation.

- Access to suitable infrastructure such as ports, roads and potential for affordable upgrades including benefits of shared infrastructure and logistics between REZ infrastructure, connecting generators and energy users/clusters. **In an offshore wind context this should include exploring the ability to safely and efficiently repurpose existing offshore and onshore oil and gas infrastructure in order to maximise the benefits for consumers and secure social licence.**

- System benefits – such as locating a REZ close to load centres and reducing dry season and interconnector risk.

- Access to workforce – this is less likely to be an issue in New Zealand compared with places like Australia and Canada (where availability and cost is a factor – and this is covered over in the ranking of the REZs in the ISP through the comparative cost analysis). **This will be very relevant for development of the offshore wind industry – Taranaki has the benefits of being the centre of the offshore oil and gas industry but investment is required to keep and retain the talent.**

- Complementarity – such as potential for large scale offshore wind to be located close to existing large scale hydro which could result in more storage capacity being available at certain times of the year and help to flatten peak electricity pricing. Southland is a good example of this opportunity.

- Scaleability – if the REZ is too small it is unlikely to drive down the connection costs and may not attract sufficient developer, investor or user interest. Offshore wind offers the opportunity to scale REZs where onshore development is limited by social licence, onshore wind and soalr resource quality, lack of hydro or geothermal resource and competing land uses. **Good examples are the Gippsland, Portland, Illawarra and Hunter REZs in Australia where onshore resources are limited but access to the abundant offshore wind resources (especially for the REZs located around the Bass Strait) offers the opportunity to centre large REZs around existing infrastructure and workforces and transition existing thermal generation located close to the coast as well as depleted offshore oil and gas fields.**

Q7. Do you agree with using a tender process for committing projects in a REZ? Are there alternative processes that could be considered?

We do not agree that the tender process described is entirely reflective of the approach being taken in Australia. There are several different approaches being taken at Federal and State level to deliver REZs including the use of the traditional regulatory investment test for transmission process for interconnection (especially when you deliver "many to many" outcomes and/or there are system side benefits from connecting a REZ. In some cases there are private led developments which may have direct or indirect Government support such as G-REZ in Victoria which builds off the designation of Gippsland as a Victorian REZ. The tender process is being pursued in NSW with the NSW designated REZs which do not overlap with the REZs in the ISP but it is critical to note the REZ TNSP role is being tendered not just the opportunity for generators to connect. **As offshore wind farms take several years to develop it is critical to give offshore wind developers the opportunity to secure a pathway to grid connection early in the development cycle even if the FID may be some years in the future. One approach to consider is having a separate transmission licence regime for the offshore wind farms which is then co-ordinated with development of the coastal REZ.** We have included figure 12 from REZNC below and included our comments on the proposed process.

The regional reference group concept in NSW with a cross-section of local stakeholders including iwi/hapu, councils, local MPs and business leaders is a useful approach to stakeholder engagement for the REZs. **This is very relevant in a coastal REZ where the reference group can include stakeholders such as the commercial and recreational fishing industry and representatives from the marine tourism industry.**

A critical issue is who will take responsibility for land acquisition, planning and interface arrangements with Transpower and local networks? In NSW the current position is that this will fall on EnergyCo rather than the new TNSP or the generators. **In the case of coastal REZs we would recommend co-ordination around shore crossings to minimise impact**

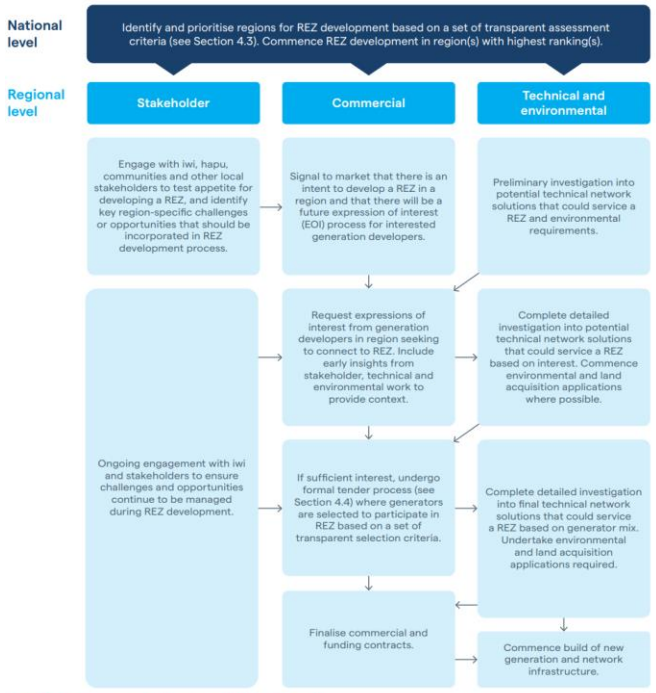

Figure 12: Potential process for developing REZs in New Zealand

We would support a high level of industry participation in the design phase. The whole point of a REZ is to promote collaboration between the transmission, lines companies and generators rather than the "at twenty paces" approach that has been encouraged by the existing regulatory settings.

The REZ framework should also seek to promote collaboration in the design phase so generators look to develop projects which benefit the system and the REZ rather than just their own interests. This is the approach that Energy Estate has taken with WalchaLink and development of the New England REZ in NSW **and Ausnet with the G-REZ concept in Victoria which is bringing offshore wind developers and onshore RE developers together to optimise design from the outset. We are also working closely with other offshore developers in other parts of Australia such as NSW to collaborate on the connection options within a REZ.**

Q8. Who should be involved with coordinating and undertaking the various steps within a REZ development process? (1/2)

Our suggested list of stakeholders to be included in a NZ context include:

Design phase

- Transpower
- Lines Companies
- Iwi/Hapu
- Regional councils
- Community Groups
- Affected industries such as fishing, aquaculture, offshore oil and gas industries, shipping
- Industry groups such as NZWEA (offshore wind working group)
- Central Government – MBIE, NZTE, Ara Ake, other relevant ministries such as Treasury, environment, oceans/fisheries, transport

  *[**Note:** In our view REZs are most successful when Central Government seeks to co-ordinate the different government stakeholders. This does not need to involve a fast track or centralised planning process for REZ infrastructure or connecting generators/loads but expecting proponents to shuffle between different departments without a level of co-ordination can have negative outcomes. The concierge/case management services being put in place by NSW is a good example of the support that can be given for REZs.]*

- Electricity Authority
- Commerce Commission – particularly for clarity around the regulatory position for Transpower and the Lines Companies
- Connecting Generators
- Retailers/energy market participants
- Delivery partners/ports/transport

  *[**Note:** We recommend involving delivery partners in the design phase particularly in a NZ context where there are logistic challenges (such as access to ports and suitable bridges and roads) and high delivery and construction costs. We have seen several REZs designed initially by transmission companies, governments and their consultants without understanding fundamental buildability issues and constraints. The result has been major redesign issues during the development process and even shelving or relocating the proposed REZ. There is no substitute for on the ground due diligence during the design phase.]*

Q8. Who should be involved with co-ordinating and undertaking the various steps within a REZ development process? (2/2)

Design phase cont.

