Orion

Application for innovation allowance to offset carbon emissions related to electricity lines services in a manner that will lower costs to customers

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Innovation Allowance Application June 2021

This is an application for an innovation project allowance as defined under the Electricity Distribution Services Input Methodologies Determination 2012, 20 May 2020. This application should satisfy the requirements of the DPP determination.

Introduction

This application is in service of Orion's purpose of 'Powering a cleaner and brighter future for our communities' and in support of our aspiration to be New Zealand's most advanced electricity network.

Our purpose and strategy are aspirational and go beyond provision of core regulatory services. As such we:

- want to keep the customer at the centre of what we do and be able to adapt and flex with their changing needs over time
- are required to and want to be an important player in meeting the country's low carbon objectives
- are being intentional around building a sustainable pipeline of talent
- need to remain financially sustainable and relevant while evolving

In the Determination, an "innovation project" means a project that is focussed on the creation, development, or application of a new or improved technology, process, or approach in respect of the provision of electricity lines services in New Zealand.

We confirm that the project which is the subject of this application is focussed on the creation, development, and application of a new approach to the provision of electricity lines service in New Zealand. We explain further below, however in summary our innovative project is to offset carbon emissions related to electricity lines services in a manner that will lower costs to customers. Our project will also mean that we can ensure that the negative climate impacts of delivering our service provision, and the activities that support that, can be mitigated by activities that our customers tell us they value and will directly benefit from.

This innovation allowance application is for the sum of $583,000. Some of this quantum has been spent already however the majority will be costs incurred over the next 4-5 years. We seek advance approval of the future costs. We note that this is Orion's first innovation allowance application and hence our application for $583,000, given no cumulative applications to date, does not exceed our total innovation project allowance for the DPP regulatory period – which is $825,000.

Project Background

Orion has set a target to reduce its group operational emissions (excluding distribution losses) by 50% from 2018 levels by 2030, a reduction of approximately 1500 tCO2e per annum, and by 80% by 2050. Orion has also announced it will offset remaining group emissions excluding distribution losses, with effect from June 2022. This will mean the group will be 'carbon neutral' in relation to its operational emissions for financial year 2022 and future years.

These Orion targets and activities have been set by Orion management and the Orion board as we believe that our customers today are supportive of Orion lowering emissions and being carbon neutral. We similarly believe that in the future – in the period 2030 to 2050 - our customers will remain strong, and probably be even stronger, in their desire for us to be carbon neutral. This belief is based on experience - every year the focus on sustainability and the environment by our community, and the expectation that businesses be sustainable and reduce and offset their carbon, grows.

Given a strong likelihood in the future that we will need to be carbon neutral, there is benefit to us adopting a strategic approach to carbon neutrality early, before the cost of becoming carbon neutral increases.

There is general commentator agreement that the price of offsetting, through either the purchase of offsetting units (for example compliant carbon units (NZU's) within the New Zealand emissions trading scheme (ETS)) or establishment of forest, native or otherwise, will increase with time.[1] Consequently, aside from being innovative amongst the electricity industry in announcing that Orion will have neutral corporate emissions by June 2022, we also have sought to develop and implement an innovative strategy toward achieving this.

By development and now implementation of an innovative offsetting strategy, we can reduce long-term costs to our customers and remove price uncertainty. In fact, we believe that our offsetting strategy will be net present value (NPV) positive for our customers. This means that even if regulation does not make carbon neutrality compulsory in the future, our customers will still benefit from lower costs.

To offset its emissions, Orion is pursuing a short and long-term approach. In the short term, international Verified Emissions Reduction units (VERs)[2] will be used to offset the period from 2022 to approximately 2030. At the same time, Orion is establishing native forestry to the value of $3.5 million in its network region, which will have reached sufficient maturity by around 2030 to sequester carbon units at least equivalent to Orion's operational emissions and potentially more.

In the long term, to allow for the risk of catastrophic events,[3] or Orion not being successful in reducing its operational emissions,[4] Orion has also purchased NZUs to the value of $1 million. These NZUs provide cover for our carbon neutrality claims in the period 2030 to 2050, or if such cover isn't required then these NZUs can be sold in the future, generating sufficient income forecast to cover the cost of the native forest establishment.

We are unaware of any other company in New Zealand adopting this strategic use of three mechanisms – VERs, forestry, and NZUs – to carbon offset. We believe it is an innovative portfolio approach that will lower ultimate costs to customers.

[1] By way of example, with respect to forestry, land availability and cost is likely to become an issue

[2] Verified emission reductions represent a reduction in greenhouse gas emissions (GHGs) from a project that is independently audited (i.e., verified) against a third-party certification standard. Each verified emission reduction represents one metric tonne of carbon dioxide equivalent emissions (tCO2e).

[3] Such as fire or pest damage to forestry

[4] For example due to unavailability of fit-for-purpose heavy duty electric vehicles

Environmental approach

Orion's project is to offset emissions related to electricity lines services. This project is part of our overall approach to reduce our operational environmental impact.

We believe we need to reduce our operational environmental impact for a variety of reasons, including:

1. Our communities, and therefore our customers, are becoming increasingly concerned about environmental impacts. We believe to maintain our social licence to operate we need to tangibly demonstrate that we care for the environment and are doing our part in the areas of carbon reduction and offsetting, sustainability and biodiversity.
2. There is a risk future government regulation will require electricity distributors to consider their environmental impact in their operations, particularly their operational carbon impact. By undertaking an innovative approach to offsetting our next 30 years of carbon now, as opposed to waiting for such regulation, we will ultimately deliver electricity lines services at a lower cost to consumers.
3. Our research indicates that our customers support using native forestry to offset our operational emissions
4. It is simply the right thing to do, given climate change and the loss of biodiversity, and it will deliver intergenerational benefits for the community we serve.

To reduce our operational environmental impact, we have implemented a number of actions:

a. We have set targets to reduce operational carbon emissions, excluding electrical losses, by 50% by 2030 and 80% by 2050 and we are currently developing programs to achieve these reductions.
b. We have announced we will be carbon neutral, for operational emissions excluding electrical losses, at a group level (Orion networks and our subsidiaries) from June 2022.
c. To achieve this operational carbon neutrality, we have approved an approximate $4.85m programme:
    i. Purchased and registered approximately $1 million of NZUs
    ii. Purchased and registered VERs at a cost of approximately $350,000
    iii. Plan to plant native forestry up to a cost of $3.5 million spread over the next five years

Our carbon offsetting programme amounts to a $4.85m investment. However, our application specifically relates to $1.17m of the cost related to the planting of native forestry. Further detail as to why we are not seeking, within our Innovation Allowance application, money spent on VERs and NZUs, and only 1/3rd of native planting costs is explained in the '*Orion's Project Costs*' section later in this application.

The Innovation Project allowance we seek is 50% of the $1.17m, namely $583,000.

Our native forest plantings are the part of the programme that will be used most to offset emissions post 2030 – as by then the trees will have grown sufficiently to be sequestering significant quantities of carbon. This matches a timeframe in which we think it is realistic to expect we will be required by the community, government or regulators to be carbon neutral.

Our offsetting strategy explained

We have developed our innovative offsetting strategy bearing in mind a number of risk factors, what is and isn't allowed in order to claim neutrality, future price forecasts for NZUs and potential availability and price of VERs.

We refer to *adaptation* and *mitigation* in our approach, these are defined terms:

1. **Mitigation** is about reducing greenhouse gas emissions and enhancing forests and other *sinks* to remove greenhouse gases from the atmosphere.

2. **Adaptation** involves taking action to avoid, withstand or benefit from current and projected climate changes and their impacts. Adaptation is in response to external impacts or pressures and in the context of climate change, these can be both physical and transitional.

We endeavour to step through our offsetting strategy below.

1. There are three recognised steps to achieve carbon neutrality. These steps are:
    a) *Measure* the businesses carbon emissions
    b) *Reduce* emissions as much as possible
    c) *Offset* the remaining emissions that are unable to be removed from operations

2. Orion has measured its carbon emissions and set a carbon reduction goal. We therefore have a start point for our journey and an idea of what our eventual 'residual' emissions will be. Orion has chosen to exclude emissions associated with distribution losses from its reduction target and offset plans, this is because:
    a. The emissions factor associated with losses directly reflects the generation mix of New Zealand as a whole. As we move towards 100% renewable electricity generation, we expect emissions associated with electricity losses to drop.[5]
    b. Emissions associated with distribution losses are accounted for at the time the electricity that travels along the lines is generated. Generators are a 'point of obligation' under the ETS. Additional offsetting would be double counting the 'offset' that is required.
    c. We have limited control over distribution losses and determined it inappropriate to add offsetting these emissions as a cost to our operations.

3. It is important to recognise emission reduction efforts as both a key adaptation risk treatment, in addition to an important mitigation effort we can undertake to improve social license to operate. Emissions sources in our operations represent an ongoing and increasing risk, both in terms of supply and in terms of increasing operating costs. Any steps to reduce these emissions will save our customers operating costs in the long term.

4. Emissions measurement, management and offsetting at Orion are run through the external specialist 'Toitu'. This provides external verification that emissions are measured to ISO 140064 standard and any units sequestered or surrendered are sufficient to justify the claims that Orion will make about its carbon neutral stance. This also ensures that Orion's approach is in line with Ministry for the Environment guidance about voluntary measurement and offsetting.

[5] The New Zealand emissions factor for electricity is a coefficient reflecting emissions associated with the generation of electricity for New Zealand as a whole. As fewer fossil fuels are used to generate our electricity, the emissions factor drops, as do the emissions associated with electricity used in operations or lost as it travels along our lines.

5. Our offsetting strategy can be split into two approximate time periods:
    a. 2022 to around 2030 'establishment period'
    b. Around 2030 to 2050 (and beyond) 'sequestration period'

6. The establishment period required a lowest cost approach to offset our operational emissions, while reduction projects are set in motion and native forestry is established. During the establishment period:
    a. The 28,000 offshore verified reduction units (VERs) that we have purchased will be progressively surrendered to be carbon neutral each year. The amount surrendered each year will depend on our carbon emissions that year. 28,000 VERs has been calculated as the amount of VERs required to ensure we can be carbon neutral from FY22 to around FY30, with some headroom built into the number purchased, to allow for the possibility of failure to meet reduction targets.[6]
    b. We will establish our native forest. We are presently establishing relationships with landowners with a view to planting, or encouraging regeneration, of approximately 250ha of native forestry planting. This planting will naturally take time to grow, and hence it is only by around 2030 that the native forest itself will be of sufficient size to sequester enough carbon on an annual basis, to allow Orion to use it to be carbon neutral in each year.

7. The sequestration period – which is broadly from 2030 onwards - has been calculated to ensure Orion group can offset its operational emissions without further cost beyond our initial $4.85m budget.
    a. Native forestry planted during the establishment period, will have reached sufficient maturity to offset the Orion group operational emissions each year through to at least 2050.

        However, the offsets from the forest are anticipated to exceed the amounts required for Orion to claim carbon neutrality over time. This is because forest sequestration will increase and then plateau[7] at relatively high levels, whilst operational emissions reduce over time. In effect the supply of offsets increases (and then plateaus at a high level) whilst the demand for offsets by Orion decreases.

        This creates an increasing bank of permanent forest NZUs that are forecast to carry an increasing market value.

    b. The 27,063 New Zealand Emission Units (NZUs) purchased will provide a hedge during the sequestration period against our carbon reduction targets not being met or sequestration through native forests being less than anticipated, through say fire or pest.

