



Financing and incentivising the decarbonisation of Aotearoa

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The intent of this report

The purpose of this report is to provide food for thought for potential applicants to the Westpac NZ Government Innovation Fund's investment round of *Financing and Incentivising the Decarbonisation of Aotearoa*.

The process of decarbonisation is a challenge for many levels of New Zealand society. As the environmental author Robert McFarlane succinctly wrote, "We are indebted to, and embedded in, carbon." The extraction and use of fossil fuels have created prosperity, but this has also set in motion a tidal wave of environmental problems to deal with now and into the future. The challenge is how to decarbonise without creating more burden.

With the right system settings we can make it easier for us all to make better choices for decarbonising Aotearoa. With this in mind, we invite the reader to think about what could be achieved through innovations aimed at financing and incentivising decarbonisation in our country. Innovation in the carbon reduction space requires a comprehensive response that matches the complexity of the problem. We need to efficiently work towards solutions that best contribute to New Zealand's international agreements, to protect our land and oceans, and to improve quality of life and wellbeing.

This report is not intended to convince the reader of the need to take action on climate change. Rather, this report intends to illuminate some changes that could be made to deliver impactful solutions at pace. Simply planting more trees isn't enough; Aotearoa already invested heavily in exotic forests planted in the 1990s to offset its emissions and meet targets. According to the Climate Change Commission, "The carbon removal benefits of these forests are now coming to an end. Gross emissions have increased by 26% since 1990, and Aotearoa is in a position that is more difficult than it might have been if it had started developing the structures, strategies and plans it needs to create a low-emissions system earlier."

We need to look beyond the trees, literally and metaphorically, and see the interconnected forest, as we will not solve today's challenge with yesterday's thinking.

Note: The case studies highlighted in this report are not an endorsement of their effectiveness, as that is unknown. They are intended to provide a breadth of inspiration for readers about the possibilities to finance and incentivise decarbonisation.

What is decarbonisation?

Most simply, decarbonisation is the significant reduction of greenhouse gas (GHG) emissions into the atmosphere.

Another definition adds in the goal of the, "reducing or eliminating of carbon dioxide from energy sources to achieve zero net emissions of carbon dioxide (CO₂), as well as the stabilising of emissions of short-lived greenhouse gases."¹ Net zero emissions is about achieving the balance between GHG emissions produced and GHG emissions being taken out of the atmosphere.

Decarbonisation can take several forms, from prevention to capture, and includes decreasing non-renewable electricity, improving energy efficiency, shifting from fossil fuels, carbon capture and storage technology, and carbon offsetting and insetting (owning your carbon credit supply). To create a net zero Aotearoa we will need to use a combination of these methods, as decarbonisation does not imply the complete removal of carbon from our economy but implores that we reduce where we can and offset where we cannot. For this paper, decarbonisation also refers to reducing overall consumption so that we use less, waste less, and, therefore emit less.



The Climate Change Commission states that, "Reducing greenhouse gas emissions is not the only objective; the nature of the transition also matters. Aotearoa needs to transform in a way that maintains and builds wellbeing. This is particularly important to Iwi/Māori."²

This means elements such as social and individual wellness, preventing environmental degradation and enabling regrowth, financial sustainability and prosperity, and cultural integrity are necessary components of decarbonisation.

To accomplish this, Aotearoa can learn from tangata whenua. Māori Climate Commissioner Awatere Huata, sees deep Indigenous knowledge and principles of whakapapa, mauri and utu as critical supports "to build an inclusive, all-encompassing approach to climate change that supports and empowers everyone."³

¹Deloitte 2020

²Climate Change Commission 2021

³Office of the Māori Climate Commissioner 2019

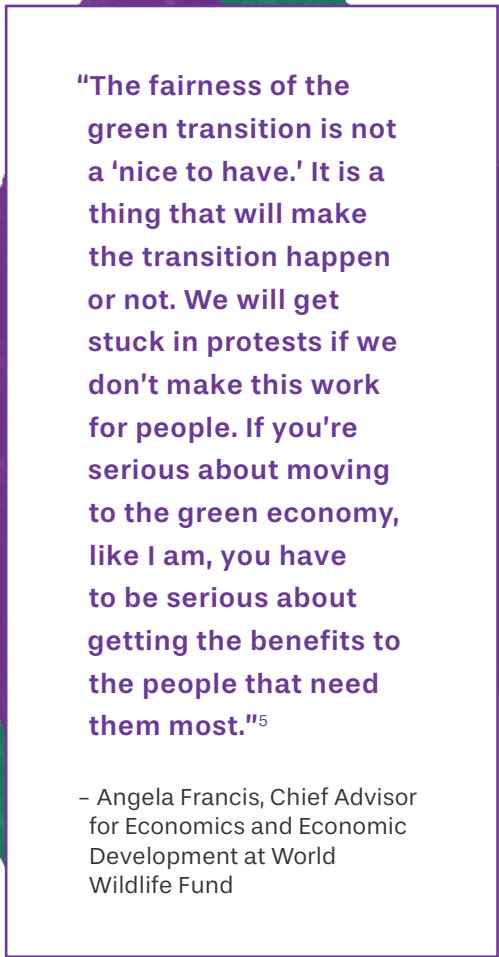
The need for a just transition

Conversations with the contributors to this report, along with scanning current viewpoints, highlighted that efforts for decarbonisation in New Zealand must also ensure a "just transition."

Angela Francis, the Chief Advisor for Economics and Economic Development at WWF, argues that to decarbonise effectively, we must put people first. Specifically those who see a green economy not working for them and who have pressing concerns about livelihood, housing and health.

We need to "show how moving to a green economy delivers on the things that people are already worried about. It improves their lives, whether they care about the environment or not."⁴

Benefits for individuals include having cleaner, quieter, and healthier cities, expanded employment opportunities to support the transition, and homes that provide improved warmth and energy efficiency to reduce illness and lower cost. A lower carbon future can be a bright future.