- Experienced (local) environmental, ecological and social consultants

*[**Note:** This builds on the previous point. A successful REZ is dependent upon delivering the REZ infrastructure and the connecting projects. During the design phase you need to understand the issues which will be faced in the development phase so you can seek to design the REZ taking into account on the ground physical, environmental and social constraints and opportunities. The need to redesign the Central West Orana REZ to move from a linear route to new design which seeks to minimise biodiversity impact and maximise the use of public land is a good example of why focussing on these issues early on can save time and money.]*

Implementation phase

- Transpower
- Lines Companies
- Iwi/Hapu
- Regional councils
- Central Government – MBIE, NZTE, other relevant ministries such as Treasury, environment, oceans/fisheries
- Connecting Generators
- Retailers/energy market participants
- Delivery partners/ports/transport
- Community groups
- Funders

***[Note:** Development of REZs is more akin to a well managed PPP process than development of competitive generation or regulated transmission assets. Many elements of a REZ will be funded by project finance or corporate balances sheets and engagement with potential lenders from an early stage in the implementation phase is very helpful as it ensures you get their inputs and they are up to speed when asked to finance projects inside a REZ. In the case of the NSW Electricity Infrastructure Roadmap key funders have been involved from the design phase (such as NAB and CEFC).]*

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Q9. Do you agree with the proposed project criteria? Are there any that you would change or add? (1/2)

We have commented below on the proposed criteria and suggested additional criteria. We note that the REZDC mentioned by way of example a period of one year for a EOI process to assess initial interest. We believe that this is much longer than is necessary and running an elongated REZ development process creates a real risk of developer and stakeholder fatigue especially if one of the goals of REZs in NZ is to attract new capital and new market participants to help drive down cost of capital and increase competition.

We support the comment on page 31 of the REZNC that a cost benefit analysis can be useful during the REZ design phase. However, we stress the cost benefit analysis needs to have a wider remit that a regulatory investment test. We have first hand experience of the negative impact of taking a RIT approach to a REZ situation (Broken Hill in Australia).

Land rights should include easement corridors between the project and the REZ infrastructure – **to consider how this fits with offshore wind regime as implemented in NZ and customary rights**

REZ design should consider options such as a loop rather than linear only. **In an offshore context this may encourage shared infrastructure offshore as well as onshore**

From a generator's perspective we believe the consenting risk assessment is a key criteria as otherwise the other connecting generators end up bearing the consenting risk of other projects which had been anticipated to connect. **If offshore wind is contemplated in a REZ designing terminal stations for future expansion can help facilitate better outcomes**

Proposed project selection criteria

Criteria could include:

- Land secured
  (not started, in negotiation, secured)
- Stage in financing
  (none, in process, secured)
- Stage in design
  (concept, developed, detailed)
- Stakeholder engagement
  (not started, plan in place, in progress)
- Consenting
  (not started, in progress, secured)
- Network connection concept assessment
  (not started, in progress, complete)

Financing should take into account proponents who can finance on balance sheet so may not engage with lenders at an early stage. **This is very relevant in offshore wind where large global balance sheet players are very active.**

Our view is that network studies and connection design should be well advanced at the selection stage as this reduces the risk of re-design and allow the REZ infrastructure to be efficiently designed and delivered. **As highlighted, due to the development cycle of offshore wind designing a REZ to accommodate offshore wind coming into the REZ over time rather than just at the outset is a key feature of coastal REZs.**

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Q9. Do you agree with the proposed project criteria? Are there any that you would change or add? (2/2)

Our suggested additional project criteria for you to consider are set out below:

- Local content strategy, **which is very relevant for coastal REZs taking into account the scale of the offshore wind supply chain and the opportunity this presents for New Zealand**
- Iwi partnership strategy
- Community ownership
- Procurement and equipment supply
- Offtake arrangements – this is seen as a key feature in many of the REZ development processes especially if the connecting generator is not part of an integrated gentailer. In a NZ context where new generation is rapidly needed to address security of supply, thermal retirements and reduce prices you may not want to weight this criteria as highly as we have seen in other markets.
- Financial commitment including willingness to put up credit support/guarantees**. Due to the size of offshore wind projects and the scale of the development costs incurred it is not uncommon for commitments to be made during the development cycle in order to secure grid access rather than just at or close to FC.**
- Approach to collaboration with other generators, users and REZ infrastructure owners (ie Transpower/Lines Companies) – in some cases this has been judged on the level of participation and support that a generator has shown throughout the process
- Need for OIO approval and status

Q10. Do you agree with the challenges we have identified?

We have commented on the challenges identified below.

5.1 Access and Firm Capacity Rights
We consider that secondary movers to a new or upgraded GIP should pay the capacity related cost for the connection. Putting firm capacity rights into the mix appears too onerous given how long the TPM process has taken already.

5.2 Funding and cost recovery

We do not agree that statement on page 13 of the REZNC that "typically...developers are committed up front so that network investment is designed to the right size, and all costs are shared and recovered from the connecting generators'. In our view this is exactly the type of traditional thinking which has led regulators and other stakeholders globally to review how to better design and deliver shared infrastructure. There are many practical issues with the approach - such as how can you co-ordinate the development pathways of different projects. **This is very relevant to offshore wind and we have already highlighted the need to look to design a (coastal) REZ to accommodate offshore wind over time rather than upfront.**

We strongly recommend that New Zealand looks at supporting REZ development through anticipatory expenditure which is then recovered from subsequent connecting generator or users. This can be funded by TransPower (through new or existing debt facilities), agencies such as NZGIF (which would be performing a similar role to CEFC in Australia or GIB did in the UK) or the first mover.

In order to achieve the lowest system costs and taking into account the size and cost of offshore connections we recommend looking at options such as a separate offshore transmission entity such as used in the UK OFTO system or new models such as partnerships between Transpower, lines companies, iwi and the project owners.

5.3 Environmental approvals
We consider load and generation projects should be consented separately to the REZ transmission assets. For offshore REZ spur lines, it is better for the generator to lead the process. If a loop REZ transmission system is considered then Transpower should be considered.

Q11. What are some of the ways to overcome these challenges and who should be involved?

We have included in our response to Q10 some of the ways to overcome the first two challenges identified – access and firm capacity rights and funding and cost recovery. We would be happy to go into more detail with you on these issues.