        If the reasons to have this hedge do not transpire (e.g. we achieve our carbon reduction targets and there is no fire) then the NZUs purchased, and the excess NZUs generated from our planting program as discussed at a. above, can be sold in

[6] VERs are able to be used by organisations to claim carbon neutrality unless they are 'point of obligation' emitters under the New Zealand Emission Trading Scheme (ETS). Orion is not a point of obligation except in regard to our SF6 gas losses. It is important to note that VERs do not fall under the NZ ETS, and therefore there is a long term risk that they may not be able to be used to claim neutrality in New Zealand. The likelihood of policies around VERs changing means that Orion did not believe it sensible to purchase VERs to offset emissions post 2030, despite their substantially cheaper cost, as such purchases could prove worthless and be a cost to our customers. We believe spending $350,000 on VERs was a prudent balance between benefit, risk and cost.

[7] Native forest growth peaks at approximately 18 years after planting, and then native forest grows at a steady rate for a number of years before growth begins to slowly tail off. Native forest continues to sequester carbon, albeit at low rates, for up to 300 years.

the future. These NZUs can then be sold to the market thereby recovering, we believe completely, the original $4.85m spent given the forecasts for increasing NZU prices.

8. There are therefore potentially two sources of increasing commercial value to Orion and its customers:
    a. Surplus purchased NZUs
    b. Surplus sequestered NZUs
9. In addition to commercial value, Orion is also generating social and environmental value through its offsetting approach:
    a. Biodiversity impact through the regeneration of native forestry on previously degraded farmland
    b. Social impact through creation of a natural community resource – ability to ensure public access to the native forest is an important requirement of any offsetting land partnerships
    c. Cultural impact through regeneration of local Runanga ancestral land.

How Orion's project meets the innovation allowance purpose

Customer Sentiment

Orion's approach is that that true climate adaptation is customer-centric and our network must adapt to the future requirements of customers, while accommodating changes in our operating environment. For this to occur, customers must be actively involved in identifying adaptation pathways that meet their needs. To this end, Orion regularly engages with its customers, to assess what they expect from us. Customer sentiment supports investment in a forestry offsetting strategy and the intergenerational nature of native forestry is particularly appealing.

In 2019, Orion ran a series of customer workshops to identify the material sustainability topics that customers thought Orion should address in its operations. A common theme that occurred in discussion about what the sustainable development goal (SDG) *responsibility consumption and production* meant, was that Orion had a 'product stewardship' role in the carbon footprint of the electricity it carried and delivered to its customers.[8] If we look to use this as a guide for behaviour, Orion can interpret this community belief as an indication that we should be responsible to ensure the emissions associated with operating the electricity network should be minimised and/or offset. Achievement of this in a visible and engaging way would mean delivering on customer expectations, increasing social license. We could therefore anticipate that community tolerance for electricity works and demand management activities in the future would be improved.[9]

We also engaged with our Customer Advisory Panel [10]on the same topic. As they were better informed generally about the role of a distributor, the 'responsibility' issue was not framed in the same way, but what was clear was that our customers were grappling with how to adapt to increasing regulation, inequality and a shifting environment. Ensuring that the electricity they rely on is delivered in the most carbon-neutral way was perceived as one way to assist with that difficulty and improve the overall service we provide for them.[11] Equally, our Major Customers were asked about their priorities, with similar answers – climate action ranked in the top two priorities for participants.[12]

Although we were unable to carry out in-person customer workshops in 2020, we did carry out a telephone survey to assess whether a native forestry offsetting strategy would be positively received by our customers. 75% of respondents were positive about Orion using native forestry to offset its operational emissions.[13]

The general theme of customer consultations was that Orion would be perceived as improving its service, if it ensured that the electricity it delivered was done with the smallest carbon footprint possible.

[8] The sustainable development goal 'responsible consumption and production' consistently ranked in the top 5 topics for importance to workshop groups and top 3 goals for the ability of Orion to influence

[9] The UMR report from the workshop series is provided at Appendix 2, part 1

[10] The panel includes representatives from those vulnerable in our community, iwi, health, energy retailer, business, local government and farming

[11] The summary of the CAP discussion board is attached at Appendix 2, part 2

[12] The results of the major customer survey are attached at Appendix 2, part 3, question 4 shows the climate action priority.

[13] The responses to this survey are attached at Appendix 2, part 4, the native forestry question is covered at page 6.

The business case for an innovative approach

Given the above customer feedback we believe that our customers today support our efforts to reduce and offset our emissions. However, even if one was to consider the above as not yet enough evidence of this customer desire, it is beyond question that community/customer focus on the environment is ever increasing, backed by increasing scientific urgency around action.[14]

Thus, even if one didn't believe it is quite there today, there is a strong likelihood that our future customers – say by 2030 or before – will want and expect Orion to be carbon neutral.

Similarly, a certain percentage likelihood must be put on the possibility that regulations will change in the future regarding significant sized corporates and/or distributors being carbon neutral.

Therefore, in the similar way that Orion and other distributors invest in assets to lower reliability and resiliency risks, Orion has looked at how it can invest early to lower the risk/cost of future neutrality demands.

By getting in early, and being innovative, we believe we have lowered future costs to customers.

To determine if our approach would lower costs to customers, we engaged a leading accountancy firm to model our innovative and proactive approach (early mover[15]) versus the alternative of doing nothing now and waiting to see what happens in the future (slow follower). These approaches, and the financial costs of each of them, are discussed below.

Slow follower- Wait until later

The slow follower approach was modelled as a scenario where Orion purchases NZUs to offset its operational greenhouse gas emission in the year they occur from 2030 to 2050. 2030 was chosen as the year to begin this approach as by 2030 we believe there is a strong chance that Orion will be required/expected to be carbon neutral.

A summary of how the estimated cost (in NPV terms) to our customers, of this approach, was calculated is:

Scenario inputs	Input source	Scenario outputs
Estimated annual operational carbon emissions (tCO_2e)	Provided by Orion based on forecasts of declining carbon footprint over time	• Cost per annum from 2030 to 2050 of purchasing NZUs in each year to offset that year's operational emissions • NPV of the above NZU purchases from 2030 to 2050
Forecast carbon price (NZD per tCO_2e) – i.e. forecast price of NZU's	From the NZ Climate Commission's Draft Advice of where minimum NZU pricing would need to be to reach NZ carbon targets	
Orion's weighted average cost of capital	Provided by Orion	

[14] https://climateactiontracker.org/countries/new-zealand/; https://environment.govt.nz/assets/Publications/Files/environment-aotearoa-2019.pdf, page 9

[15] This description should not be interpreted as investing too early given that we are in a 'climate emergency'.

Based on an approach of offsetting our annual emissions in each year from 2030 to 2050, via purchasing NZUs in each respective year, the NPV cost to our customers of Orion achieving carbon neutrality from 2030 to 2050 is estimated at approximately $1.8m.

Recognising there is a risk, no matter how small or big, that there may be no requirement for Orion to offset in the future from either our customers or government/regulators, this $1.8m needs to then be weighted according to that risk to estimate the true cost of a slow follower approach.

For instance, if there is only a 50% chance of Orion being required to be carbon neutral, the cost to customers of a slow follower approach is estimated at 50%*$1.8m, or $0.9m. If though, there is a 75% chance of Orion being required to be carbon neutral, the cost to customers of a slow follower approach is estimated at $1.4m.

Early mover- Innovative and early approach

Orion's early mover approach to achieving carbon neutrality has already been discussed. A summary of how the cost (in NPV terms) to our customers, of this innovative approach, was calculated is:

Scenario inputs	Input source	Scenario outputs
Estimated annual operational carbon emissions (tCO_2e)	Provided by Orion based on forecasts of declining carbon footprint over time	• Initial costs of purchasing VERs and NZUs and planting forestry • annual income generated from the sale of surplus NZU's generated from own forest once that years emissions are covered • Income from the sale of any remaining NZUs in 2050 • NPV of the above NZU purchases/sales from 2022 to 2050
Estimated cost of native tree planting activities	Provided by Orion based on various consultant's advice	
Estimated carbon sequestration from native tree planting activities	Based on government carbon sequestration tables	
Current Orion holdings of VERs and NZUs	Provided by Orion	
Forecast carbon price (NZD per tCO_2e) – i.e. forecast price of NZU's	From the NZ Climate Commission's Draft Advice of where minimum NZU pricing would need to be to reach NZ carbon targets	
Orion's weighted average cost of capital	Provided by Orion	

Our innovative approach to achieving carbon neutrality from 2022 to 2050 is estimated to have a cost to our customers of approximately -$0.7m. Or in other words, it is estimated to be NPV positive to our customers so actually is not a cost but rather a potential income source.

This is due to the previously explained scenario of Orion being able to sell in the future excess NZUs generated (i.e. our ability to sell our supply of NZU's that exceed our demand for NZUs to be able to claim carbon neutrality). These NZUs will likely be sold to the market at a significantly greater value than their value today, thereby recovering, we believe completely, the original $4.85m spent on our offsetting programme.

Cost to customers- sensitivity comparison

The following table shows the benefit to our customers in financial terms only (excluding ecosystem value which is discussed in the next section) of our early mover approach.

	Assumed chance of carbon neutrality being required by 2030		
	20%	50%	80%
NPV of early mover approach	$0.7m	$0.7m	$0.7m
NPV of slow follower approach	-$0.4m	-$0.9m	-$1.4m
Benefit to customers of Orion's approach	**$1.0m**	**$1.6m**	**$2.1m**

In addition, we have performed sensitivity analysis on the calculations. The summary results of which are shown below.

	Benefit to customers of Orion's early mover approach		
	20% chance of carbon neutrality being required by 2030	50% chance of carbon neutrality being required by 2030	80% chance of carbon neutrality being required by 2030
Targeted reduction in operational emissions not achieved by a factor of half the target (i.e. Orion only manages to achieve a 25%, rather than 50% reduction by 2030, and 40%, rather than 80% reduction by 2050)	-$0.4m	$0.6m	$1.6m
Minimum NZU pricing used in base case reduced by 20%	$0.2m	$0.6m	$1.0m
Minimum NZU pricing used in base case increased by 20%	$1.9m	$2.5m	$3.2m

The above sensitivity analysis strongly suggests that our current innovative approach to offsetting carbon emissions will result in lower long-term costs to our customers.

It should also be noted that the above analysis of the net benefit to customers of Orion's innovative approach is considered conservative due to the following factors:

1) To determine the NPV of the slow follower approach, carbon neutrality was only assumed to occur post 2030. This differed to the calculations in regard to our early mover approach where carbon neutrality occurred from FY22.

   If Orion had assumed that our customers wanted Orion to be carbon neutral from 2022 – an assumption that wouldn't be unrealistic given the customer consultation to date – then the net benefit to customers of our innovative approach would be even greater than that shown in the tables.