"The fairness of the green transition is not a 'nice to have.' It is a thing that will make the transition happen or not. We will get stuck in protests if we don't make this work for people. If you're serious about moving to the green economy, like I am, you have to be serious about getting the benefits to the people that need them most."⁵

– Angela Francis, Chief Advisor for Economics and Economic Development at World Wildlife Fund

⁴Francis 2019

⁵Ibid

Why financing and incentivisation of decarbonisation?

Aotearoa is not on track to meet our targets after years of delayed action.⁶

Amongst our international partners, there is seen to be a "credibility gap between New Zealand's rhetoric and action" with the short-term policy focus unable to keep pace with the ambition of the Zero Carbon Act and the declaration of a climate emergency.⁷ The COVID-19 pandemic has resulted in declining emissions, but this does not represent a significant shift towards decarbonisation. As economic recovery occurs, so too will our emissions. Based on our current pathway and actions, New Zealand's rating is "highly insufficient", contributing to global warming greater than 4°C, nearly triple the Paris Agreement limit of 1.5°C.⁸ We need to do more and do better.

To decarbonise Aotearoa, we need to get environmental action on the table across the entire economy.

We need to use "investment and policy to reward people and businesses for the decisions they take that lower carbon and restore nature rather than degrade it."¹⁰ We need to create the conditions for people to transition, and the Climate Change Commission recommends we "enable system level change through innovation, finance and behaviour change."¹¹

"You have Scandinavian ambitions in terms of quality of life and public services, but a US attitude to tax. The brand 100% Pure New Zealand lulled many into a false sense of security, when the environmental reality is far more challenging."⁹

-British High Commissioner to New Zealand Laura Clarke

With financing and incentivising, we are looking at two sides of the same decarbonisation coin: mobilise capital to support low emissions outcomes and "address behavioural barriers that prevent people and businesses from making the most of cost-effective opportunities to reduce emissions."¹²

⁶Climate Change Commission 2021

⁷Daalder 2021

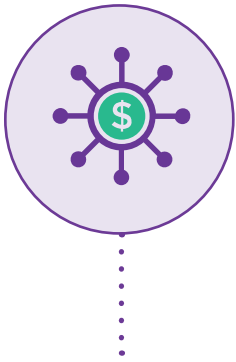
⁸Climate Action Tracker 2021

⁹Daalder 2021

¹⁰Francis 2019

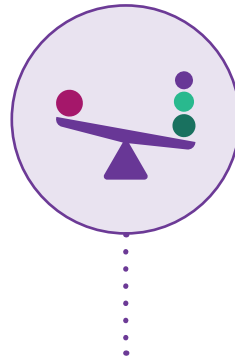
¹¹Climate Change Commission 2021

¹²Ibid



Why financing?

The Climate Change Commission believes that "access to finance and investment capital will underpin emissions reductions in every sector."¹³ The flow-on effects are unequivocal and what we have now is unsustainable. "Our current financial system is contributing to environmental degradation and entrenching inequality across many measures; we are rapidly consuming finite pools of natural and social capital to produce financial capital."¹⁴ Decarbonisation requires capital, through debt and equity financing, and we do not have an appropriate model of risk and return to support sustainability projects.



Why incentivisation?

"Thus far, the transition to a low-carbon economy has largely been led by the power and utilities (including renewables) sector."¹⁵ We need to support this transition with a focus on how we consume energy. This is where incentives can shine and create shifts by rewarding people rather than restricting them.

Currently, businesses, consumers, and government lack enough incentives, or possibly the right type of incentives, to create a tipping point. Incentives can be extrinsic (material reward) or intrinsic (personal fulfillment with no promise of a reward). Both are critical for widespread adoption of actions that reduce carbon emissions.

"Collectively, we need to change the way investment and lending decisions are made, so that environmental, social and economic factors are integral and negative impacts, both immediately and over the long term, are avoided."

– Sustainable Finance Forum 2021

¹³Climate Change Commission 2021

¹⁴Sustainable Finance Forum 2020

¹⁵Deloitte 2020

The connection to climate change

Climate change is a global issue that has a significant local impact, especially when partnered with continued growth and development pressures in New Zealand.

It will affect all of us in ways we struggle to comprehend and through more than just our environmental or economic wellbeing. Humanity did not develop to deal with challenges of such scale and consequence that confront our relationship with time. Approximately a decade is "all that remains to stop irreversible damage from climate change."¹⁶ We can see into the future, and are already experiencing the impacts of more unpredictable weather conditions today. The Royal Society of New Zealand identified several sensitivities to climate change that put Aotearoa at risk, even at the optimistic low-end of the expected rise in global temperature. These include living on coasts and floodplains, being surrounded by oceans, our heavy economic dependency on freshwater, vulnerability of our unique ecosystems, and our reliance on strong international connectivity.¹⁷ The wellbeing of our natural systems is linked to Māori values, and if compromised, poses further threat to cultural sites, their high-proportion of assets in natural resources, and ties to indigenous ecosystems.¹⁸



"Our unique way of life, identity, and the values and traditions that make us who we are, are at risk of being altered or lost forever. Some of the things we care about most – our ability to direct our own future, a secure life for our grandchildren, and our deep connections to the natural beauty of these islands – are all threatened by climate change."