Environmental approvals

In this submission we have included a number of suggestions which seek to address this challenge and we have highlighted some of our suggestions below:

- Iwi/hapu involve in initial design including go - no go decisions.
- Regional Reference Group concept from NSW with broad cross-section participation including local suppliers, energy users, unions, councils, key stakeholders such as fishing industry and other users of the marine environment.
- Mandatory co-ordination amongst developers in respect of community engagement. The feedback we have recently had from communities and councils in the Gippsland region of Victoria is that people wanting to be involved with consultations and community engagement are having to attend events 2-3 times every week. This is leading to engagement fatigue and in our view is not fair on local communities.
- Better use of digital platforms/VR so stakeholders can understand the impact of proposed projects including cumulative impact
- Acknowledging cumulative impact issue upfront and ensuring this is built into REZ design
- REZ design to include a focus on high value and enduring environmental benefits for the region – such as new biodiversity corridors, restoring habitat and creating wildlife/fauna sanctuaries (including marine environment)
- Emphasising the benefits upfront rather than as a response to community and stakeholder concerns – this is why we believe local employment/supplier mandates are so important to mitigate the approval challenges. A great example in practice was the Victoria desalination project which ensured that benefits were shared across the community – even to the level of not using just one local catering supplier for the construction workers but using as many different local suppliers on a rolling basis.

Q12. Do you see any other potential challenges that need to be considered? (1/2)

- **Timetable**

The interface between the transmission operator, whether this is Transpower or OFTO equivalent party, and the generator(s) is critical due to the possible liquidated damages the generator(s) may face in their PPAs for late delivery.

If you take the approach that all projects need to be ready to connect at the same time (as was inferred in the REZNC) we believe that REZ development in New Zealand will be slow and potential participants may even lose interest. **In the case of offshore wind it is very unlikely that you will be able to co-ordinate all the projects so you need to anticipate there will connection over time in order to reduce down the overall system costs.**

- **Regulatory interference or indifference**

Lack of clear political support – the recent intervention by the Commissioner of the Environment is a good case in point and doesn't encourage developers and investors to focus on New Zealand. It needs to be shown that NZ is supporting the rapid build out of new renewable capacity as evidenced by the work undertaken by Transpower on Net Zero Grid pathways and Te Mauri Hiko.

It is not clear to us that the Electricity Authority or the Commerce Commission are wholly on board with the REZ concept or understand the potential benefits to New Zealand of offshore wind, new large scale clean industrial clusters and fostering new demand. This is not uncommon in our experience as the principles which underpin a REZ are different than the fully liberalised market which has been espoused for the last 30 years. Incumbents may also be resistant to new entrants especially large scale developments such as offshore wind which can offer bulk power solutions to the market.

- **Failure to deliver local outcomes and lack of monitoring to assess whether or not commitments/intentions have been met**

While we and other developers have high hopes for delivering local outcomes the key to success is the delivery of these outcomes. The model adopted by the Australian Capital Territory was excellent – with strong obligations on developers to deliver local outcomes, frequent audits and mechanisms to deal with failures to deliver the contracted outcomes (such as cash contributions a fund administered by the ACT which was used to deliver local outcomes).

We recommend embedding within the NZ REZ concept the appropriate mechanisms to monitor the delivery of local outcomes and ensuring that there is regular auditing of the commitments made by developers/REZ transmission owners and operators.

Q12. Do you see any other potential challenges that need to be considered? (2/2)

- **Mobilisation of sufficient resources within Transpower and other key stakeholders**

In our experience transmission companies and regulatory bodies have under-estimated, often substantially, the resourcing required to deliver REZs (and the energy transition generally). The sheer volume of connection enquiries and EOI responses has, at times, overwhelmed the relevant teams.

The rapid growth of the teams managing the NSW Electricity Infrastructure Roadmap is an example of what can be required to deliver REZs across one State in Australia. The team has grown from literally 2 people when there was a Renewable Energy Advocate but no formal REZ concept of legislation to hundreds of people across multiple teams dealing with the different workstreams. We are not suggesting or advocating that NZ should take the same approach as NSW (which includes significant market intervention by the Government in transmission and procurement of generation and storage) but exercises of the magnitude of REZ design and implementation should not be viewed as an extension of the day job for a transmission company or the lines companies either.

- **Design of REZ infrastructure**

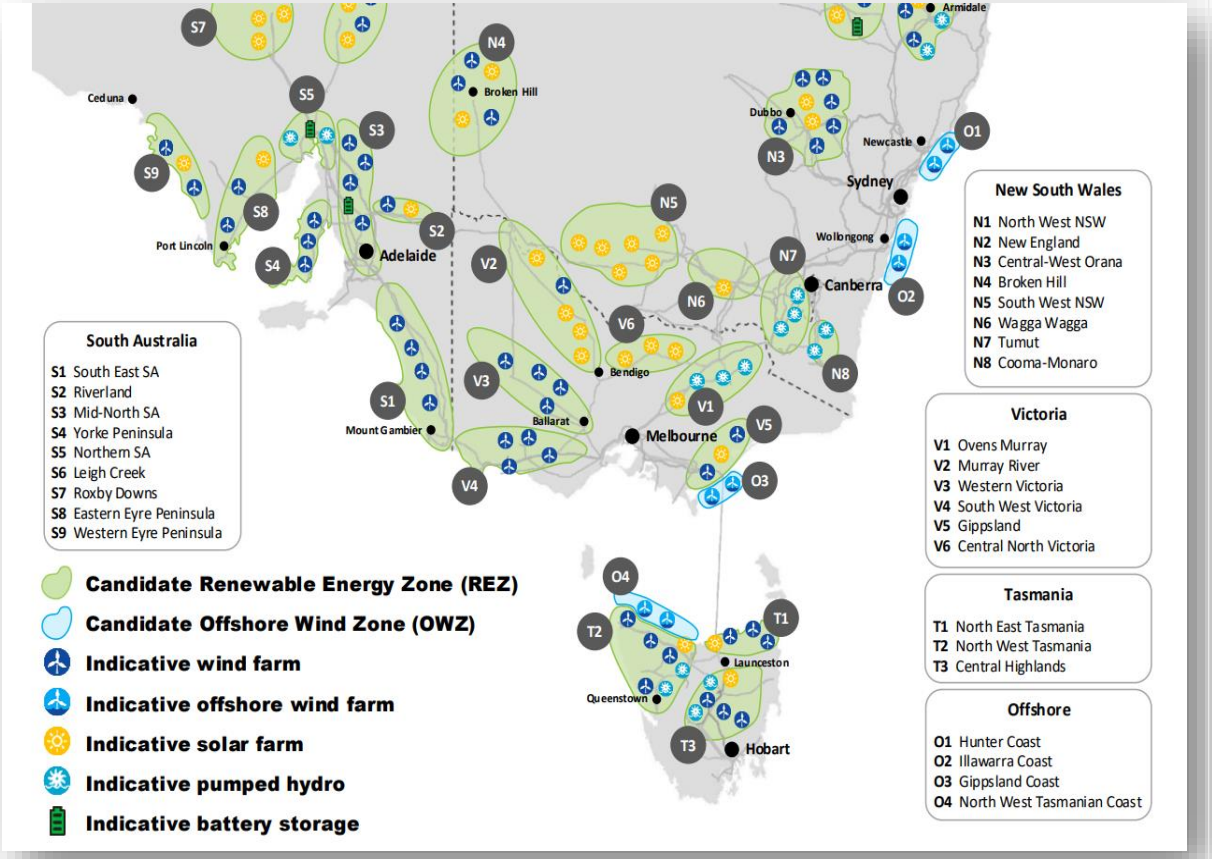
We have included a slide on the issue of *undergrounding of transmission lines*. We believe bringing a new concept to stakeholders like a REZ deserves to have sufficient attention on the design of the transmission infrastructure and assessment of the options such as undergrounding and new tower designs. This has recently become a critical issue in Australia and we recommend you carefully study the ongoing debate in Victoria with the Western Victorian Transmission Project (the first ISP Project) and the protests from the councils and communities.