2) Our financial analysis excludes ecosystem service value, which is discussed in the next section

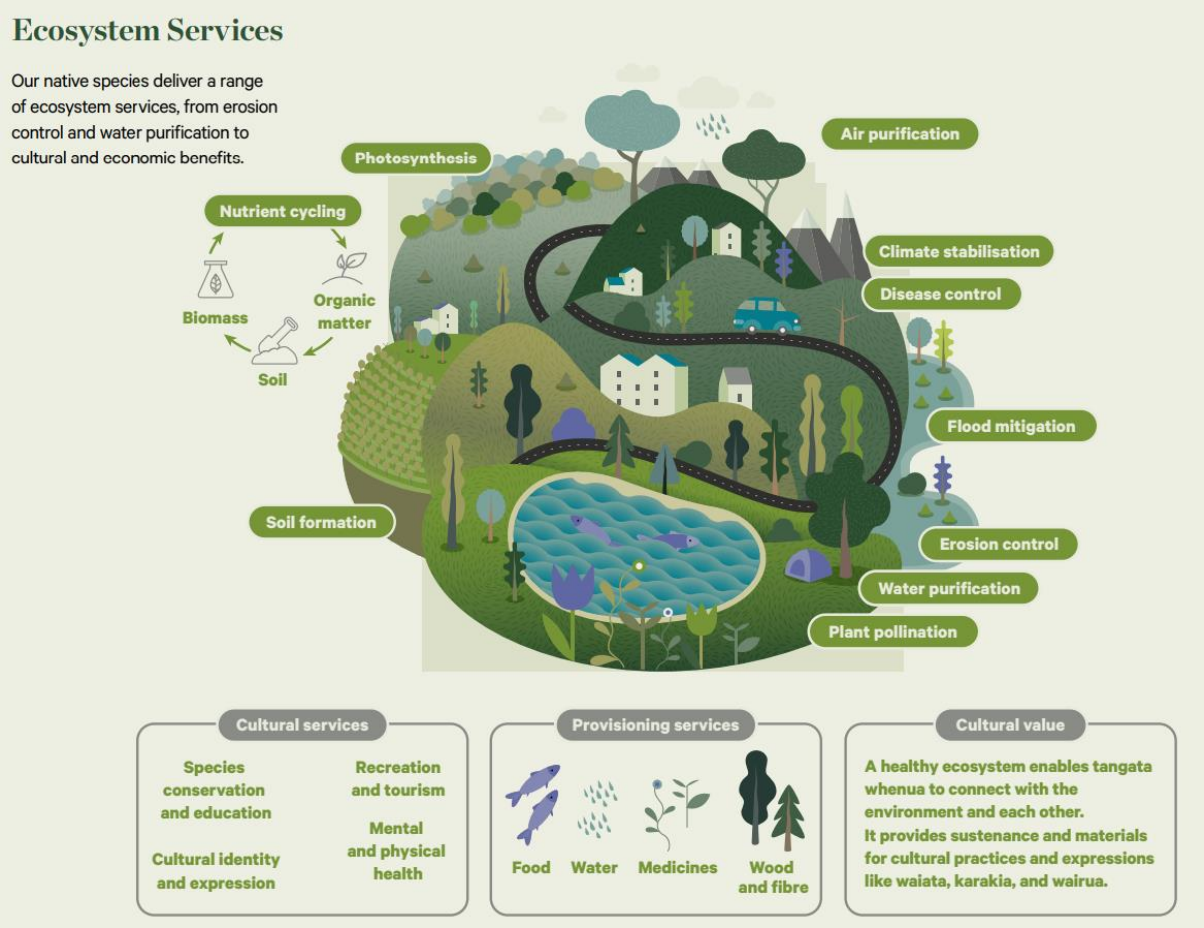
Ecosystem services value – biodiversity and cultural/social

Nature has a value in its own right and functioning natural systems provide many benefits to the organisms (including people) that inhabit them.

The benefits ecosystems bring to human wellbeing and the wellbeing of other species and ecosystems are known as 'ecosystem services' and fall into four main categories:

- Supporting (e.g. nutrient cycling, soil formation, primary production)
- Provisioning (e.g. food, fresh water, wood, fibre, fuel)
- Regulating (e.g. climate regulation, flood and disease regulation, water purification)
- Cultural (aesthetic, spiritual, educational, recreational)[16]

The following diagram produced by the Aotearoa Circle shows these ecosystem services, how they relate to biodiversity and bring value to our community.



Our community gain wellbeing through connection, engagement and experience of a thriving natural environment. The Aotearoa Circle report on biodiversity notes that

> *The native biodiversity of New Zealand is also fundamental to Māori culture, as nature and people are entwined through whakapapa (genealogy), te reo (the Māori language), tikanga (custom), toi (the arts), kai (food), rongoā (medicines) and taha wairua (spirituality). The loss*

[16] Millennium Ecosystem Assessment 2005

> *of biodiversity and the growing distance between the people and what biodiversity remains are undermining relationships, responsibilities and practices (Waitangi Tribunal 2011).*

High levels of biodiversity support ecosystem functions and resilience, improving the ability of ecosystem services to be maintained despite disturbance and change. Loss of biodiversity has a negative impact on ecosystem stability and recovery and can result in resource collapse.

Globally, perceptions and language around the value of biodiversity tend to change through time and also vary between cultures and economic sectors. However, some principles remain consistent and uncontested. For instance, it is widely accepted, including in Aotearoa, that people's wellbeing depends on the health of the natural environment around them. This aligns with the Māori view that people are not separate from nature. The recent UK government report, the *Dasgupta review* on the economics of biodiversity provides a significant warning about the consequences of continuing to ignore our natural capital in planning for our future.[17]

New Zealand's farming, forestry and horticulture sectors typically rely on non-native species, but native biodiversity contributes to their success through ecosystem services such as clean water, nutrient cycling and pollination.

Orion is at the beginning of its land partnership journey, so the quantified value of improving biodiversity and ecosystem services through native forestry on a particular land area is not yet available. However, some earlier work has been carried out in New Zealand on the value of ecosystem services to an area that provides an illustration of the type of value that can be created.

Research in the Ohiwa catchment found that ecosystem services provided through establishment of native forest create more overall value than other land uses, such as exotic (non-native) forest, dairy or dry land pastoral farming and estimated the total value of ecosystem services per hectare for native forestry at $6,607.[18]

Orion intends to establish at least 200 hectares of native forestry on previous degraded or marginal farmland, equating to an ecoservices systems value in the region of $1,300,000 based on the Ohiwa research. This ecosystems value has not been included in our NPV calculations given the infancy of research into ecosystem valuation. If it had our offsetting approach would have shown even lower costs to our customer's long term.

Scalability

Orion's approach to addressing our obligations and contributions to carbon neutrality can be socialised, partnered or co-invested with other electricity distributors and community businesses.

Even though we have not yet publicised widely across electricity distributors our offsetting project, word is beginning to get around and we expect interest in our approach from other electricity distributors. Powerco has already invited Orion to come and talk to them about our approach. Orion also intends to talk to and share our knowledge and experience on this with other electricity distributors.

We are very open to partnering with other electricity distributors on this project to lower costs to their and our customers, and to share resource and lower project risk. For instance, one of the risks with forestry is fire. If land parcels where forestry is grown are split across network boundaries, and shared between two or more networks for offsetting, then risk will be split.

[17] Gov UK - Dasgupta Review - Headline Messages
[18] The Aotearoa Circle, Native Forests Report, page 7

Conclusion

We believe that Orion achieving carbon neutrality:

- is wanted by our customers now given the customer sentiment we have received. In addition, customers lagging in their sentiment will soon catch up given National focus on climate change e.g. by 2030.
- can be delivered at lower long-term cost to our customers by implementation of an innovative and early approach - being an early mover
- delivers a higher quality of supply to our customers as our customers place a value on electricity being as "green" as possible
- can be socialised, partnered or co-invested with other electricity distributors

Given the above we apply for an Innovation Allowance on the basis that our innovative approach to achieving carbon neutrality meets the purpose of *"delivering electricity lines services at a lower cost to consumers and at a higher quality of supply to consumers"* as per Schedule 5.3 of the Electricity Distribution Services Default Price-Quality Path Determination 2020.

Orion's Project Costs

As previously mentioned, Orion has incurred, or will incur, the following costs on this project:

i. Purchased and registered approximately $1 million of NZU's

ii. Purchased and registered approximately $350,000 of Verified Emission Reduction units (VER's).

iii. Plans to plant native forestry up to a cost of $3.5 million spread over the next five years. To date consultant costs incurred have totalled $36,114.

However, in respect of these costs and the application we are making, three factors are very relevant:

a) The VER's will be used to achieve carbon neutrality for the period 2022 to approximately 2030.

It is arguable as to whether we have a clear mandate from customers to be carbon neutral before 2030 – but we strongly believe we will have such mandate, either from customers or government/regulators, by 2030.

Consequently, given the uncertainty of our current consumer mandate, the cost to purchase the VER's to achieve carbon neutrality before 2030 is not included as part of this application.

b) The $1m of purchased NZU's may or may not be needed to achieve carbon neutrality beyond 2030. This entirely depends on such factors as whether Orion will be successful in reducing its operational carbon footprint in line with the targets it has set, and the success of its native forestry planting program.

As both these factors are broadly within the control of Orion management, we are not including these $1m of NZU costs as part of our application.

c) Orion has established its carbon neutrality targets across its group – which includes its contracting subsidiary Connetics. Broadly the ratio split of Orion's carbon footprint to Connetics carbon footprint is 1:2. Therefore of the $3.5m budget for native forestry within this project, only 1/3rd should be apportioned to the cost of Orion's regulated business seeking carbon neutrality post 2030.

Consequently, the project costs which are relevant to this application is the amount of $1.17m (being 1/3rd of $3.5m). Less the 50% Orion contribution, the final value of our application for Innovation Allowance Investment is $583,000.

To date, of this $583,000 application, we have spent $18,057 (being 50% of total consultant costs to date). This $18,057 is entirely operating expenditure.

We anticipate the split of future expenditure incurred to be 90% capital expenditure, 10% operating expenditure.

Specialist Report

Dr Paul Winton has provided a specialist report on the innovative nature of Orion's approach. He concludes that

> *The Project provided by Orion represents an innovation project, whose purpose is to deliver electricity lines services at a lower cost to consumers and that this innovation project will have benefits that will be of general application to Orion and other EDBs*

His position is reached on the basis that:

- New Zealand is pursuing an emissions path aligned to Paris' 1 5 C target that may see steep emissions cuts
- Uncertainty around the regulatory response to decarbonisation creates a cost risk to Orion electricity users if managed poorly
- The Project delivers electricity lines services at lower costs by becoming carbon neutral using a mix of cost mitigation tools and meets MFE guidelines

Finally, he notes that all EDB are exposed to similar costs risk hence the Innovation Project benefits will be of value to other EDB.

A copy of the report is **attached** at Appendix 3.

Conclusion and discussion points

We appreciate and understand that this application for Innovation Allowance Investment of $583,000 is:

a) One of the first, if not the first, Innovation Allowance applications the Commission has received

b) Not for "typical" network expenditure.

Consequently, we welcome the opportunity to discuss this application with the Commission as part of the Commission's assessment.

As part of the Commission's considerations, it may also be helpful to consider the following issues which Orion has identified during the writing of this application:

1) The determination requires the expenditure related to an innovation allowance to have been spent by the distribution business before application[19]. We would like the Commission to consider application based on a business case for expenditure rather than on the expectation that expenditure is completed.

   This would:

   a) provide greater confidence and certainty for electricity distributors who plan to undertake innovative projects.

      Requiring expenditure to be completed before application is likely to disincentivise application in this context and actually discourage the distribution business to undertake the innovative project – as there is no guarantee that any innovation fund application will be successful post spending on the project particularly if the project turns out to be not very successful (a known risk of innovative projects).

   b) encourage longer term projects and intergenerational programmes of work

   c) reduce the need for applicants to annually resubmit projects which run, and incur costs, for more than one year.[20] This removal of the need to resubmit projects on an annual basis – after costs have actually been incurred – would lower costs at both electricity distributors and the Commerce Commission.

2) At present, an innovation allowance can only be applied for *"no later than 50* ***working days*** *following the end of an* ***assessment period".*** If the Commission wishes to incentivise innovative activity our feedback is that restricting applications to a defined limited period per year window does not achieve this nor does it align with the agility and dynamic behaviour it is seeking from electricity distribution businesses.