–Ministry for the Environment 2020

"There will be more flooding events, increased coastal erosion, and we have houses, and marae, and urupā that are already at threat right now, not in the future but right now."¹⁹

– Tina Ngata, advocate for environmental, Indigenous, and human rights

¹⁶United Nations 2019

¹⁷Royal Society of New Zealand 2016

¹⁸Ibid

¹⁹Dewes 2020

On an individual and societal level, the wellbeing impacts of climate change are only just beginning to be understood. The connection to inequity at a global level is deeply intertwined. "The most vulnerable people bear the brunt of climate change impacts yet contribute the least to the crisis."²⁰ As the climate becomes more unpredictable and disruptive, the challenges of extreme events, health effects, food security, threats to livelihood, water security, and cultural identity are disproportionately greater for marginalised groups.

Carbon emissions are the key driver of climate change; we need to reduce our carbon footprint and the incentive is strong. "The good news is it's now clearly cheaper to save the planet than to ruin it. The bad news is we are fast running out of time."²¹ We have exceeded, or are on the brink of, environmental tipping points in polar ice sheets, permafrost, and the Amazon rainforest and these are expected to cascade like dominoes.²²

It is the biggest challenge of our generation to shape a lower carbon world. "Adaptation to those climate changes would still be necessary and may entail substantial changes for some sectors and regions, but would be more feasible than in a high-carbon world."²⁴ Hopefully we never realise the implications of a high-carbon world; the time to decarbonise is now.

"Climate change is more than an environmental crisis – it is a social crisis and compels us to address issues of inequality on many levels: between wealthy and poor countries; between rich and poor within countries; between men and women, and between generations."

– The World Bank

"The Earth will get as warm as we make it, which means we're the ones [that must] stop it."²³

– Prof Anders Levermann, The Potsdam Institute for Climate Impact Research (PIK)

²⁰The World Bank n.d.

²¹Doer and Harvey 2020

²²The Guardian 2021

²³ibid

²⁴Royal Society of New Zealand 2016

The changing landscape of sustainability and business

Businesses are feeling pressure from multiple angles to drive sustainability within their organisations and support their survival in a shifting carbon paradigm. The following list of drivers has been derived from Deloitte's work on the subject.²⁵

Investor pressure

The financing model is shifting as investors are looking beyond short-term returns towards the sustainability of investment in the face of climate change. By investing in businesses that have more sustainable operations, there is a lower risk, especially with stranded assets. Environmental, social, and governance (ESG) ratings for companies have kickstarted a trend of more sustainable investments.

Customer, employee and community demands

A shift in generational values, employee activism, and public pressure has occurred, causing businesses and government to acknowledge the need to embrace a low-carbon future. New Zealand's overseas markets are demanding it.

Regulatory pressure, policy, and government targets

New Zealand's national goals and international commitments to carbon reduction set the tone for transformation based on public demand. Regulations of our trading partners will continue to shape the sustainability of the goods we produce.

Cost reduction and enhancements in operational efficiency

While there are currently potentially higher upfront costs, savings in operating costs with lower carbon technologies are substantial, and the price of renewable energy has decreased significantly.

"We're increasingly seeing an awareness among CEOs and CFOs that a corporate strategy can no longer be distinct from a sustainability strategy. Aligning them shows a public commitment to building resilience into business models and creating a better future for all."²⁶

– Joanna Silver, Head of Sustainable Finance, Westpac New Zealand

²⁵Deloitte 2020b

²⁶Chartered Accountants Australia and New Zealand 2020

What we can do about it

This section aims to explore the potential for financing and incentivisation to support both the technical and non-technical innovations that are needed to decarbonise at speed and scale.

"The clear implication of this is that New Zealand's emissions reductions commitments in 2030 and 2050 will mostly have to be met by technologies that are in-use today."

- EECA 2021

"No politician is going to change the incentives for owning a petrol and diesel car, unless they first put in place good quality, affordable public transport, a scrappage scheme so people can upgrade to an electric vehicle, and charging infrastructure, especially in rural areas."³⁰

- Angela Francis, Chief Advisor for Economics and Economic Development at WWF

The good news is that the "low-emission innovations which are already commercially available today have the greatest potential to reduce emissions by 2030 and beyond."²⁷

This means adopting existing technologies is key and where financing and incentivisation innovations should focus in the near term. According to EECA, "Addressing the innovation diffusion chasm stands out as the biggest priority when it comes to emissions reductions in New Zealand."²⁸ This is the gap between existing solutions and market penetration that is difficult to overcome. How successful we are in this will ultimately determine if we decarbonise by the time set out in our national objectives and international commitments.

Transportation illustrates these challenges with the diffusion chasm. We have solutions to remove fossil fuel reliance for commuter transportation. However, several barriers still exist: infrastructure, cost, where we work, where we live, public transit quality, and, ultimately, how we connect. For decarbonisation to occur, "The adoption of low-carbon technologies will be crucial, but non-technical innovations such as changes in practices or behaviours will be required too."²⁹

²⁷EECA 2021

²⁸Ibid

²⁹Ibid

³⁰Francis 2019

What we can do about it

A systemic approach to shape the future of financing

"The widespread consensus is that the climate crisis cannot be solved by public capital alone." Meeting our net zero targets will require a multifold increase (~10x) of private investment.³⁰ The financial sector has a critical role to play in reaching carbon goals, largely through re-orienting investments towards more sustainable technologies and businesses.³¹ The shift to lower-emission innovations requires sustainable or "patient" finance, which can accept a higher level of risk and can link funds to sustainability outcomes, paving the way for future venture capital investment in low emissions. This is why the Government established the New Zealand Green Investment Finance alongside the Zero Carbon Act to accelerate investments that reduce GHGs.