The redesign of the Central West Orana REZ in NSW is another example of the issues being faced with design and insufficient engagement with stakeholders early in the design process. In our view, the new design which moves away from linear infrastructure to focus on building new infrastructure in areas with a lower social value due to the existing mining operations and reusing corridors is a good result for the stakeholders but came only after communities raised their material concerns.

This also applies to the design of towers and other infrastructure. Radical steps like wooden and guide structures and adopting the most innovative designs should be considered carefully in the design phase. We know that the many communities and individuals have very negative perceptions of transmission towers and the corridors required for transmission. Not everything can be designed like the waste to energy plant in Copenhagen with the integrated ski slope but doing nothing to address legitimate concerns is unlikely to speed up the development of REZs.

Examples from overseas of REZ concepts for offshore wind

Australia



The Integrated System Plan in Australia has moved quickly to take not account offshore wind potential in the REZ design.

The original ISP did not contemplate offshore wind REZs.

The potential significance of offshore wind to the transformation of the Australian energy system and decarbonisation/net zero goals has now been taken into account in the draft 2022 ISP with the candidate OW Zones following the passage of the Offshore Energy Infrastructure Bill and the work undertaken by the offshore wind industry and State Governments such as NSW and Victoria.

The potential to co-ordinate onshore REZs with offshore REZs into broader coastal REZ zones is now seen as a priority bearing in mind the early retirement of coal fired generation in the Hunter/Central Coast region of NSW and LaTrobe Valley in Victoria and the impending decommissioning of offshore oil and gas infrastructure in the Bass Strait.

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Germany - Netherlands

Hy3 – Large-scale Hydrogen Production from Offshore Wind to Decarbonise the Dutch and German Industry

Hy3 was announced in 2020 – before the latest EU annoucements and recent upsizing of offshore wind ambitions in Europe in response to energy price shock and energy security concerns. By working together Netherlands and Germany could repurpose existing under-utilised gas infrastructure in Netherlands and potential for storage in salt caverns to decarbonise energy supply and reduce costs for consumers by not developing standalone energy systems.

Hy3 seeks to build upon the existing offshore wind developments in the North Sea and move towards greater collaboration and integration of the onshore and offshore infrastructure.

The feasibility study released in March 2022 examined the Hy3 concept in detail. https://www.tno.nl/en/about-tno/news/2022/3/towards-dutch-german-hydrogen-value-chains-synergies-for-decarbonised-industry-and-mobility

In pursuit of 600% renewables

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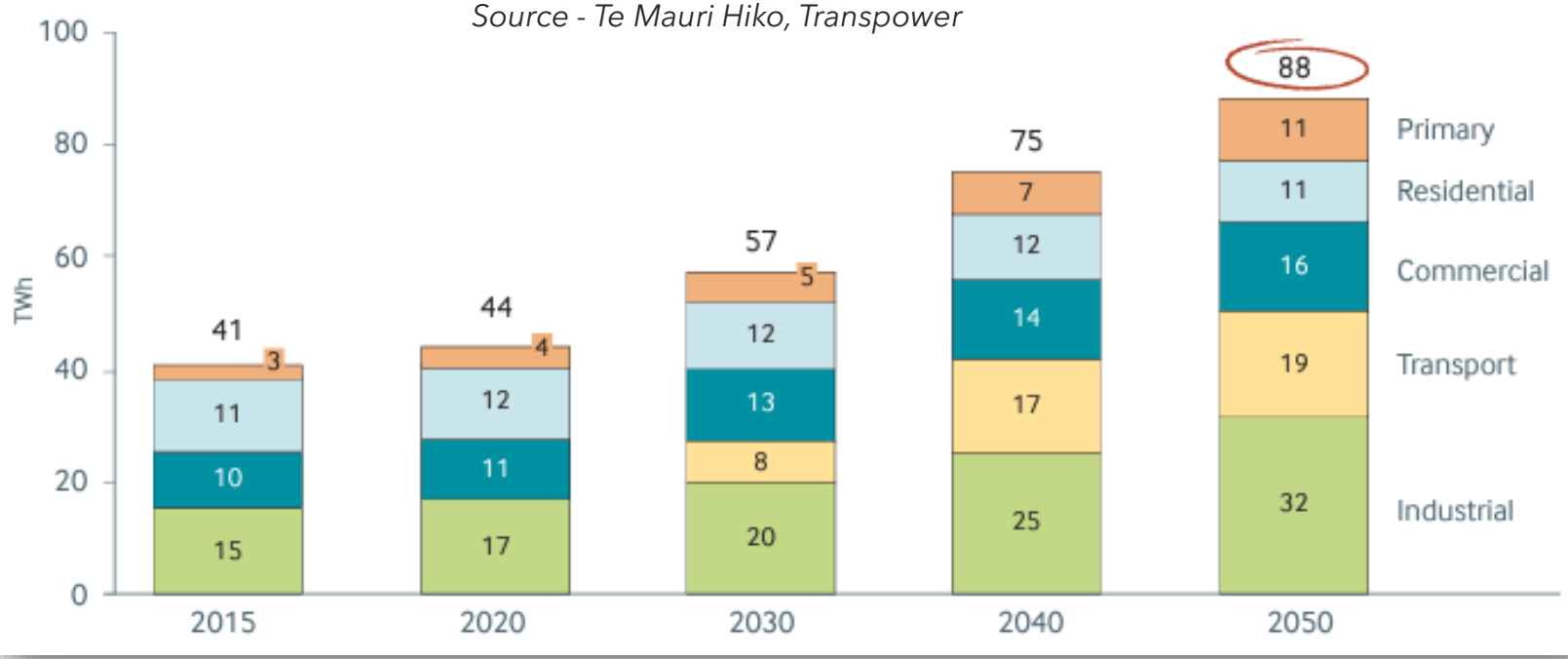
Te Mauri Hiko – The future of energy demand

New Zealand has world class offshore wind resources which complement existing and new hydro, geothermal and onshore wind and solar generation. Offshore wind can accelerate New Zealand's progress towards achieving its net zero target and support the decarbonisation of key industries such as transport and agriculture.