   We would like the Commission to consider alternative application windows or the removal of an application window altogether. We also consider that there should be a reasonable maximum time period for the Commerce Commission to consider such applications.

3) The current innovation allowance wording requires that *"****prior*** *to commencing the innovation project, the non-exempt EDB received a signed report from an engineer or suitable specialist…"*.

   We believe that the receipt of the "report from an engineer or suitable specialist" should be able to be obtained after the commencement of the innovation project.

[19] Schedule 5.3 2

[20] By example, if Orion was to be successful with regard to this innovation allowance application, but only in relation to already incurred costs, we would seek to resubmit this application each year until we stop spending money on our native forest plantings. This could mean around 5 years of applications needing to be made, and needing to be considered by the Commerce Commission.

This later obtaining of the report would enable:

a) more information to be provided to the independent engineer/specialist – therefore presumably improving their ability to determine whether a project is innovative and likely to lower costs and/or improve quality, and

b) not increase the costs of the project to the electricity distributor, at a time when they are possibly unsure of whether they wish to proceed with the project, or uncertain as to whether they wish to proceed with an application.

4) Some projects may require more than one specialist report to cover the breath of the activity that is to be undertaken. The Commission's rule should allow this.

5) In addition to inviting discussion with the Commission on this application, and potential changes to the drafting of Section 5.3.2 in light of the issues discussed immediately above, we would also like to discuss whether any of the $4.85m spend on this project can be allocated to Orion's Regulatory Asset Base (RAB). We confirm that we have not allocated any of this expenditure to our regulatory asset base however, given this project breaks new ground on sustainability and the environment in our sector, we believe further consideration of this by the Commission is warranted.

Appendix 1- Determination Wording

Innovation Allowance

From: **Electricity Distribution Services Default Price-Quality Path Determination 2020**

Schedule 5.3: Approval of drawdown of innovation project allowance

Schedule 2.1

(1) In order to draw down an amount from its **innovation project allowance**, a **non-exempt EDB** must:

(a) no later than 50 **working days** following the end of an **assessment period** submit an application to the **Commission**, which includes a description of:

(i) the **innovation project** in respect of which that **non-exempt EDB** has incurred costs and for which it proposes to apply amounts drawn down from the **innovation project allowance**;

(ii) details of the costs incurred by the **non-exempt EDB** in undertaking that **innovation project** (being costs that have not previously been the subject of applications for drawdown amounts from the **innovation project allowance**) and the proportions of those costs that were **opex** or **capex**; and

(iii) that **innovation project's** purpose, including the steps that the **non-exempt EDB** has taken or intends to take in order to achieve that purpose;

(b) make the application specified in sub-paragraph (1)(a) of Schedule 5.3 publicly available on its website at the same time as it submits it to the **Commission**; and

(c) obtain approval from the **Commission** in accordance with paragraph (2) of Schedule 5.3.

(2) The **Commission** may by notice in writing to the **non-exempt EDB** approve an application by that **non-exempt EDB** to draw down an amount from its **innovation project allowance** if that **non-exempt EDB** satisfies the **Commission** that—

(a) the sum of the amount of the proposed drawdown amount for the **innovation project** and amounts already approved by the **Commission** for draw down from the **innovation project allowance** by that **non-exempt EDB** does not exceed that **non-exempt EDB's innovation project allowance** for the **DPP regulatory period** in Table 5.1 of Schedule 5.3; and

(b) that **non-exempt EDB** has already incurred an amount of costs on the **innovation project** that is at least equivalent to 200% of the proposed drawdown amount (provided such costs have not already been used in a previous application to justify a drawdown amount from the **innovation project allowance**); and

(c) prior to commencing the **innovation project**, the **non-exempt EDB** received a signed report from an **engineer** or **suitable specialist**, where the **engineer** or **suitable specialist** stated in their opinion that-

(i) the proposed **project** is an **innovation project**;

(ii) the purpose of the **innovation project** is either:

A. delivering **electricity lines services** at a lower cost to **consumers**; or

B. delivering **electricity line services** at a higher quality of supply to **consumers**; or

C. delivering **electricity lines services** at a lower cost to **consumers** and at a higher quality of supply to **consumers**; and

(iii) the benefits of the **innovation project** will be of general application to the activities of that **non-exempt EDB** or of other **EDBs**; and

(d) if the **non-exempt EDB** has elected to use a **suitable specialist** to procure a signed report in terms of paragraph (2)(c) of Schedule 5.3, the **suitable specialist** has sufficient expertise in a field relevant to the **project**, which must be evidenced by the **non-exempt EDB** providing a copy of the **suitable specialist's** curriculum vitae to the **Commission** together with the application to draw down from its **innovation project allowance**.

(3) The **innovation project allowances** for **non-exempt EDBs** during the **DPP regulatory period** are as set out in Table 5.1 of Schedule 5.3.

Table 5.1: Innovation project allowance for the DPP regulatory period Non-exempt EDB	**Limit ($'000)**
Alpine Energy Limited	222
Aurora Energy Limited	454
Centralines Limited	150
Electricity Ashburton Limited	173
Eastland Network Limited	150
Electricity Invercargill Limited	150
Horizon Energy Distribution Limited	150
Nelson Electricity Limited	150
Network Tasman Limited	150
Orion New Zealand Limited	825
OtagoNet Joint Venture	150
The Lines Company Limited	181
Top Energy Limited	198
Unison Networks Limited	520
Vector Limited	2,022

(4) When the **Commission** issues an approval for a drawdown amount for an **innovation project** from the **innovation project allowance** for a **non-exempt EDB** in accordance with paragraph (2) of Schedule 5.3, it must state in its approval the proportion of **opex** and **capex** in that drawdown amount, which should be equivalent to the proportion of **opex** and **capex** in the costs incurred by that **non-exempt EDB** for the **innovation project** and included in its application under paragraph (1) of Schedule 5.3.

(5) Where the **Commission** has approved a drawdown amount for an **innovation project** from the **innovation project allowance** for a **non-exempt EDB** in accordance with paragraph (2) of Schedule 5.3, that **non-exempt EDB** must within 50 **working days** of completing that **innovation project:**

(a) submit a report to the **Commission** that outlines the key findings of that **project**; and

(b) make the report in sub-paragraph (5)(a) of Schedule 5.3 publicly available on that **non-exempt EDB's** website at the same time as it submits the report to the **Commission**.

Schedule 2.1: Recoverable costs

(1) The **forecast opex** used for calculating the **opex incentive amount** is specified in paragraph (1) of Schedule 2.2.

(2) The **forecast aggregate value of commissioned assets** and **retention factor** used for calculating the **capex incentive amount** are specified in paragraphs (2)-(3) of Schedule 2.2.

(3) The **extended reserves allowance** for a **non-exempt EDB** must be approved in accordance with Schedule 5.2.

(4) The **quality incentive adjustment** for a **non-exempt EDB** must be calculated in accordance with Schedule 4.

(5) The process for the **Commission** approving a draw down amount by a **non-exempt EDB** from its **innovation project allowance** is set out in paragraphs (1)-(2) of Schedule 5.3, and it is this approved draw down amount of the **innovation project allowance** that constitutes a **recoverable cost**. The total **innovation project allowance** available to a **non-exempt EDB** for the **DPP regulatory period** is the amount specified in Table 5.1.

Definitions

assessment period: means a 12-month period commencing 1 April and ending on 31 March of the following year

capex- see IM determination-

(a) Part 2

(i) incurred in the **acquisition** or development of an asset that is, or is intended to be, **commissioned**; and

(ii) that are or are intended to be included in the **value of commissioned asset**; and

(b) Part 4-

(i) forecast to be incurred in the acquisition or development of an **additional asset**; and

(ii) that are included in the **forecast aggregate value of commissioned asset**, but only to the extent that the costs are forecast to be included in an **aggregate closing RAB value for additional assets**; and

(c) Part 5-

(i) incurred or forecast to be incurred in the acquisition or development of an asset that is, or is intended to be, **commissioned**; and

(ii) that are included or are intended to be included in the **value of commissioned asset** or **forecast value of commissioned asset**, as the case may be, but only to the extent that the costs are included or are intended to be included in a **closing RAB value**;

consumers- see IM determination- has the same meaning as defined in s 2(1) of the Electricity Act 1992;

DPP regulatory period: means the **regulatory period** 1 April 2020 to 31 March 2025

electricity lines services- see IM determination- has the same meaning as defined in s 54C of the **Act**;

Engineer- see IM determination- means an individual who is-

(a) a chartered professional engineer as defined in s 6 of the Chartered Professional Engineers of New Zealand Act 2002

(b) acting in that professional capacity; and

(c) **independent**;

innovation project allowance- see IM determination- means, in respect of a particular **EDB**, a maximum amount set by the **Commission** as an allowance, which the **EDB** may draw down with the

approval of the **Commission**, on such conditions as may be specified in a **DPP determination**, for costs incurred by that **EDB** in relation to one or more **innovation projects**, whether **capex** or **opex**;

innovation project- see IM determination- means a **project** that is focussed on the creation, development or application of a new or improved technology, process, or approach in respect of the provision of **electricity lines services** in New Zealand;

opex- see IM determination- for the purpose of

(a) Subpart 3 of Part 3, means **operating costs** plus any **lease payments**;

(b) Part 4, means the value of **operating costs** attributable to **electricity distribution services** supplied by an **EDB** which are forecast to be incurred in the **disclosure year** in question as determined by the **Commission**; and

(c) Part 5, means **operating costs** after application of clause 5.3.5;

suitable specialist: means an **independent person** (or **persons**) having specialised knowledge or skill based on training, study, or experience

Independent: see IM determination- means neither in a relationship with, nor having an interest in, the **EDB** in question that is likely to involve him her or it in a conflict of interest between his, her or its duties to the **EDB** and his, her or its duties to the **Commission**;

Appendix 2- Customer Sentiment surveys

Part 1 2019 Customer Workshops

Part 2 2019 Customer Advisory Panel

Part 3 2019 Major Customer Survey

Part 4 2020 Customer Telephone Survey

Appendix 3 – Specialist Report

CONFIDENTIAL

TEMPLE

CAPITAL INVESTMENT SPECIALISTS

Reducing cost to Orion customers

Specialist opinion on proposed Orion Innovation Project

May 2021

Context, document purpose and approach

Context and document purpose

- The Electricity Distribution Services Default Price-Quality Path Determination 2020 explains that the Commission may approve an application by a non-exempt EDB to draw down an amount from its innovation project allowance provided a number of conditions have been met.
- One of the conditions (Schedule 5.3 (2) (c)) is that prior to commencing the **innovation project**, the **non-exempt EDB** received a signed report from an **engineer** or **suitable specialist**, where the **engineer** or **suitable specialist** stated in their opinion that-
  - (i) the proposed **project** is an **innovation project**;
  - (ii) the purpose of the **innovation project** is either:
    - A. delivering **electricity lines services** at a lower cost to **consumers**; or
    - B. delivering **electricity line services** at a higher quality of supply to **consumers**; or
    - C. delivering **electricity lines services** at a lower cost to **consumers** and at a higher quality of supply to **consumers**; and
  - (iii) the benefits of the **innovation project** will be of general application to the activities of that **non-exempt EDB** or of other **EDBs**; and
- Moreover under Schedule 5.3 (2) (d) if the **non-exempt EDB** has elected to use a **suitable specialist** to procure a signed report in terms of paragraph (2)(c) of Schedule 5.3, the **suitable specialist** has sufficient expertise in a field relevant to the **project**, which must be evidenced by the **non-exempt EDB** providing a copy of the **suitable specialist's** curriculum vitae to the **Commission** together with the application to draw down from its **innovation project allowance**.
- Orion has provided Temple: Capital Investment Specialists (Temple) with an application for an innovation project (The Project) in accordance with Schedule 5.3 (1) (a) and requested that Temple provide a signed report explaining whether, in Temple's opinion, the conditions of Schedule 5.3 (2) (c) i, ii and iii are met by the project outlined in The Project application.
- The purpose of this Document is to meet this request

Approach

- The Application and supporting valuation model have been reviewed and assessed against the requirements of Schedule 5.3 (2) (c) and commentary made
- Research (desktop and industry expert interviews) has been undertaken to inform the assessment of innovativeness, cost benefits and wider applicability
- The following documents were made available by Orion:
  - Orion NZU NPV Calculation.xlsx (financial model)
  - Orion Innovation Allowance Application May 2020.docx (Innovation Project application)
- A curriculum vitae as described above has been provided in Appendix 2

Executive summary

In our opinion The Project provided by Orion represents an **innovation project, whose purpose is to deliver electricity lines services at a lower cost to consumers** and that **this innovation project will have benefits that will be of general application to Orion and other EDBs.** The rational for this opinion is expanded below.