Overall, in New Zealand, we are currently behind the European Union which has had a sustainable finance strategy since early 2018. According to the Roadmap for Action published by Sustainable Finance Forum, "Significant volumes of sustainable projects are not funded as they do not meet traditional risk/return requirements or encounter prohibitive cost barriers."³² The World Economic Forum refers to this as an investment gap, driven from:³³

- *A mismatch of financier risk appetite and inadequate de-risking;*
- *On the demand side, investors flag the lack of "bankable" opportunities and a limited pipeline;*
- *Policy/regulatory uncertainty, limited clarity and granularity on transition pathways;*
- *And a lack of data to inform decisions and track progress.*

"The co-design of solutions focused on innovative financing approaches, new ways of doing business and de-risking measures are necessary. Today, mechanisms required to bring together stakeholders across the ecosystem to collaboratively co-design solutions do not exist structurally."

– World Economic Forum 2021

CASE STUDY

Green bonds and climate bonds

What they are:

A means of investing in sustainability projects with a guaranteed return that removes risk and incentivises decarbonisation action through providing the necessary capital.

Why it's interesting:

Growing in popularity in recent years in New Zealand, green bonds allow investors to remove guilt and increase impact from their portfolio, generate a modest but assured return, and enable organisations such as Auckland Council to "finance and refinance the region's electric trains, public cycleways and associated infrastructure."³⁴

Recently, as New Zealand's largest issuer of sustainability bonds, "sustainability finance has helped Kāinga Ora bring forward plans to move up to the Homestar 6 standard by six to 12 months."³⁵

³⁰World Economic Forum 2021

³¹European Commission 2021

³²Sustainable Finance Forum 2020

³³World Economic Forum 2021

³⁴Auckland Council 2020b

³⁵NZ Herald 2021

This is a human problem in a big system. Projects that identify and address the systemic barriers limiting the flows of private capital towards low-emissions investments and “ways to incentivise the growth of sustainable capital markets need to be explored.”³⁶

Opportunity areas identified by the Sustainable Finance Forum include improving data quality and availability, more robust and transparent reporting, supporting the sectors' capability in sustainable finance, and developing standards and pathways for sustainable investments.³⁸

The World Economic Forum proposes three focus areas to help overcome key challenges:³⁹

1. ***The innovative blending of capital supported by an enabling ecosystem is needed, where different sources of public and private capital are brought together. To do this effectively, mechanisms that activate collaboration among multiple stakeholders are necessary.***
2. ***Transformative business models are essential, where industry participants and capital providers work together to establish new contracts and ways of doing business to increase the probability of commercial success.***
3. ***Targeted public intervention is critical, focused on the design of incentive schemes that reward early adopters of innovative technological solutions and de-risking schemes.***

Expanding our understanding of incentivisation

A common view of incentivisation is rooted in rewards such as money or gifts. To support systemic change, we also must consider intrinsic incentives as a powerful force for change. Decarbonisation is critical for the success of our future economy and sustainability is also deeply personal and connected to our values. We cannot forget about the hearts and minds.

While you can further break down incentive types (e.g., moral, social), the key point is that there are many approaches to make the better choice easier. The following section aims to explore the topic of incentivisation broadly and highlight levers that can motivate people to change their behaviours with decarbonisation as an outcome.

A portfolio of incentivisation solutions working together can create a tipping point to mass adoption and societal change.

“There is a breadth of innovation opportunities. I don't think a technical solution is going to be adequate. We need to lead people through the adoption of technology and practices.”

– Alec Tang, Director of Sustainability, Kāinga Ora

³⁶Sustainable Finance Forum 2020

³⁷World Economic Forum 2021

³⁸Sustainable Finance Forum 2020

³⁹World Economic Forum 2021

Extrinsic incentives

FUNDING AND REBATES

Incentivising change through providing money for the specific purpose of decarbonisation activities

While linked to the financial system discussed previously, funding is referring to the act of giving money as an economic incentive rather than financing, which involves being able to access capital.

There are several ways that money can be deployed as an incentive such as retrofitting and scrappage schemes that enable people to upgrade to cleaner tech, research grants, tax incentives and deductions, and subsidies for sustainable goods and services. Access to prize pools and lotteries can drive behaviour change and crowdsource ideas and action.

CASE STUDY

The NZTA Clean Car Discount

What it is:

A recently introduced NZ government policy to incentivise the purchase of fully electric and plug-in hybrid vehicles by reducing the cost through rebates after purchase. It also adds on a fee when purchasing high emitting vehicles.

Why it's interesting:

A feebate scheme like this "has the additional benefit that it disincentivises high-emitting vehicles, while encouraging lower-emissions ones."⁴⁰

PROCUREMENT AND CONTRACTING

Incentivising change through establishing clear signals for suppliers

To promote regenerative farming practices, NZ Merino has a unique approach to creating signals through their contract model by "facilitating long-term contracts between their growers and brands, ensuring a fair price for both parties creating financial security and an ability to forward plan when not reliant on the fluctuations of the commodity market."⁴¹

For the building and construction sector, the power of procurement preference for decarbonisation over lowest cost could dramatically shift how we build and what we build with. This would lead to the reduced cost of climate-friendly practices in the future.

"We find growers are more willing to measure their emissions and sequestration, plan to engage in lower emission practices, and consider ways to increase their sequestration when they are positivity incentivised by the market rather than being regulated by the government."

– Felicity Thomas, ZQRX Project Coordinator, NZ Merino

⁴⁰Climate Change Commission 2021

⁴¹Felicity Thomas (personal communication, 15 July, 2021)

POLICY AND REGULATION

Incentivising change through the system rules and settings

Changes to legislation with built-in continuous improvement can create the adaptable settings that enable entire sectors to start down a lower carbon path. An example of this is California's thermal building code that automatically incorporates new low-emission innovations that pay for themselves in efficiency savings every three years, leading to a building today using 80 per cent less energy than a pre-code building (1978).⁴²

New Zealand's main policy instrument to incentivise the reduction of GHG emissions is the emissions trading scheme (ETS). While it has recently undergone significant reform, it does not include agriculture and could further incentivise emission reduction with additional co-benefits. The Ministry for the Environment states that "we will also need additional tools and approaches that can work alongside the NZ ETS, to bring down emissions over the next 30 years."⁴³

"Brands want high quality credits with co-benefits such as biodiversity improvements from native forest restoration or regeneration, linking patches of forest remnants, pest and predator control are great ways to sequester carbon and improve native biodiversity concurrently. But it is very difficult for these projects to be recognised by or feasible with the "one size fits all" ETS system which does not allow for a price differential and high-quality credits to be fittingly rewarded.