New Zealand will benefit from rapidly falling costs for offshore wind – **and remember** – in a global market it is the comparative cost of offshore wind which matters not whether offshore wind in New Zealand is cheaper than onshore wind or hydro.

Source - Te Mauri Hiko, Transpower



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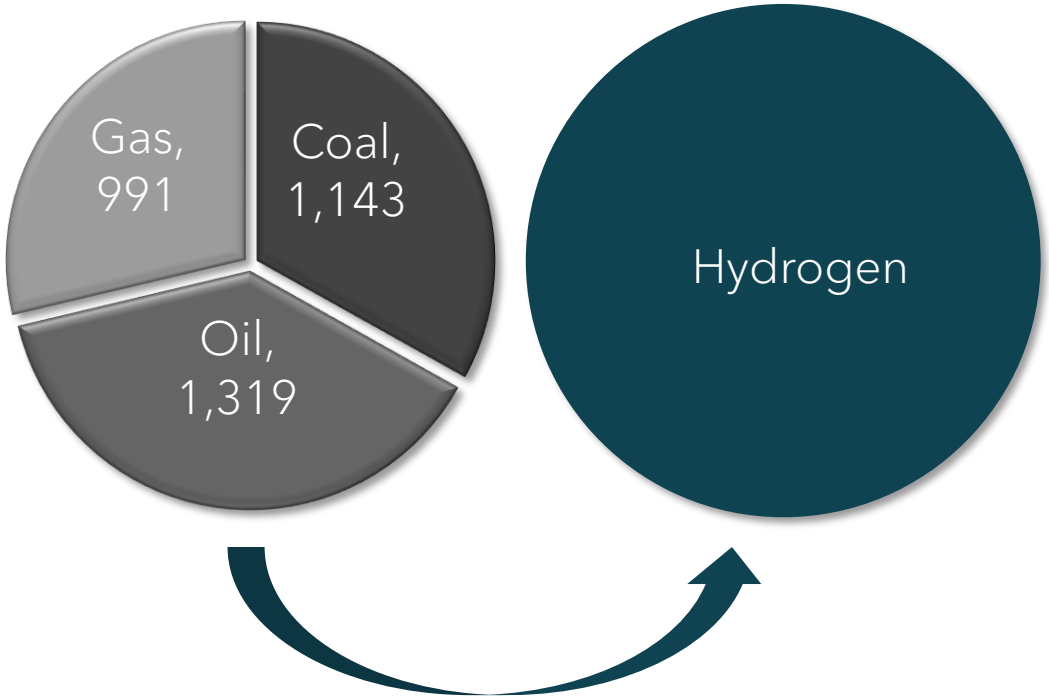
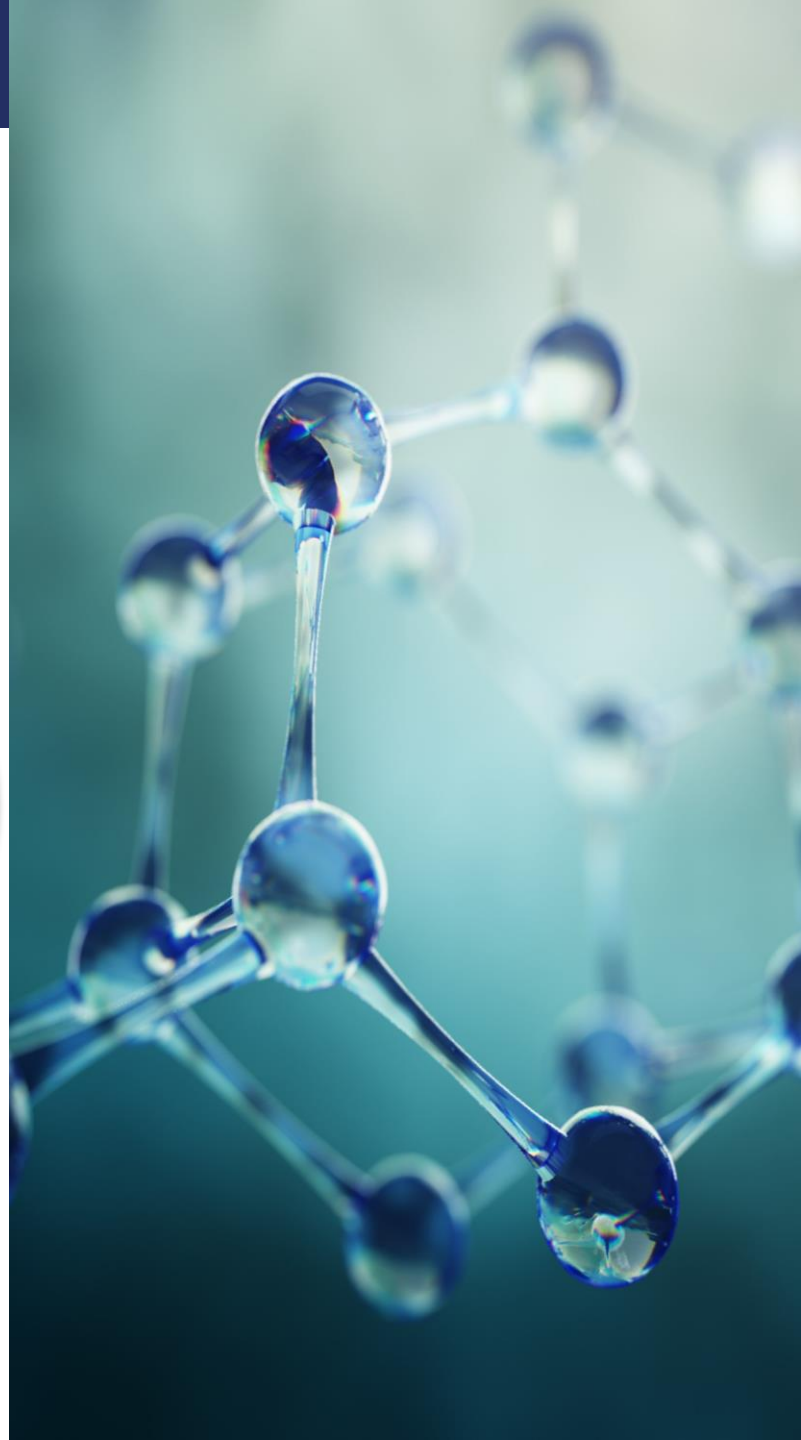
The scale of the challenge