The proposed project is an innovation project

Innovative projects are (Schedule 5.3 Definitions) "*a **project** that is focussed on the creation, development or application of a new or improved technology, process, or approach in respect of the provision of **electricity lines services** in New Zealand*".

The project is focused on the development and application of a new approach in respect of electricity lines services in New Zealand. Specifically the project provides an approach to managing electricity lines services cost risk associated with climate change to consumers. This costs risk is not currently being discussed publicly by any other EDB nor is the cost risk management method proposed being used. The cost risk and innovative approach to managing it is expanded below.

The purpose of the Innovation Project is delivering electricity lines services at a lower cost to consumers

New Zealand is pursuing an emissions path aligned to Paris' 1.5C target that may see steep emissions cuts

- The New Zealand government has set a clear target, through the Climate Change Response (Zero Carbon) Amendment Act 2019 (commonly referred to as the Zero Carbon Act), for New Zealand to "….*contribute to the global effort under the Paris Agreement to limit the global average temperature increase to 1.5 Celsius above pre-industrial levels*".
- The government's final path is uncertain and contested and hence an appropriate EDB response unclear

Uncertainty around the regulatory response to decarbonisation creates a cost risk to Orion electricity users if managed poorly

- Given current emissions, the government's climate response could represent costs to Orion customers in excess of $4-5m per annum Risk builds due to the gap between policy and science and the chance of an orderly shift is now low
- Voluntary mitigation can reduce cost risk but we're in a state of flux hence innovation is needed
- To ensure stakeholders are not overly exposed to cost risks Orion has announced it will be carbon neutral, excluding distribution losses, from 2022

The Project delivers electricity lines services at lower costs by becoming carbon neutral using a mix of cost-mitigation tools and meets MFE guidelines

- The Project delivers carbon neutrality with lower costs than the status quo on all assumptions
- The Innovation Project also meets the principles of voluntary offsets laid out by MFE

The benefits of the Innovation Project will be of general application to the activities of that non-exempt EDB or of other EDBs

All EDB are exposed to similar costs risk hence the Innovation Project benefits will be of value to other EDB

Signed

Dr. Paul Winton

Director

Executive summary

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The proposed **project** is an **innovation project**	Innovative projects are (Schedule 5.3 Definitions) "*a **project** that is focussed on the creation, development or application of a new or improved technology, process, or approach in respect of the provision of **electricity lines services** in New Zealand*". The project is focused on the development and application of a new approach in respect of electricity lines services in New Zealand. Specifically the project provides an approach to managing electricity lines services cost risk associated with climate change to consumers. This costs risk is not currently being discussed publicly by any other EDB nor is the cost risk management method proposed being used. The cost risk and innovative approach to managing it is expanded below.
The purpose of the Innovation Project is delivering electricity lines services at a lower cost to consumers	**New Zealand is pursuing an emissions path aligned to Paris' 1.5C target that may see steep emissions cuts** • The New Zealand government has set a clear target, through the Climate Change Response (Zero Carbon) Amendment Act 2019 (commonly referred to as the Zero Carbon Act), for New Zealand to "….*contribute to the global effort under the Paris Agreement to limit the global average temperature increase to 1.5 Celsius above pre-industrial levels*". • The government's final path is uncertain and contested and hence an appropriate EDB response unclear **Uncertainty around the regulatory response to decarbonisation creates a cost risk to Orion electricity users if managed poorly** • Given current emissions, the government's climate response could represent costs to Orion customers in excess of $4-5m per annum Risk builds due to the gap between policy and science and the chance of an orderly shift is now low • Voluntary mitigation can reduce cost risk but we're in a state of flux hence innovation is needed • To ensure stakeholders are not overly exposed to cost risks Orion has announced it will be carbon neutral, excluding distribution losses, from 2022 **The Project delivers electricity lines services at lower costs by becoming carbon neutral using a mix of cost-mitigation tools and meets MFE guidelines** • The Project delivers carbon neutrality with lower costs than the status quo on all assumptions • The Innovation Project also meets the principles of voluntary offsets laid out by MFE
The benefits of the Innovation Project will be of general application to the activities of that non-exempt EDB or of other EDBs	**All EDB are exposed to similar costs risk hence the Innovation Project benefits will be of value to other EDB**

Signed

Dr. Paul Winton

Director

The project manages electricity lines services cost risk associated with climate change

There is increasing political and legislative pressure for businesses to reduce or eliminate greenhouse gas emissions. A simple and internationally recognised path has been created for organisations to manage their greenhouse gas emissions towards carbon neutrality. The term 'carbon neutral' is used when an activity, process, organisation, event or building has zero net GHG emissions.

Before claiming to be carbon neutral, entities should (1):

- calculate their emissions and disclose the scope for their measurement
- take as much action as practicable to reduce these emissions, and then
- cancel or retire credible units equivalent to the remaining emissions. This process results in emissions being offset or being carbon neutral.

Buying and then cancelling or retiring units incurs a cost. There is extremely high uncertainty in regulatory and carbon market pricing however recent reports suggest costs for carbon emitters could rise as high as $1,000 per tonne. For Orion Group, such unmanaged costs might add millions to the costs of electricity services for EDB customers. This risk is expanded in the following section.

Orion's proposed Innovation Project manages this cost risk for consumers by capping total potential costs in a manner that will not add costs to consumers and in fact is estimated to reduce costs for consumers under a range of credible scenarios. It does this by balancing **Impending climate change cost risk** with **Innovative cost risk mitigants** as illustrated below.

Impending climate change cost risk

Impending yet uncertain costs to consumers associated with climate change. These costs risk being influenced by Orion's success in decarbonising its business and the costs imposed on Orion to manage any residual emissions. These costs risk exceeding $3m a year based on recent (2018) New Zealand Productivity Commission work and estimated Orion emissions.

Innovative cost risk mitigants

Orion has combined three ways of manage the costs associated with residual emissions.

i. Purchased and registered approximately $1 million of NZU's [government issued carbon credits]
ii. Purchased and registered Verified Emission Reduction units (VER's) at a cost of approximately $350,000 [internationally recognised carbon credits]
iii. Plan to plant native forestry up to a cost of $3.5 million spread over the next five years.

(1) Ministry for the Environment. 2020. *Guidance for voluntary carbon offsetting – updated and extended until 31 December 2021.* Wellington: Ministry for the Environment.

There is no evidence that carbon cost risk is being actively managed nor managed as proposed in the Innovation Project by other EDB

To assess whether the Innovation project represents a new or improved approach to the provision of electricity lines services in New Zealand the annual reports of all Electricity Distributors (EDB) were searched for references to key words. As noted below few made reference to a means of 'Voluntary' use of 'offsets' to manage 'carbon cost'. The absence of discussion on costs risks to EDB is striking. Only one EDB, Marlborough Lines, considers offsetting carbon and makes no reference to future carbon costs. Only Top Energy makes reference to the cost of carbon management and its activities are limited to NZU.

	Voluntary	**Offsets** [context specific hence excludes tax offsets for example]	**'Carbon cost' or 'cost of carbon'** [nb frequent reference to carbon but not carbon cost]
Alpine Energy Limited	N	Yes: diesel offset using solar	N
Aurora Energy	N	N	N
Buller Electricity	N	N	N
Centralines Limited	N	N	N
Counties Power	N	N	N
Eastland Network	N	N	N
Electra Limited	N	N	N
Electricity Ashburton	N	N	N
Electricity Invercargill	N	N	N
Horizon Energy Distribution	N	N	N
Mainpower New Zealand	N	N	N
Marlborough Lines Limited	Y (voluntary assessment)	Y (forestry offsets referenced)	N
Nelson Electricity Limited			
Network Tasman Limited	N	N	N
Network Waitaki Limited	N	N	N
Northpower Limited	N	N	N
Orion New Zealand	NA	NA	NA
OtagoNet Joint Venture	N	N	N
Powerco Limited	N	N	N
Scanpower Limited	N	N	N
The Lines Company	N	N	N
The Power Company			
Top Energy Limited	N	N	Y: with lower carbon costs as we used hedged NZUs purchased in previous years to meet our ETS obligations
Unison Networks	N	N	N
Vector Lines Limited	N	N	N
Waipa Networks Limited	N	N	N
WEL Networks	N	N	N
Wellington Electricity Limited	N	N	N
Westpower Limited	N	N	N

Source: Most recent (typically FY20) annual reports for EDB provided by Orion

Executive summary

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The proposed **project** is an **innovation project**	Innovative projects are (Schedule 5.3 Definitions) "*a **project** that is focussed on the creation, development or application of a new or improved technology, process, or approach in respect of the provision of **electricity lines services** in New Zealand*". The project is focused on the development and application of a new approach in respect of electricity lines services in New Zealand. Specifically the project provides an approach to managing electricity lines services cost risk associated with climate change to consumers. This costs risk is not currently being discussed publicly by any other EDB nor is the cost risk management method proposed being used. The cost risk and innovative approach to managing it is expanded below.
The purpose of the Innovation Project is delivering electricity lines services at a lower cost to consumers	**New Zealand is pursuing an emissions path aligned to Paris' 1.5C target that may see steep emissions cuts** • The New Zealand government has set a clear target, through the Climate Change Response (Zero Carbon) Amendment Act 2019 (commonly referred to as the Zero Carbon Act), for New Zealand to "….*contribute to the global effort under the Paris Agreement to limit the global average temperature increase to 1.5 Celsius above pre-industrial levels*". • The government's final path is uncertain and contested and hence an appropriate EDB response unclear **Uncertainty around the regulatory response to decarbonisation creates a cost risk to Orion electricity users if managed poorly** • Given current emissions, the government's climate response could represent costs to Orion customers in excess of $4-5m per annum Risk builds due to the gap between policy and science and the chance of an orderly shift is now low • Voluntary mitigation can reduce cost risk but we're in a state of flux hence innovation is needed • To ensure stakeholders are not overly exposed to cost risks Orion has announced it will be carbon neutral, excluding distribution losses, from 2022 **The Project delivers electricity lines services at lower costs by becoming carbon neutral using a mix of cost-mitigation tools and meets MFE guidelines** • The Project delivers carbon neutrality with lower costs than the status quo on all assumptions • The Innovation Project also meets the principles of voluntary offsets laid out by MFE
The benefits of the Innovation Project will be of general application to the activities of that non-exempt EDB or of other EDBs	**All EDB are exposed to similar costs risk hence the Innovation Project benefits will be of value to other EDB**

Signed

Dr. Paul Winton

Director

Source:

The Zero Carbon Act 2019 sets a clear expectation of New Zealand's decarbonisation pathway

The Climate Change Response (Zero Carbon) Amendment Act 2019 (the Zero Carbon Act) was signed into law with near unanimous support. It provides a means for future governments to receive independent advice on emissions budgets over coming years and the Purpose of the Act provides the primary guiderails for future government plans. As Minister James Shaw has said, any future governments or plans must deliver to the purpose of the Zero Carbon Act (1). As such while there are many possible emissions reductions profiles for New Zealand all must adhere to the purpose of the Zero Carbon Act

The purpose of the Act is to:

> "*provide a framework by which NZ can develop and implement clear and stable climate change policies that - contribute to the global effort under the Paris Agreement to limit the global average temperature increase to* ***1.5º Celsius*** *above pre-industrial levels*"
> (s3(1)(aa))

The Commission is required to provide advice that is consistent with this:

> "A *person who...carries out a duty under this Act* ***must****... carry out that duty in a manner that is consistent with the purpose of this Act*"
> (s3(2))

Source: Climate Change Response (Zero Carbon) Amendment Act 2019, Lawyers for Climate Action submission to Auckland Regional Transport Committee May 2021; (1) Television New Zealand Q&A May 30 2021

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The government's final path is uncertain and contested and hence an appropriate EDB response unclear

While the Purpose of the Zero Carbon Act and the supporting science, represented by the IPCC's 2018 Special Report on 1.5C, are also clear the path that New Zealand will pursue and the corresponding scale and timing of costs remains highly uncertain.