– Felicity Thomas, ZQRX Project Coordinator, NZ Merino

COORDINATION AND COLLABORATION

Incentivising change through resource sharing, fair distribution, and smarter spending

Collaboration could take many forms, such as standardisation, shared goals, knowledge or infrastructure. By distributing the investment needed to reduce emissions, such as through a communal biodigestion facility to produce energy among regional or value chain partners, the cost-benefit in both the short and long term can make the decision significantly more possible for leaders. It is a major disincentive to tackle these challenges alone.

"When an agency's mandate prevents it to act and think end-to-end, partnership with other agencies/organisations should be sought to create a pipeline of innovation with cross-government support."

– EECA 2021

⁴²Doer and Harvey 2020

⁴³Ministry for the Environment 2021b

Intrinsic incentives

DATA AND ACCESSIBLE KNOWLEDGE

Incentivising change through improving information flows, feedback loops, and reducing delays

From a macro point of view, we have a challenge with the transparency of data to increase the public pressure to decarbonise. We do not know the impact of our decisions and therefore are disincentivised to make different choices. From a micro point of view, we are placing a significant burden, in terms of cost and effort, for producers to collect and report data (e.g., farmers). Making data collection and usage more accessible for all actors in the system could incentivise them to shift and capitalise on the transformation.

This is also a major contributor to the growth of sustainable finance as investors need proof of performing. Homestar, a tool to rate home performance and environmental impact can give investors that incentive through verification and confidence.⁴⁴

CASE STUDY

The Efficient Appliance Calculator

What it is:

Gen Less is a platform backed by EECA to help consumers “live more with less.” The Efficient Appliance Calculator is one of the many tools and guides designed to help consumers make more planet-friendly choices. They say they do this through using data to “filter and compare appliances to find the most efficient appliance that meets your needs.”⁴⁵

Why it's interesting:

Making more sustainable purchasing decisions is tough and the Gen Less platform aims to connect consumers with a source of trusted information, presented in a way that people can use. By making the issues and better choices more clear, this can incentivise individuals to make lower carbon-decisions which ultimately flows back to the manufacturers.

⁴⁴Bennett 2021

⁴⁵Gen Less 2021

COMMUNICATION AND BELIEF

Incentivising change through reframing the social narrative and shifting norms

Effectively communicating the need for change with the wealth of data we have and illuminating the stories where positive change is happening can motivate individuals to be a part of the movement.

Art and storytelling can play a powerful role to connect with people's value systems that drive their behaviour through social and moral incentives.

"Polar bears and ice sheets in Greenland are not something that our whānau here can relate to - you're not going to have a go there, you're going to have a hard time getting them to engage through that discussion, so when you start talking about kina, and pāua and kōura, that gives our people something much more relevant [to engage with]."⁴⁶

– Tina Ngata, advocate for environmental, Indigenous, and human rights

CHOICE ARCHITECTURE

Incentivising change through enabling choices that align with existing values and desires

We can incentivise behaviour change by adjusting our environments and interactions to make better choices more common. This is at the "pointy end" of the individual and their choice. This practice is often referred to as "nudging" or choice architecture. This could be a simple change such as adjusting default shipping methods to be the lowest carbon option rather than the fastest time. Looking at specific behaviours, we can design interventions that enable people to seamlessly make more carbon-friendly decisions that align with their lifestyle or even make it enjoyable through mechanisms such as gamification.

CASE STUDY

Google Sustainability

What it is:

[Google is embedding sustainability](#) as a feature in its core products and leveraging their reach to influence our daily decisions.

Why it's interesting:

Technology has a large role to play in helping us decarbonise through choice architecture. By making the sustainable choice easier through Maps, searches, and more, individuals are incentivised to take more eco-friendly routes, find lower emission travel, and purchase more sustainable products.

⁴⁶Johnsen 2020

Negative incentives

We have purposefully chosen not to focus on negative incentives as a means of promoting transition (e.g., taxes and fines). While they have a role to play in making fossil fuels and unsustainable practices less desirable, they are not enough to mitigate climate change. Negative incentives are also less popular and can be slow to create change.

For example, with rising petrol costs, "While drivers may purchase a more fuel-efficient car in the long run, they are more likely, in the shorter run, to reduce other kinds of consumption to offset the rise in cost."⁴⁷ Carbon taxes have also been shown to place an added burden on rural populations.⁴⁸ In addition, a "price-based approach to mitigating climate change is that it fails to account for markets' potential to create perverse incentives."⁴⁹ For example, when the cost of conventional energy, materials, and approaches increases, suppliers see an opportunity and develop more, which ultimately lowers the cost and disincentivises lower carbon choices. Specific to New Zealand, the Climate Change Commission warns of a possible unintended consequence of negative incentives based on our existing policy settings and sector infrastructure for forestry. "Increasing emissions prices would also incentivise greater establishment of permanent exotic carbon forestry. However, current NZ ETS settings will incentivise more planting of fast-growing exotic species, such as pine",⁵⁰ which impacts biodiversity and our native species.

"Contrary to the conventional wisdom, steadily rising costs for conventional energy cannot be counted on to propel the necessary shift toward a low-carbon future."

– World Economic Forum 2016

Positive incentives are deemed to be the better approach by the World Economic Forum.