2019 global fossil fuel production is 3,450 Mt/a hydrogen

2050 hydrogen replacement 3,450 Mt/a hydrogen



IEA



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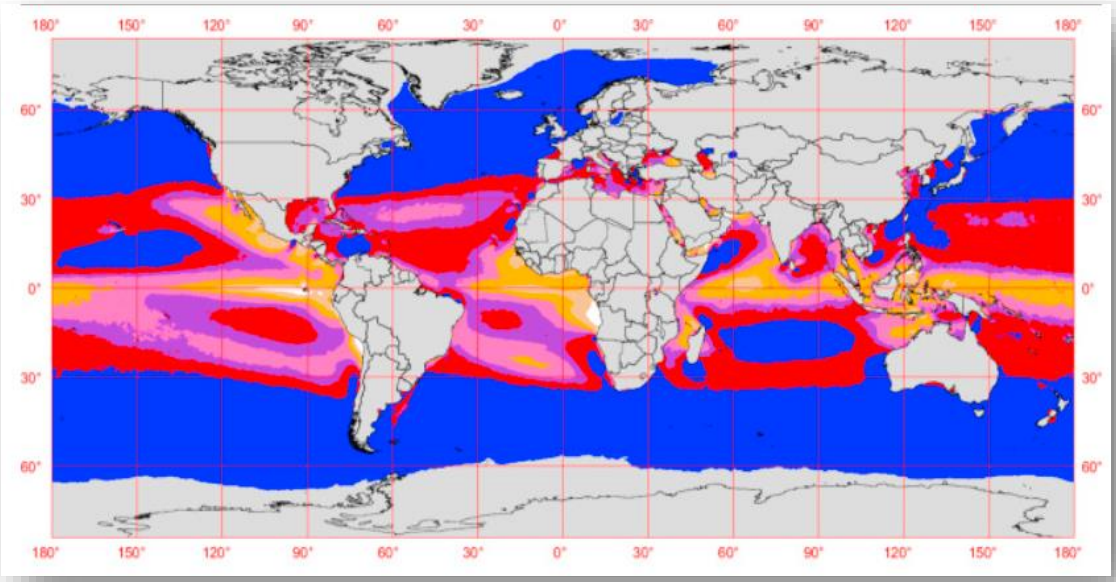
Globally significant wind resources and market



Global offshore wind stats:
6.1 GW installed in 2020
35 GW total installations by 2020
270 GW installations estimated by 2030

NZ context:
9GW electricity generation in NZ now (hydro, thermal, geothermal, wind)
6.5GW of wind generation needed by 2050 (Transpower)
2,000GW of technical potential for NZ offshore wind production (GWEC)

Wind power class	Resource potential	Wind power density (W/m^2)
1	Poor	0 - 100
2	Marginal	100 - 150
3	Fair	150 - 200
4	Good	200 - 250
5	Excellent	250 - 300
6	Outstanding	300 - 400
7	Superb	> 400

New Zealand has outstanding offshore wind resource potential

That creates a huge opportunity to become net zero positive and leading exporter of renewable energy

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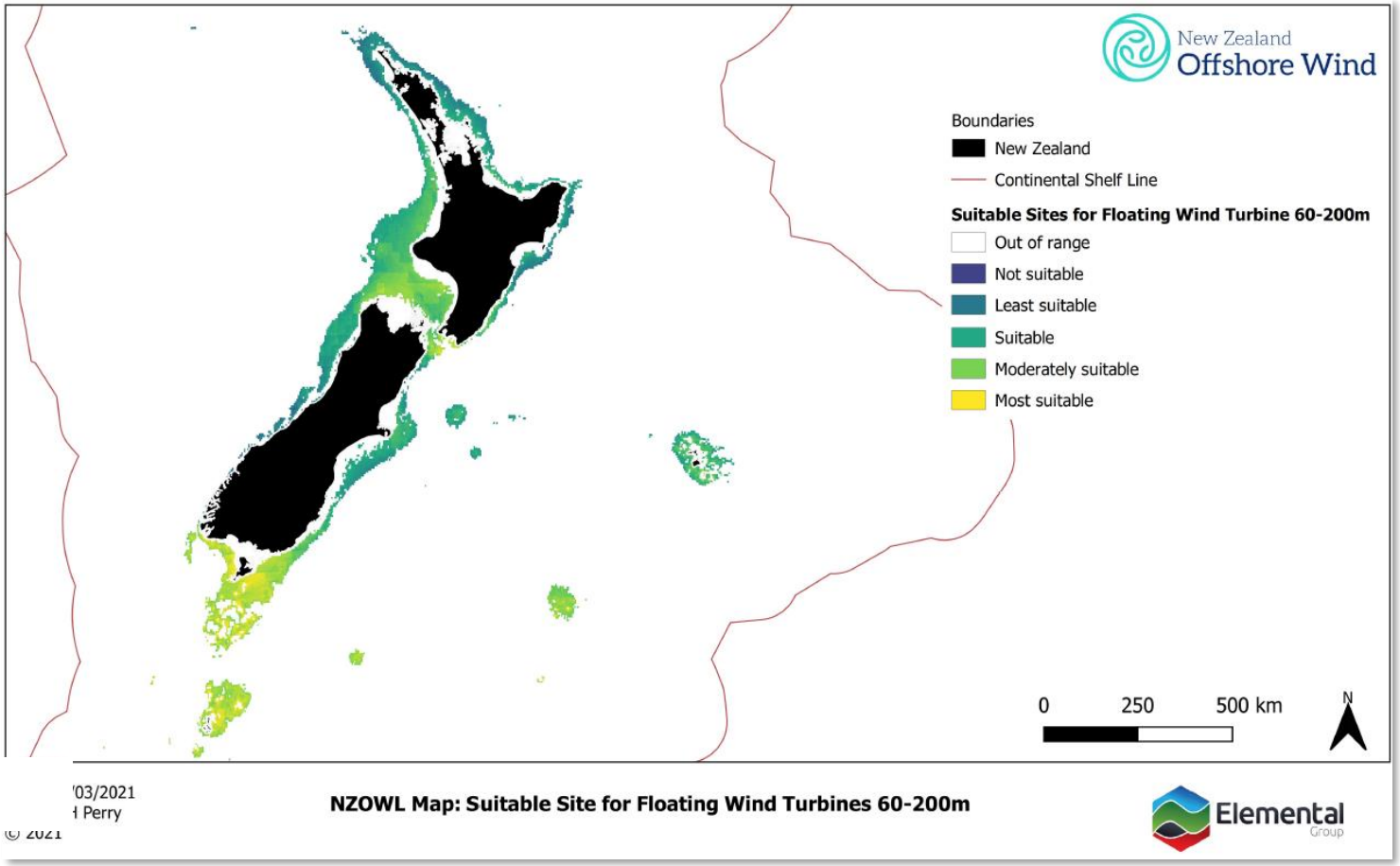
Where is the resource?