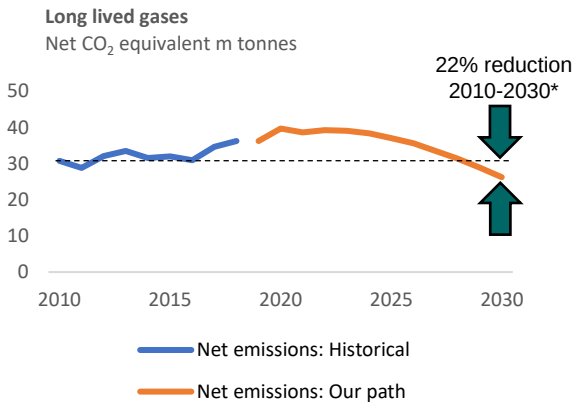
Science says one thing….

"*In model pathways with no or limited overshoot of 1.5°C, global net anthropogenic CO_2 emissions decline by about 45% from 2010 levels by 2030,…*"*,

IPCC October 2018

Source: IPCC, 2018: Summary for Policymakers. In: Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [V. Masson-Delmotte, P. Zhai, H. O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J. B. R. Matthews, Y. Chen, X. Zhou, M. I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, T. Waterfield (eds.)]. In Press

…the Climate Change Commission says something else …



*The Climate Change Commission do not explicitly break gases down beyond long life and biogenic methane and hence the 22% gap represents long lived – primary CO_2

Source: Climate Change Commission Draft Recommendations February 2021

… and this may be unclear for a while and ultimately be decided by the courts

In our view, the Commission's draft advice does not comply with the legal requirements. The main reason for this is that the advice is not consistent with what is required to keep global warming to less than 1.5° Celsius - we consider that emissions over the current decade must be capped at 400 Mt, not the 628 Mt proposed by the Commission's draft budgets. This is a fundamental error that must be fixed before the advice is finalised. Failing this, the advice will be unlawful, in our opinion."

Source: Lawyers for Climate Action 2021

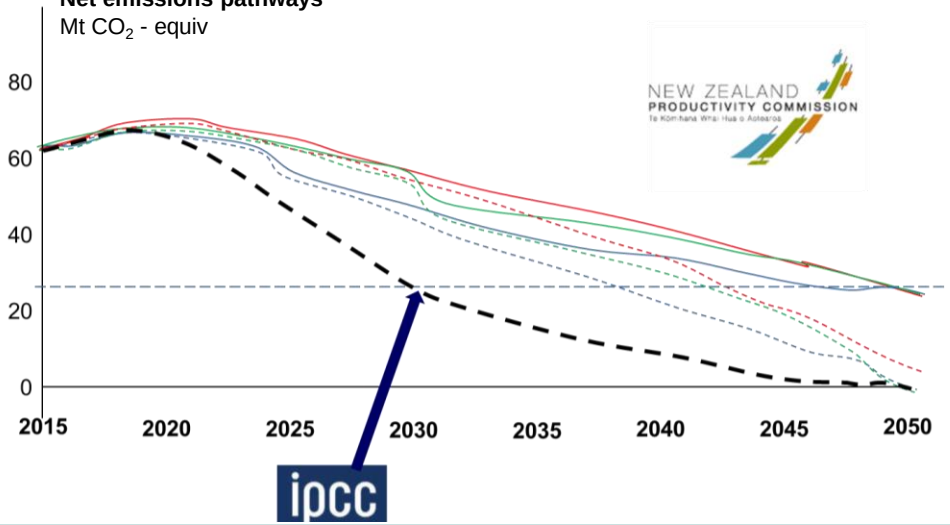
Given current emissions, government's climate response could represent costs to Orion customers in excess of $4-5m per annum

Six scenarios were published by the New Zealand Productivity Commission in August 2018 outlining emissions pathways, "*….to limit global warming to under 2˚C, consistent with the Paris Agreement."* (coloured blue, red and green in the left hand chart below). For each scenario New Zealand carbon prices were estimated and are shown in the chart to the right below. Paris-consistent global prices were also considered, *"Global carbon prices that are consistent with the Paris Agreement are based on the range of estimates developed by the Carbon Pricing Leadership Coalition and under the International Energy Agency's Sustainable Development Scenario to meet the Paris Agreement commitment to limit global warming to below 2˚C".* Higher prices have also been modelled and are reflected in the Productivity Commission's work, in some cases reaching USD1,000 per tonne by 2050. These costs are not shown in these charts below but highlight the high uncertainty.

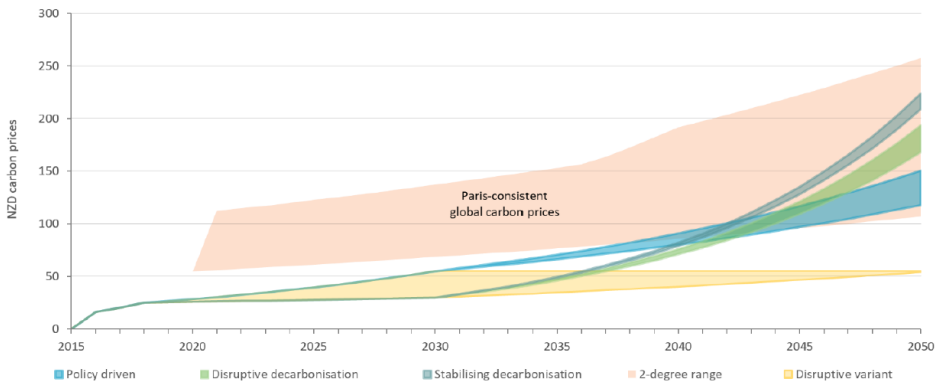
One month after the release of the Productivity Commission's report, the IPCC released pathways consistent with 1.5C. The Zero Carbon Act embraced this new target as its purpose. As is seen below the black dashed line the IPCC pathway sees New Zealand decarbonisation occur much more quickly than proposed under the *2˚C, consistent pathways proposed by the Productivity Commission.* One can conclude that this more aggressive pathway could reasonably see prices run higher than those proposed by the Productivity Commission in order to meet he purpose of the Zero Carbon Act. More recent work by the Climate Change Commission indicates, "*The Commission's modelling has enabled a better understanding of the marginal abatement costs likely to be required in Aotearoa to meet the emissions budgets and 2050 target. Our analysis suggests that marginal abatement costs of around $140 per tonne of CO2e abated in 2030 and $250 in 2050 in real prices are likely to be needed*"

As such while there remains extremely high uncertainty in carbon prices, EDB should consider scenarios where carbon costs exceed NZD150 (above the global price for 2C) by 2030. For Orion Group, given current emissions in excess of 3,000 tonnes per annum this could represent costs to consumers in excess of $4-5m per annum if not managed appropriately.

Net emissions pathways
Mt CO_2 - equiv



Future carbon costs (2C pathways)
$ per tonne CO_2 – equiv.



Source: Concept Consulting, Motu Economic and Public Policy Research, & Vivid Economics. (2018b). Modelling the transition to a lower net emissions New Zealand: Uncertainty analysis. Wellington, NZ; New Zealand Productivity Commission. (2018). Low-emissions economy (Section 3.4); Orion Innovation Project financial model 'Orion NZU NPV Calculation.xlsx'; Temple analysis; Climate Change Commission

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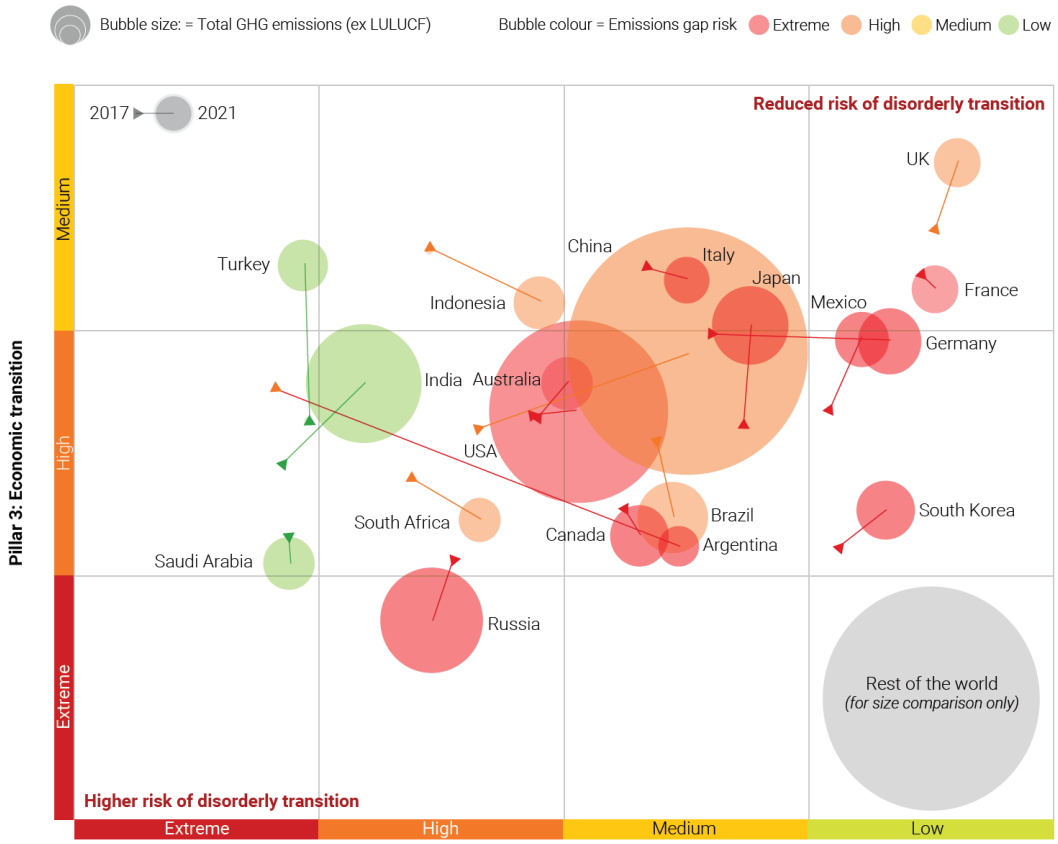
Risk builds due to the gap between policy and science and the chance of an orderly shift is now low

A recent assessment by global risk intelligence company Verisk Maplecroft illustrates the impending risk all businesses, particularly those heavily dependent on carbon, face. They further explain that in their opinion the chance of an orderly transition to a low economy world has now passed and businesses should plan for mandated change at short notice:

> "*Our data underscores that it is clear there is no longer any realistic chance of an orderly transition. Companies and investors across all asset classes must prepare for at best a disorderly transition and at worst a whiplash from a succession of rapid shifts in policy across a host of vulnerable sectors. And this doesn't just apply to energy companies – transport, agriculture, logistics and mining operations must all work to identify the threats and opportunities a carbon-restricted future will open up for them*", …..
>
> "*These conditions will leave businesses in carbon-intense sectors facing the most disorderly of transitions to a low-carbon economy, with measures – such as restrictive emissions limits for factories, mandates for buying clean energy, and high levies on carbon – imposed with little warning.*"
>
> Verisk Maplecroft Environmental Risk Outlook 2021

The chart to the right explains this risk by highlighting the emissions-gap risk (the gap between current and 2030 reduction goals), Pillar 2: Capacity and intent to implement policies and a Pillar 3: A measure of the economy's carbon intensity.