"Directly reward[ing] those who do invest in a low-carbon future"⁵¹ is where we need to focus. While more costly in the short term compared to increasing taxes, positive incentives promote greater long-term benefits. However, when revenue from negative incentives are allocated to reinforce positive ones, such as reducing taxes for small businesses or lower socioeconomic groups, this can support a more equitable transition across society. The combination of incentive types can be a powerful lever.

"For example, governments could implement accelerated depreciation schemes for investment in low-carbon businesses; offer subsidies for investment in energy-efficient buildings; and create policies that favor industrial innovation aimed at reducing emissions and boosting competitiveness. All of this would make fossil fuels less attractive to both investors and consumers."

– World Economic Forum 2016

⁴⁷World Economic Forum 2016

⁴⁸DeWeerd 2021

⁴⁹World Economic Forum 2016

⁵⁰Climate Change Commission 2021

⁵¹World Economic Forum 2016

Targeting high impact areas

In New Zealand, most of our carbon emissions are coming from energy use and agriculture. These two sources make up nearly 90% of our total emissions.⁵² Starting with energy use, the picture becomes clearer when it is broken down further.

⁵²Ministry for the Environment 2021

Energy demands

How might we incentivise increased efficiency to make smarter use of the energy we produce?

While New Zealand's energy grid is primarily based on renewables, we run into challenges during peak times in the morning and early evening. In combination with the variability associated with hydro and wind electricity generation, this peak demand requires the burning of coal and natural gas. In the New Zealand context, "investing in energy-efficient technology will provide a cheaper means of substituting for thermal generation and lowering greenhouse gas emissions than new renewable generation."⁵³ Waning Chua (Strategy Lead, EECA) sees peak demand management as an appropriate solution to reduce coal or gas generation during peak times. Energy management systems in homes and businesses can help us get there by reducing the thinking and effort required to adopt change.

"Policy-makers and industry planners should ensure they devote appropriate investigation and investment to electricity efficiency measures alongside other decarbonisation activities. This requires placing a much higher priority on electricity efficiency than it currently receives."

– EECA 2019

CASE STUDY

AI and home management systems

What it is:

Using AI and machine learning to blend customer preferences with customers' typical behaviours to predict and manage when people will adjust their thermostats, switch on their appliances, or charge their vehicle to balance energy demand.

Why it's interesting:

This technology is readily available and takes the thinking out of doing good and saving money. Given that energy costs make up a small fraction of household spending, it is difficult to ask people to make trade-offs in their comfort and lifestyle for the environment. Home management systems can optimise energy consumption and individual's needs, providing benefits that encourage positive action.

Incentivising businesses and households to be more energy-efficient can play an important role by showcasing the benefits of lower carbon practices on people's lives and businesses' bottom lines. The solutions that exist can lighten the load on the grid and handle simple daily tasks to make life easier.

⁵³EECA 2019b

Passenger transport

How might we incentivise lower emission behaviours for light passenger and commercial transportation in cities?

While it has relatively low energy usage, transportation punches above its weight when it comes to emissions; it accounts for 43.6% of Auckland's emission profile. Light vehicles are the primary source, at 30% in Auckland⁵⁴ and 13.6% nationally.⁵⁵ Electric vehicles (EV) have come a long way towards reducing their "green premium", or the added cost for a more sustainable choice. With continued improvements in battery technology, and more favourable conditions in the marketplace, the cost of EVs is decreasing. However, with much government investment being placed in technology and infrastructure, how do we innovate to support people and businesses to use vehicular transport more efficiently?

While not ignoring the smaller regional areas in New Zealand, the opportunity for the most significant reduction is in urban centres due to the traffic density. Transportation is the main focus of Te Tāruke-ā-Tāwhiri: Auckland's Climate Plan that Alec Tang, now the Director of Sustainability at Kāinga Ora, helped create. He views the challenge from a holistic perspective that considers the individual's role within the system. "The technocratic solution is to remove fossil fuels. The non-technocratic solution is to use cycling and walking. We need to reshape how we live in cities." In appreciation that there is still a need for vehicles, Alec sees a need to confront our expectations on the vehicles we have and for what purpose. "We need to understand the most appropriate tool [vehicle] for each job, and how we make that work".

"Transportation innovation is something that hasn't really been addressed [in NZ] outside of technology and infrastructure."

– Waning Chua, Strategy Lead, Energy Efficiency Conservation Agency (EECA)

Auckland's goal by 2030 is to have a 64% reduction in transportation emissions through: ⁵⁶

1. increasing public transport, cycling, and walking
2. having new homes in transit-oriented developments
3. actions such as remote working and reducing trip lengths
4. increasing fuel efficiency, and
5. having 40% of passenger and light commercial vehicles be electric or zero-emission, amongst others.

While technology plays an important role, it is part of a suite of improvements with behaviour changes, as Te Tāruke-ā-Tāwhiri: Auckland's Climate Plan demonstrates.

⁵⁴Auckland Council 2020

⁵⁵Ministry for the Environment 2021

⁵⁶Auckland Council 2020

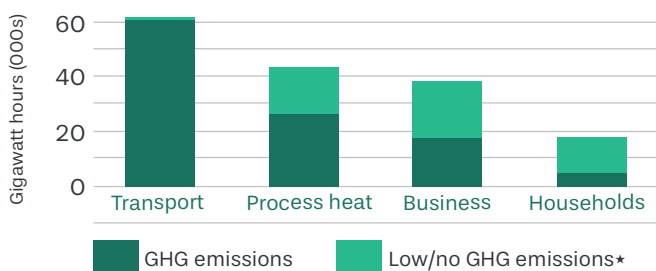
Process heat

How might we fund and incentivise industrial processors that use fossil fuels for low and intermediate heat generation to shift to more efficient, lower emission technologies?