GWEC estimate - 2,000 GW technical potential of offshore wind resource
On an area basis - proven fixed turbines (22 GW) and proven floating to 200m (57 GW)
Proven energy – 79 GW

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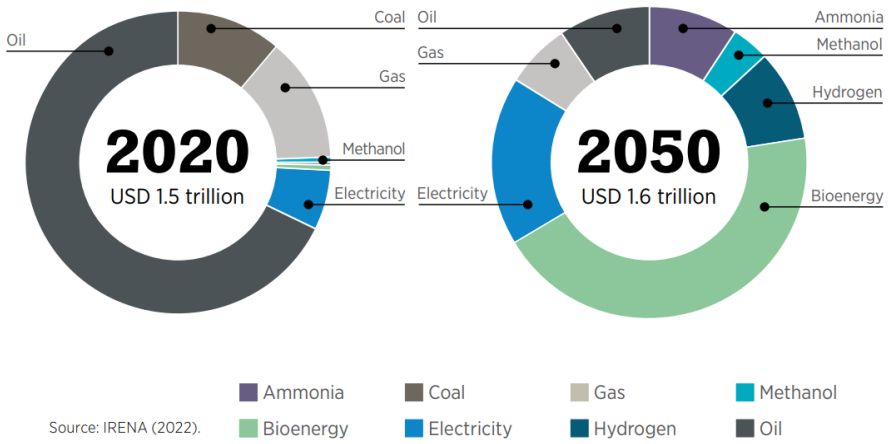
NZ Pure – the green gas export opportunity

Figure S.1 Shifts in the value of trade in energy commodities, 2020 to 2050



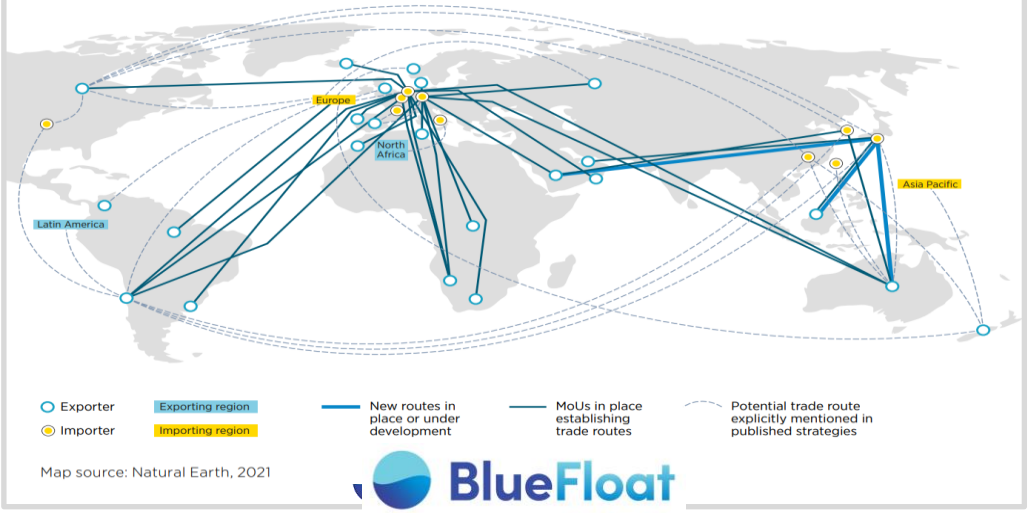
Source: IRENA (2022).

600% RE can displace 31 MT CO_2e /a

This is equivalent to 50 % of New Zealand's net emissions or 0.1% of global fossil fuel emissions

Potential to produce 3.3 million tonnes of hydrogen equivalent energy by 2050, a $10 billion per annum industry (or even more at today's prices)

Figure S.2 An expanding network of hydrogen trade routes, plans and agreements



Map source: Natural Earth, 2021

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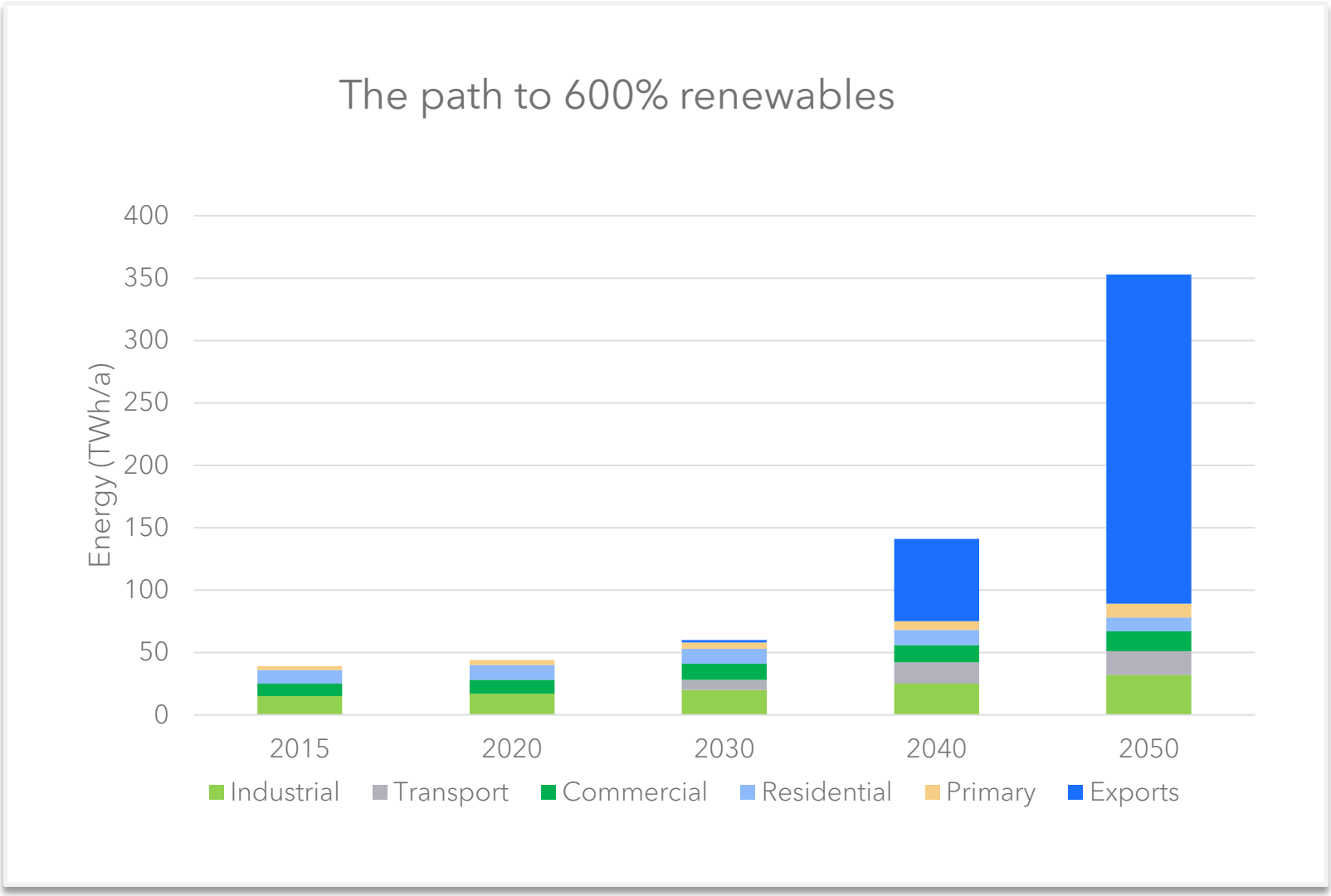
Our vision – taking it slowly