G20 carbon policy performance 2017-2021



Pillar 2: Capacity and intent to implement carbon policies

Emissions gap pillar does not include emissions or mitigations from land use, land use change and forestry (LULUCF).

Voluntary mitigation can reduce cost risk but we're in a state of flux hence innovation is needed

Voluntary mitigation with offsets can reduce cost risk: Voluntary mitigation is the reduction of emissions and / or the increase in GHG removals beyond current government requirements. Voluntary mitigation can be undertaken across Scope 1, 2 and 3 or using offsetting or insetting*. Motu defines offsetting as, "*claiming external mitigation to neutralise or otherwise compensate for an organisation's residual emissions under its internal mitigation target.*" (1). Voluntary mitigation has the potential to reduce exposure to carbon-cost risk.

Carbon neutrality: Achieving 'carbon neutrality' or 'net zero emissions' is one form of voluntary mitigation. A common and well accepted approach involves *measuring* an organisation's emissions footprint across sources and sinks within an appropriate boundary, *reducing* those net emissions as far as possible and *compensating* for (or neutralising) remaining emissions using insetting or offsetting. In some cases organisations offset beyond their residual emissions to generate 'net negative' emissions, sometimes referred to as being 'carbon positive' or 'climate positive'.

The voluntary mitigation landscape is in a state of flux: New Zealand is moving into a new emissions reduction target period with the commencement of the Paris agreement period 2021-2030. The features of voluntary offsetting grounded in the Kyoto protocol will not continue under the Paris Agreement. As such innovative methods of compensating for residual emissions are needed to manage cost risk. Further supporting comments are provided below from Ministry for the Environment and Motu.

> "*Beyond 2020, New Zealand enters a new emissions reduction target period under the Paris Agreement. The current process, which prevents double claiming, will not be a credible approach to offset emissions generated under the Paris Agreement period. This is due to the voluntary carbon offsetting process involving the cancellation of units originating under the Kyoto Protocol, rather than under the Paris Agreement period. Recognising this approach as credible for emissions occurring after the end of this year would not align with New Zealand's stance against the use of these units after 2020. The Ministry is currently investigating potential pathways for credible voluntary carbon offsetting, using New Zealand-generated mitigation, in the context of the Paris Agreement period of 2021–2030.*" (2)
>
> "*Voluntary mitigation' means reducing emissions and increasing removals of greenhouse gases beyond government requirements (including requirements in the New Zealand Emissions Trading Scheme). Past approaches to voluntary mitigation will not work in the context of the Paris Agreement and domestic climate change policies. A new framework is needed to incentivise voluntary climate action and better help organisations to make credible, transparent and marketable claims. Many organisations in Aotearoa want to go beyond government requirements to help tackle climate change. However, past approaches to voluntary offsetting and carbon-neutral claims are not compatible with the Paris Agreement*."
> https://www.motu.nz/our-research/environment-and-resources/emission-mitigation/voluntary-mitigation-nz/ accessed May 2021
>
> "*The VCM [Voluntary Carbon Market] framework which evolved through 2020 was grounded in features of the Kyoto Protocol which will not continue under the Paris Agreement." (1)*

(1) Catherine Leining and Dominic White, "Boosting voluntary climate action in Aotearoa New Zealand", Motu report, March 2021; (2) Ministry for the Environment. 2020. Guidance for voluntary carbon offsetting – updated and extended until 31 December 2021. Wellington: Ministry for the Environment; * see https://ghgprotocol.org/ for a discussion on Scope definitions

To ensure stakeholders are not exposed to cost risks Orion will be carbon neutral from 2022

Central Canterbury electricity distributor, Orion, today announced its commitment to achieving carbon neutrality for corporate emissions by June 2022, the first electricity company in New Zealand to commit to this ambitious target. The commitment is eight years ahead of Christchurch City Council's goal for council-owned companies to achieve carbon neutrality by 2030.

Orion Group Chair, Jane Taylor, said the Group was committed to taking decisive action to address climate change.

> "*The world is facing a climate emergency and we need action that is both urgent, and game-changing. The Orion Group is helping businesses to reduce their energy consumption and switch to clean energy sources, and we can't ask others to decarbonise if we don't walk the talk ourselves.*"

To meet the target, the Group is implementing initiatives to reduce its corporate emissions such as vehicle and building emissions, and investing in natural climate initiatives that will provide carbon offsets.

> "*We will plant more than 200 hectares of native forestry in our region. While this takes time to be planted and grow, we will purchase carbon reduction units associated with New Zealand and international carbon reduction projects. These nature-based solutions have additional benefits by encouraging biodiversity, providing environments for our native insect and bird wildlife, and helping with fire and erosion control. We'll be creating places for future generations to use for recreation and wellbeing and that is a win all round*," Taylor said.

Orion's target covers both its electricity distribution network, and the work of its network build and maintenance subsidiary, Connetics. It excludes electrical losses of around 14,000 tonnes of carbon per year as these losses are an unescapable, natural phenomena due to heat loss as electricity passes through lines and cables, and are already largely offset by electricity generators. Taylor says the cost of purchasing offsets will be absorbed in Orion Group's capital budget.

> "*Actively managing our carbon footprint is a responsibility we take very seriously. It is an investment in the sustainability of our business and in the community's future. We think it is vital for us to be actively managing our emissions, and doing everything we can to help New Zealand achieve its commitments under the Paris Agreement*."

Orion Group Chair, Jane Taylor

Source: Orion Group

The Project delivers carbon neutrality with lower consumer costs than the status quo on all assumptions

Orion with the support of an external accounting firm undertook scenario analysis to understand the costs of electricity services to consumers. These scenarios explored differing cost assumptions and differing time of action and are outlined below alongside the Net Present Value (NPV) of each scenario. Further details are provided in Appendix 1.

Scenario A: Status quo	Orion purchases NZUs to offset its operational greenhouse gas emissions in the year they occur, from 2030 to 2050
Scenario B: Innovation Project	Orion takes an early, innovative approach from 2022 of surrendering current holdings of emission units and planting its own permanent native forests

Forecast carbon prices in NZD per tCO2e, which were sourced from the New Zealand Climate Change Commission. Note these forecasts are materially lower than those considered by the New Zealand Productivity Commission in 2018.

We calculated the NPV results of net cash flows to 2050 for each scenario in each of Orion's two emission reduction pathways.

Under both emission pathways, Scenario B has a higher NPV than Scenario A.

Under Orion's 'Best case' emission reduction pathway, Scenario B has a significantly higher NPV than for Scenario A.

Under Orion's 'Worst case' emission reduction pathway, both scenarios result in a negative NPV however the net cost of Scenario B is significantly smaller than for Scenario A.

Orion's 'Best Case' Emissions pathway:	
Scenario A NPV	-$1,786,926
Scenario B NPV	$688,186

Orion's 'Worst Case' Emissions pathway:	
Scenario A NPV	-$ 2,798,651
Scenario B NPV	-$ 466,481

Sensitivity analysis results: Under both emission reduction pathways, lower carbon prices or higher planting costs would reduce the marginal benefit of Scenario B over Scenario A.

Source: Orion Innovation Project financial model 'Orion NZU NPV Calculation.xlsx', Temple analysis

The Innovation Project will meet the principles of voluntary offsets laid out by MFE

It is the objective of the project to meet the principles outlined by the Ministry for the Environment. In doing so Orion's Innovation Project will be a more compelling cost risk management tool for other participants of the electricity services sector. The principles espoused by the Ministry for the Environment for voluntary offsetting are outlined below.

Transparent	The details of a voluntary carbon offset and how the offset meets *all* [emphasis added] the principles of voluntary carbon offsetting should be clearly stated and publicly available. 'Publicly available', in this context, means that the information is easily found and accessible by any member of the public. This may mean the business or organisation has published: • the details of how the principles of voluntary carbon offsetting have been met, or • the name of a third party organisation or broker who has conducted the voluntary offset on their behalf. This third party organisation or broker has published the details of how their organisation meets all the principles of voluntary carbon offsetting. In either of the above cases, these details could be published on their website for example, or in a public disclosure statement or in their annual report. It is also recommended your unit cancellation or retirement used for voluntary carbon offsetting is transparently reported in a public registry authorised by the body that issued the units.
Real, measurable and verified	Real, measurable and verified: The units used for the voluntary carbon offset represents a tonne of carbon dioxide (CO2) (or equivalent) emissions reduced or removed from the atmosphere, from tangible activities that have actually been implemented. The reduction or removal is supported by evidence from credible monitoring and reporting and should be verified by a third party.
Additional	The GHG emissions reductions or removals are due to a specific intervention and would not have occurred under business as usual. It cannot be something that was going to happen anyway.
Not double counted	Only one entity (country, company or person) can use the reduction or removal for achievement of their emission reduction or carbon neutrality goals.
Address leakage	The activity of reducing or removing emissions within the boundary of the credited activity does not result in increases to emissions elsewhere.
Permanent	Reductions or removals must be maintained over time and be unlikely to be reversed. For any demonstration of permanence, it is recommended that the organisation also states how the voluntary carbon offset will be managed if, for unforeseen circumstances, the offset is reversed. For example, if a permanent forest is used for voluntary carbon offsetting and a natural disaster, such as a fire burns the forest down, the organisation7 is obligated to undertake further activity that will result in the emissions that were released during the fire to be sequestered8 or removed somewhere else.

Source: Ministry for the Environment. 2020. *Guidance for voluntary carbon offsetting – updated and extended until 31 December 2021.* Wellington: Ministry for the Environment.

Executive summary

In our opinion The Project provided by Orion represents an **innovation project, whose purpose is to deliver electricity lines services at a lower cost to consumers** and that **this innovation project will have benefits that will be of general application to Orion and other EDBs.** The rational for this opinion is expanded below.