Energy use from process heat (see explanation to the right) from manufacturing primary products is the second largest contributor to energy-related greenhouse gases after transportation.⁵⁷ Of total business emissions, 60% are from process heat and of that, 52.5% are from low and intermediate heat generation (below 300oC) that does not require coal or gas. According to MBIE, "the ability and incentives for organisations to switch to electricity is dependent on both the relative price of electricity and the future of process heat technology."⁵⁸

79% of process heat energy is consumed by the industrial sector.⁵⁹ Currently, a range of fossil fuels are being used for specific processes such as drying, pasteurisation, sterilisation, and heating. According to the Energy Efficiency Conservation Authority (EECA), "A range of electro-technology alternatives to using heat are commercially available and are already applied within key sectors of interest for New Zealand at industrial scale around the world."⁶⁰ Looking at the largest process heat users more closely, EECA believes the "Key sectors that could benefit from technology changes are: dairy, meat, food and beverage, pulp and paper, and wood."⁶¹

Energy use in New Zealand



Source: MBIE Energy in New Zealand 2018

"Process heat is the energy used as heat mainly by the industrial and commercial sectors for industrial processes, manufacturing, and warming spaces. This is often in the form of steam, hot water or hot gases. Around half of New Zealand's process heat demand is currently met by burning coal or natural gas."

-EECA 2018

In discussion with Waning Chua, Strategy Lead at EECA, many barriers exist for businesses to shift to more sustainable practices and technology. For example, constraints on the electricity delivery infrastructure supplying manufacturing plants, large investments in existing equipment with a 20- to 40-year lifespan, and how the system has been geared to support this existing equipment (e.g. knowledge, parts, and repair). Even overseas regulations play a role as trade agreements can stipulate what technology is used, such as hot water for sterilisation in the meat industry.⁶² These barriers are an example of "carbon lock-in."

Through an understanding of these barriers to change, measures can be put in place to incentivise the adoption of overseas technology that "offer valuable co-benefits (productivity, quality, and shelf-life) which often exceed the energy and emissions savings."⁶³

⁵⁷EECA 2019b

⁵⁸MBIE 2020

⁵⁹MBIE 2019

⁶⁰EECA 2019

⁶¹Ibid

⁶²China Food and Drug Administration 2017

⁶³EECA 2019

Agriculture

How might we provide the necessary incentive for farmers and growers to reduce emissions through equipping and empowering them with data, tools, and knowledge?

The agriculture sector accounts for 48.1% of our greenhouse gas emissions.⁶⁴ This number should not be used to point blame at the industry but rather support primary producers on their journeys to more sustainable practices, while recognising the efforts they are already undertaking. He Waka Eke Noa, the Primary Sector Climate Action Partnership, focuses on incentivising carbon emission reduction through pricing mechanisms that support on-farm practice change. They intend to "incentivise the uptake of economically viable opportunities that contribute to lower global emissions."

A significant component of this that needs further work is "ensuring farmers and growers are equipped with the knowledge and tools they need to deliver emissions reductions while maintaining profitability."⁶⁵

Felicity Thomas, who coordinates NZ Merino's regenerative agriculture platform, expressed concern over "the lack of industry professionals and support for farmers to gain a clear understanding of their emissions and sequestration. We are working with experts to understand the net emissions balance of our growers' properties. However, at an individual farmer level, it is costly and time-consuming to invest in tools such as overseer or vegetation experts for better mapping."

Efforts must be made to enhance this understanding, through data and communication that is transparent and accessible. Incentivisation in this case is the removal of the barriers that prohibits undertaking lower carbon practices, such as regenerative agriculture. Uptake can go farther faster if supported with innovative financing to make it possible to obtain the capital required to invest in the shift from conventional methods.

"The land cover databases available are not good enough at a farm-level to truly capture the full picture of sequestration on farm."

- Felicity Thomas, ZQRX Project Coordinator, NZ Merino

⁶⁴Ministry for the Environment 2021

⁶⁵He Waka Eke Noa 2019

Construction

How might interventions in the building and construction system incentivise infrastructure with lower whole-of-life embodied emissions?

Where we build, why we build, how we build, and what we build with are becoming increasingly important questions as we enter a more unpredictable future. The construction and operation of buildings and infrastructure accounts for approximately 20% of New Zealand's carbon emissions, including international trade and "considers the entire life cycle of buildings, from the extraction of raw materials to the building's energy use and treatment of construction waste."⁶⁶ This number can change based on how you account for carbon emission. This report considers it in terms of the amount of operational and embodied carbon as a result of the decades-long lifespan for buildings.

Operational carbon is all the energy it takes to keep a building functioning such as ventilation, heating, cooling and lighting, whereas embodied carbon emissions are "from the materials and products that form the building and can occur right across the building's life cycle"⁶⁷ from the manufacturing of steel to the pouring of concrete and their eventual demolition.

Up until now, "the focus on reducing the environmental impact of buildings has been only to increase their operational efficiency",⁶⁸ when embodied carbon represents approximately half of the total emissions over the lifecycle of a building.⁶⁹ A report by MBIE noted "the Building and Construction Sector in New Zealand currently has a relatively immature understanding of the embodied carbon impacts of its activities, and there is no regulation or incentives requiring it to be considered."⁷⁰

CASE STUDY

Carbon-capturing concrete

What it is:

Concrete that uses CO₂ to cure through changes in the cement composition or the process used to make it.