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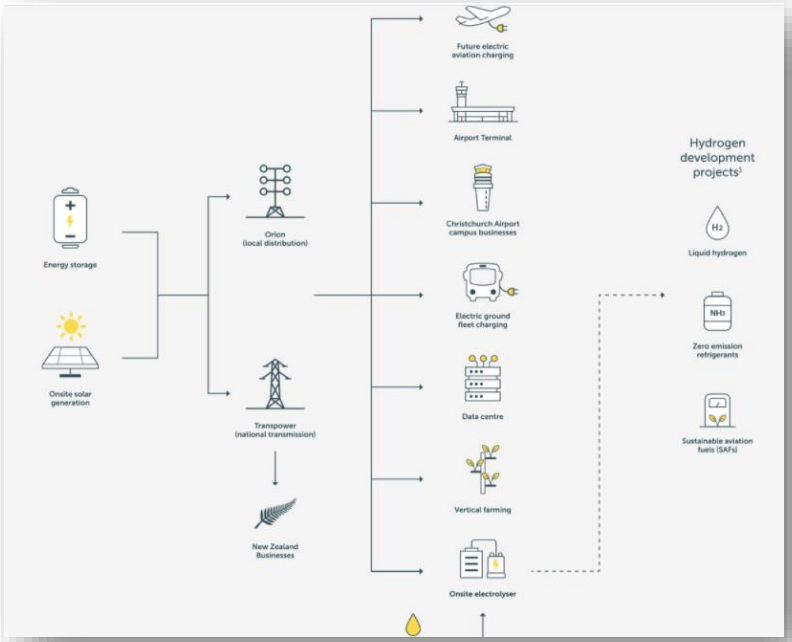
600% isn't just about exports – take a look at Kowhai Park

Solar Bay has committed a minimum of $100m to the first phase of the development of large scale solar generation at CIAL as part of a new clean industrial precinct which will serve the airport, create new industry and support the Canterbury region.

The long term plans include up to 500MW of solar PV, developing and owning new large scale wind generation in Canterbury region, on-site BESS and green hydrogen and e-fuels/SAF production and refuelling facilities. Potential large new energy users include data centres, Air NZ – electric and SAF, shipping, transport, fuel switching for dairy sector and other industry, LPG substitution with synthetic propane or butane. **Potential demand (deep decarbonisation) circa 4GW.**



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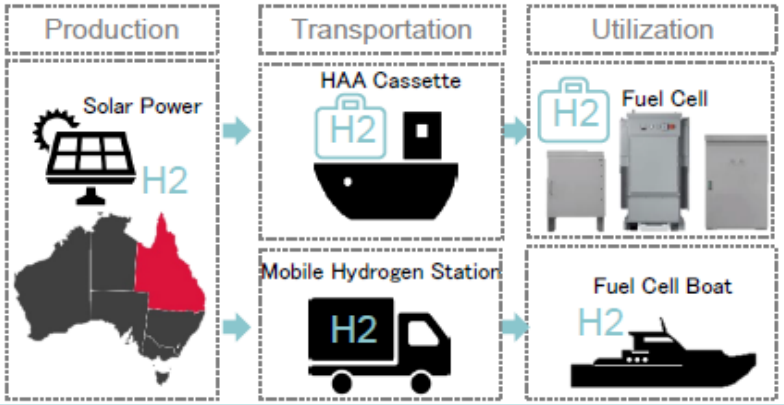
Pilot project for Green Hydrogen supply from Queensland to Palau

Sojitz will begin a demonstration project together with CS Energy and Nippon Engineering Consultants to transport renewable hydrogen produced by CS Energy in Queensland, Australia to Palau for utilization in fuel cells and hydrogen fuel cell vessels. The project has received subsidies from the Ministry of the Environment of Japan (MOEJ) under the "Pilot Project for Comprehensive Support Throughout the Whole Hydrogen Supply Chain Abroad.

1. Stationary Fuel cells
Transport hydrogen to Palau by Hydrogen Absorbing Alloy (HAA) cassette. In anticipation of a hydrogen-based society after 2030, demonstrations will be conducted with the aim of implementing stationary fuel cells to realize a distributed power supply and backup power sources.

2.Fuel Cell Boat
In anticipation of a hydrogen-based society after 2030, a demonstration will be conducted with the goal of converting marine fuel small boats to hydrogen fuel boats in the future. During the period for this project, demonstrations with hydrogen fuel boats will first be carried out off the coast of Queensland, Australia.



Outline of partner country / region

【Production: QLD, Australia】
The government of Japan and Australia have announced their commitment to the Japan-Australia Partnership on Decarbonization through Technology.

【Utilization: Palau & QLD】
There is currently a high dependence on fossil fuels for energy. As part of its efforts to shift towards decarbonization, Palau has committed to achieving a target of 45% renewable energy generation by 2025.

Prospects at commercialization (around 2030)

Expected GHG reduction: 9,131tCO2/y
Seek to achieve early commercialization of an economically efficient hydrogen supply chain that will extend to include neighboring Pacific Island countries.

1. Stationary Fuel cells
Palau has a poor power grid system, and there is a demand for the construction of a backup power system. At present, the country's main source of energy is independent power plants that rely on diesel fuel. Try to achieve decarbonization by implementing stationary fuel cells as a distributed power supply and a backup power source.

2. Fuel Cell Boat
Palau is an archipelago comprised of over 200 islands, where more than 1000 marine fuel small boats are in operation as part of island tourism, daily life, and the fishing industry. Try to achieve decarbonization by converting marine fuel small boats to hydrogen fuel boats.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