The proposed **project** is an **innovation project**	Innovative projects are (Schedule 5.3 Definitions) "*a **project** that is focussed on the creation, development or application of a new or improved technology, process, or approach in respect of the provision of **electricity lines services** in New Zealand*". The project is focused on the development and application of a new approach in respect of electricity lines services in New Zealand. Specifically the project provides an approach to managing electricity lines services cost risk associated with climate change to consumers. This costs risk is not currently being discussed publicly by any other EDB nor is the cost risk management method proposed being used. The cost risk and innovative approach to managing it is expanded below.
The purpose of the Innovation Project is delivering electricity lines services at a lower cost to consumers	**New Zealand is pursuing an emissions path aligned to Paris' 1.5C target that may see steep emissions cuts** • The New Zealand government has set a clear target, through the Climate Change Response (Zero Carbon) Amendment Act 2019 (commonly referred to as the Zero Carbon Act), for New Zealand to "*….contribute to the global effort under the Paris Agreement to limit the global average temperature increase to 1.5 Celsius above pre-industrial levels*". • The government's final path is uncertain and contested and hence an appropriate EDB response unclear **Uncertainty around the regulatory response to decarbonisation creates a cost risk to Orion electricity users if managed poorly** • Given current emissions, the government's climate response could represent costs to Orion customers in excess of $4-5m per annum Risk builds due to the gap between policy and science and the chance of an orderly shift is now low • Voluntary mitigation can reduce cost risk but we're in a state of flux hence innovation is needed • To ensure stakeholders are not overly exposed to cost risks Orion has announced it will be carbon neutral, excluding distribution losses, from 2022 **The Project delivers electricity lines services at lower costs by becoming carbon neutral using a mix of cost-mitigation tools and meets MFE guidelines** • The Project delivers carbon neutrality with lower costs than the status quo on all assumptions • The Innovation Project also meets the principles of voluntary offsets laid out by MFE
The benefits of the Innovation Project will be of general application to the activities of that non-exempt EDB or of other EDBs	**All EDB are exposed to similar costs risk hence the Innovation Project benefits will be of value to other EDB**

Signed

Dr. Paul Winton

Director

All EDB are exposed to similar costs risk hence the Innovation Project benefits will be of value to other EDB

All EDB are exposed to carbon costs through the use of motor vehicles, carbon-intensive energy sources such as diesel and embedded carbon amongst other areas. As such all will be to some extent exposed to carbon costs and would benefit from the development of approaches to manage these costs in the best interests of their customers. A detailed review of annual reports (p. 5 in this report) showed that only one EDB is explicitly considering carbon cost risks and this one EDB is using different a cost mitigation method to that proposed in the Orion Innovation project. It can be reasonably be assumed the *benefits of the Innovation Project will be of general application to the activities of that of other EDBs*

	Is the company currently considering managing carbon costs?
Alpine Energy Limited	N
Aurora Energy	N
Buller Electricity	N
Centralines Limited	N
Counties Power	N
Eastland Network	N
Electra Limited	N
Electricity Ashburton	N
Electricity Invercargill	N
Horizon Energy Distribution	N
Mainpower New Zealand	N
Marlborough Lines Limited	Managing carbon using voluntary forestry offsets however no explicit reference to the forward looking costs
Nelson Electricity Limited	
Network Tasman Limited	N
Network Waitaki Limited	N
Northpower Limited	N
Orion New Zealand	NA
OtagoNet Joint Venture	N
Powerco Limited	N
Scanpower Limited	N
The Lines Company	N
The Power Company	
Top Energy Limited	Y: with lower carbon costs as we used hedged NZUs purchased in previous years to meet our ETS obligations
Unison Networks	N
Vector Lines Limited	N
Waipa Networks Limited	N
WEL Networks	N
Wellington Electricity Limited	N
Westpower Limited	N

Appendices

Appendix 1: Orion assumptions

Orion's existing carbon footprint

	2018 base year
Scope 1	711
Scope 2	95
Scope 3	177
Connetics	1,950
Orion's operational and Connetic's carbon footprint - current	**2,933** tCO2e

Orion's Footprint targets - % of current

2030 target	50%	50%	50%	75%
2050 target	20%	80%	20%	35%

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Estimated Operational and Connetics Footprint	1,467	1,423	1,379	1,335	1,291	1,247	1,203	1,159	1,115	1,071	1,027	983	939	895	851	807	763	719	675	631	587
Orion's cumulative carbon footprint 2030 to 2050	**21,560**																				

Key other assumptions

Land purchase cost (in 2021)	$0.0 per hectare	Spilt with landowner	67%	held by Orion

		Natives	E Reg	Pinus		
First year of land purchase and planting		2022	2029	2021	YES	Is annual carbon footprint from 2030 to 2050, in each individual year, outweighed by carbon credits actually earned in that year or before
Amount of land planted (hectares)		170	0	0	NO	Is annual carbon footprint from 2030 to 2049, in each individual year, outweighed by carbon credits actually earned in that year
Land planted on straight line basis over "x" years	x=	4	1	1	YES	If credits can be carried forward, do total credits earned over period 2030 to 2050 match footprint in those decades
ACTUAL LAND PLANTED		**254**	**0**	**0**		

Discount rate applied to costs 0.00%

Results

		Natives	E Reg	Pinus
Total cost of plantings (incl fences, weeds etc)	No NPV	$14,045	$6,585	$6,335
	NPV'd	$14,045	$6,585	$6,335
Total cost after split with land owner	NPV'd	$3,563,657	$0	$0

Laurie Forestry

	Natives	E Reg	Pinus
Low planting cost estimate	$11,460	$2,909	$1,693
Average planting cost estimate	$13,688	$3,435	$2,379
High planting cost estimate	$17,367	$4,006	$3,675
Equivalent if low cost	2,907,761	$0	$0
Equivalent if average cost	3,473,075	$0	$0
Equivalent if high cost	4,406,552	$0	$0

	Natives	E Reg	Pinus
Factor of low cost vs NZPF	82%	44%	27%
Factor of average vs NZPF	97%	52%	38%
Factor of high cost vs NZPF	124%	61%	58%

Footprint

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
	3000	0.98	0.96	0.94	0.91	0.88	0.85	0.75	0.65																					
		1	0.99	0.97	0.95	0.93	0.91	0.88	0.85																					
Achieve carbon reduction target (50%/80%)		2940	2880	2820	2730	2640	2550	2250	1950	1,467	1,423	1,379	1,335	1,291	1,247	1,203	1,159	1,115	1,071	1,027	983	939	895	851	807	763	719	675	631	587
Less carbon reduction (20%/65%)		3000	2970	2910	2850	2790	2730	2640	2550	2,200	2,141	2,083	2,024	1,965	1,907	1,848	1,789	1,731	1,672	1,613	1,555	1,496	1,437	1,379	1,320	1,261	1,203	1,144	1,085	1,027
Carbon Price	40.8	51.7	62.5	73.4	84.2	95.1	105.9	116.7	127.6	138.4	142.6	146.8	151.3	155.8	160.5	165.3	170.2	175.3	180.6	186.0	191.6	197.4	203.3	209.4	215.7	222.1	228.8	235.6	242.7	250.0

Source: Orion Innovation Project financial model 'Orion NZU NPV Calculation.xlsx'

Appendix 2: Dr Paul Winton Curriculum Vitae

Under Schedule 5.3 (2) (d) if the **non-exempt EDB** has elected to use a **suitable specialist** to procure a signed report in terms of paragraph (2)(c) of Schedule 5.3, the **suitable specialist** has sufficient expertise in a field relevant to the **project**, which must be evidenced by the **non-exempt EDB** providing a copy of the **suitable specialist's** curriculum vitae. The curriculum vitae is provided below

Context	Paul has over two decade of experience in supporting investment decisions for Boards, senior executives and sources of funds (Private Equity funds, debt funds and commercial lenders). Previously, Paul worked with global strategy consulting company McKinsey & Company and Partners in Performance serving clients in Australasia, Asia, USA and Europe across multiple industry sectors. Paul today leads Temple, a nice firm helping investors make better investment decisions by undertaking reviews of markets to understand the structure, conduct and performance of market players and by explicitly mapping and prioritising value drivers for management teams and boards.
Professional history summary	• Principal at **Temple** (2005-current): Capital Investment Specialists: Temple helps boards make complex capital investment decisions and works with funds and investors to make better informed investment decisions and understand the value drivers in their business • Founder at **The 1point5 Project** (2019-current): The 1Point5 Project is a not-for-profit that will help communicate the causes, consequences and prioritised actions for New Zealanders to reduce carbon emissions with a focus on road transport. We do this by collaborating with groups targeting a 1.5°C world and help them to focus and amplify their voices by creating messages and content that kiwis will connect with. The 1point5 Project is often cited in media as an expert voice on decarbonisations • Founder at **kinaroad** (2010-current): kinaroad is an innovative surfboard OEM manufacturing solution (www.kinaroad.com). Our mission is to bring surfboard manufacturing back to Australia • Principal at **Partners in Performance** (2006-2013, Consultant most recently Principal): Diagnostics of businesses and private equity portfolio companies with a focus on identification of value drivers and their prioritisation to rapidly and sustainably increase cash flow. • Associate at **McKinsey & Co** (2000-2002): Paul served clients in Australasia, Asia, USA and Europe across multiple industry sectors. Areas of focus included private equity due diligence models, structured cost reduction and value based pricing strategy.
Selected relevant engagement history (client names are confidential)	• **Ongoing Ministerial engagement** (2018-2021): Ad hoc advice and guidance to senior Ministers on issues related to climate change particular with regards pathways and commensurate costs • **Leading private equity fund** (2018-current): Advising on the commercial implications of emerging climate law, politics and technology on their portfolio companies • **Leading gentailer** (2021): Outlined to the Board and management team the costs and risks associated with climate change in New Zealand • **Leading business lobby group** (2021): Developed and presented to the Prime Minister, Deputy Prime Minister and lead Cabinet Ministers a vision with supporting analyses for rapid decarbonisation of the New Zealand transport system • **Leading business lobby group** (2021): Developed and presented a plan to the Minister of Transport on a practical pathway to decarbonise transportation • **Large investment fund** (2020): Advised the CEO and Board of a $30Bn equity fund on development on the requirements of a science-aligned decarbonisation plan • **Large NZ EDB** (2019): Advised the board and management team on the risks to assets associated with climate change • **Waka Kotahi** (2019): Advised the board on the decarbonisation requirements and issues given impending recommendations from the Climate Change Commission. Ran workshops for the CEO and management team on the risks associated with climate change. • **Lawyers for Climate Action** (2018-current): Ongoing technical support around New Zealand pathways for decarbonisation consistent with the Zero Carbon Act and the IPCC Special Report on 1.5C • **The New Zealand Institute** (2007-2008): Developed a commercial model to accelerate the roll out of fibre to the home in New Zealand. The proposal was adopted verbatim by incoming Prime Minister John Key in 2008. • **EDB support** (2006-2021): Support for management teams and boards of over a dozen EDB across many dozens of engagements spanning areas including acquisition or development of new regulated and unregulated assets, capital structure, operational enhancement for regulated assets (e.g. SAIDI/SAIFI), climate change risks and opportunity management and fibre investment, deployment and management models
Education	• 1992-1995 - Bachelor of Engineering (BE) Mechanical Engineering (Hons) • 1996-1999 – PhD Engineering (Mechanical) – domains of research included time series analysis, nonlinear optimisation and applied statistics

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CAPITAL INVESTMENT SPECIALISTS

This investment document was prepared by Temple Capital Investment Specialists.

Temple provides specialist solutions-based advice that allows complex capital investment decisions to be made with confidence. We provide this advice to a range of leading Australasian clients including private equity funds, debt funds and major corporates who are considering investments in the range of $US10 million to $US100 million. We define the opportunities present in each investment and explore alternatives that can maximise returns and minimise risk.

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please call Paul Winton on +64 9 8899370.