Why it's interesting:

This technology can change the cement industry from one of the biggest global emitters to a carbon sponge. Multiple businesses are working on ways to integrate greener concrete into the construction sector, in a way that provides alignment with existing uses and provides additional benefits to incentivise switching. These include less curing time, higher tensile strength and hardness, or using waste products from other industries as a binding agent, as well as drastically reducing emissions and even capturing and locking away carbon.⁷¹

MBIE has put forward a framework with three objectives to reduce embodied carbon: 1) maximising new build efficiency, 2) increasing building material efficiency, and 3) reducing the carbon intensity (using materials with less embodied carbon).⁷² The interest and need to account for and improve on embodied carbon is growing domestically and globally and being pushed by organisations such as the New Zealand Green Building Council. A focus on phasing out fossil fuels in buildings remains vital, and they believe "designers can help by selecting low-emission materials and using them efficiently" to reduce embodied carbon.⁷³

⁶⁶ThinkStep 2018

⁶⁷MBIE 2020b

⁶⁸MBIE 2020b

⁶⁹ThinkStep 2018

⁷⁰MBIE 2020b

⁷¹Ibid

⁷²New Zealand Green Building Council 2019

⁷³Rathi 2019

Carbon sequestration

How might we incentivise the sequestration of carbon in a way that best suits our context and natural systems?

While we should primarily focus on reduction of emissions, it is an interesting conversation to consider the role of removing CO₂ from the atmosphere in New Zealand's future. Carbon capture and storage (CCS) through technology is another exciting area of innovation which can lock carbon away in a stable state underground. To prevent the global temperature rise of 1.5°C, reduction and prevention of greenhouse gas emissions will be insufficient; removal will be necessary. However, according to MBIE, "New Zealand has relatively few point sources of CO₂ emissions and a far higher renewable contribution to electricity generation. This means that CCS has limited potential to help New Zealand mitigate climate change."⁷⁴

On the flipside, an area of potential innovation is a biological form of sequestration through our coastlines. Coastal ecosystems "can sequester up to 20 times more carbon per acre than land forests."⁷⁵ This is referred to as "blue carbon" and is a critical part of the carbon cycle, with 83% of global carbon circulating through the ocean.⁷⁶ As plants such as mangroves and seagrass die, some get buried and trap the carbon under the seafloor where it degrades very slowly due to the low carbon environment. The challenge to overcome for incentivising adoption is the "difficult[y] to precisely measure how much carbon is sequestered and exported to the deep sea."⁷⁷ This potential to capture and store carbon makes it essential to protect our marine ecosystems and build new ones as part of the main focus of gross emissions reductions.

"Instead of pondering how to dispose of CO₂ and other waste, many companies may by 2030 view everything they produce, including emissions, by-products and end-products, as a resource that can be traded to create economic value. New partnerships and markets are likely to form. Substances long emitted or discarded as costly nuisances can become products that companies want to buy. And a new, cleaner, more circular economy can emerge."

-Deloitte 2020

⁷⁴MBIE 2011
⁷⁵Hurlimann 2019

⁷⁶Conservation International 2019
⁷⁷Hurlimann 2019

Guidance to move forward

This section provides principles to consider and inspiration on what financing and incentivising decarbonisation might look like. The aim is to support applicants and assessors in shaping up impactful, lasting interventions that enable people to transition to a lower carbon future.

Principles to guide progress

We need rapid change to meet Aotearoa's climate goals. Projects that finance and incentivise decarbonisation are more likely to make an impactful contribution if we:



Follow the tonnes and leverage what already exists

Looking at where we can reduce the emission tonnes most significantly is how we can make impact most quickly. Hal Harvey, who wrote the book on designing policy for low-carbon energy, uses the term "follow the tonnes" and says that "we don't need green paint, we need green substance."⁷⁸ While research in new technology is important, we urgently need projects that lead to scale and change in the real-world with limited resources of time and money through addressing the 'diffusion chasm.'



Target intersections, synergies, and co-benefits

Focus on creating solutions for cross-cutting problems that "can improve the quality of life for people now and in the future."⁷⁹ These include co-benefits such as improving health and wellbeing, enhancing biodiversity, and creating more liveable cities. Go for the win-wins first.



Do not ask people to make complex trade-offs

Design interventions that offer obvious benefits in exchange for the shift to lower carbon practices or technologies. To incentivise decarbonisation, information should be presented in such a way that the decision appears to be an easy choice to adopt.



Promote collective action

Focus on increasing connections for resilience in an increasingly uncertain world. As Alec Tang, Director of Sustainability at Kāinga Ora puts it, "Our survival is reliant on other people." If we can find sweet spots between lowering carbon usage and increasing community cohesion, we can amplify synergies of both positive environmental and social change.



Bring people on the journey for a just transition

Focus on incentivising those that see a green economy not working for them. People that can afford to change their lives to lower their carbon footprint may already be on board. Instead, we need to provide motivation and support for those that are worried about the end of the week, not the end of the world. Decarbonisation efforts need not add further burden for the already vulnerable.



Take a systemic view and approach

To achieve sustainable and impactful change, we must design interventions with consideration of the systemic conditions that may interfere or enable. By thinking about problems and opportunities to address decarbonisation as interconnected and interdependent, we can amplify the efforts and effects.

⁷⁸Doer and Harvey 2020

⁷⁹Climate Change Commission 2021

Financing and incentivisation in practice

Solutions to decarbonise are known, but that does not mean the implementation is easy. The mind map below provides more practical inspiration for turning the information in this report into action. The pay off for global decarbonisation, and alternatively the impact for not decarbonising, is massive, yet far away. For people to take the necessary steps before it is too late, we need to make lower carbon choices more desirable, more tangible, and more possible.

We need to solutions that make the better choice easier and create the conditions that support change at a government, industry, and consumer level.

How might you use innovation in financing and incentivisation to achieve that?



Make it Desirable

Having the alternative choice be more desirable to incentivise switching, as well as illuminating the positive elements of a greener future.

Make it Tangible

Making decarbonisation and climate change less abstract and the costs and the opportunities more real to increase the urgency and ability to act.

Make it Possible

Creating the enabling conditions and removing barriers at a systemic level that incentivise people to make lower carbon choices

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