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Zero Waste Network Aotearoa

The Zero Waste Network Aotearoa NZ

The Zero Waste Network is a membership organisation with 120+ members across the country who work towards Zero Waste with their local community. Our mission is to connect, educate, enable and inspire members to reach their zero waste goals and to be a unifying voice at local, regional and central government levels.

Our members employ 700+ people who work in resource recovery and environmental education. Collectively we recover 30,000+ tonnes of material each year and feed $30+ million dollars back into local economies through our enterprises. The Zero Waste Network is based in Auckland and Wellington with board members spread across Aotearoa.

Thanks for the opportunity to submit our feedback on He Tūāpapa ki te ora Infrastructure for a better future and look forward to seeing the final draft. We appreciate all your hard work in this space on our behalf to create better infrastructure policy and lift procurement practices.

We have put some energy into explaining how waste reduction, emissions reduction and the circular economy are connected. We hope you will find this detail useful. Our intention is to add value to the Infrastructure Commissions strategic thinking in this area. Please get in touch if there is anything in our submission that you would like to explore in greater detail

We have separated our submission into 4 sections that outline our ideas on how a reframe of resource recovery and waste management infrastructure provision would enable emissions reductions and a just transition to a circular economy by 2050.

1. Current context - Operating environment
2. Relationship between reducing waste and emissions and a Circular Economy
3. The value of a Nationwide Resource Recovery Network
4. Specific comments relating to the draft Infrastructure Strategy including the vision, outcomes, principles and priorities.

Introduction

It has become clear that the way we are using our economy to meet our needs and wants is creating some problems. Aotearoa is shifting to a well being approach as a way of applying a whole system, outcomes focused approach to solving the big issues of the day. The Infrastructure Strategy is one part of this process.

Climate change, biodiversity and soil loss, resource limits, inequality, pollution and waste are just some of the problems the Infrastructure Strategy is wrestling with. We agree that infrastructure creates the foundation for our way of life and to create resilience and well being in these uncertain times requires a fresh approach.

We need new models so public, private and civil society can work together to create a circular economy that delivers value for everybody. Establishing a coherent, integrated nationwide resource recovery network is a critical piece of the puzzle. Tackling the twin challenges of reducing waste and emissions is a big intergenerational behaviour change project. It involves a paradigm shift like the one that brought us the industrial revolution.

Substantial investment will be required to build the capacity, skill and knowledge base we need to make the jump. Investing in building the institutional, human and social capital required to change the ways we behave in all our roles needs to be a key priority for the Infrastructure Commission. This is just as important as the hard physical assets that sit alongside.

The energy, passion and focus apparent in New Zealander's concerns about 'waste' issues can be harnessed to use waste as a 'doorway' into emissions reductions for businesses, families and communities. Linking waste and emissions reductions together under the circular economy banner creates a coherent story about how we can change.

To be effective in the context of Aotearoa New Zealand, infrastructure investment needs to be underpinned by a strong partnership between Tangata Whenua and the Crown. Mātauranga Māori supports and deepens our understanding of what a sustainable, inclusive and productive ōhanga āmiomio (circular economy) could be.

Making the jump from a linear extractive economy to a circular regenerative economy is a mission that requires collaboration across traditional boundaries. Strong partnerships and cooperation locally, nationally and internationally will enable us to share knowledge and expertise so we can learn from and support one another.

The Circular Economy banner can be used as a rallying point to create a Mission driven collaboration of public, private and civil society actors. Government will lead the charge, supporting this diverse mix of organisations to work in synergy to innovate, invest and deliver grey green and soft infrastructure solutions that generate public value. This approach is in line with wellbeing budget priorities and the Government Procurement Rules.

The Circular Economy encompasses both material and energy flows, which are inextricably linked. Materials and energy are combined in various ways to create the goods and services supplied through our economy. Applying Zero Waste and Circular Economy principles enables us to slow down material flows, design out waste and pollution, regenerate natural and social systems and reduce GHG emissions.

Our sector has been locked into an 'end of the pipe' approach to dealing with the materials and products that are flowing through our extractive, linear economy. We have been stuck in this space for many years. We need to stop managing our waste problems. It is time to shift our attention up the Waste Hierarchy so we can start solving them.

We can increase circularity by moving into the prevention, reuse, repair, refurbishment, composting and closed loop recycling spaces. This will radically reduce the amount of material flowing through our production and consumption system. It will also reduce the emissions all our stuff generates across its life cycle.

The Infrastructure Strategy is very light on detail about how waste reduction and resource recovery are to come in under the infrastructure banner. The Commission's State of Play: Waste and Resource Recovery contained more detail but this has not flowed through into the final draft of the Strategy.

We see infrastructure issues around waste reduction and resource recovery best fitting into Priority area 4: Supporting a zero carbon economy and preparing for climate change. We would prefer to see this expanded out to become ***Supporting the shift to a zero carbon zero waste circular economy[1] to reduce material flows and emissions and prepare for climate change.***

The Infrastructure Commission's Strategy has flagged the intention to use infrastructure investments to generate well being across the board. The idea of making the best use of the infrastructure we already have and exploring non built options for solving infrastructure problems are particularly relevant to solving our waste problems.

When thinking about the relationship between infrastructure and 'waste' it is useful to distinguish between:

- the hard and soft Infrastructure that forms the current waste management and emerging resource recovery system and
- the construction and demolition waste generated through the building and maintenance of all forms of infrastructure.

It is important that we create an effective resource recovery system for the construction and demolition materials being generated on large and small building sites across the country. But the real wins come when we start to think differently about how we can use infrastructure to enable a just transition to a low carbon, low waste circular economy.

[1] This aligns with the Climate Change Commissions advice to Government - detail in a later section

Part one - How did we get here?

To solve our waste problems we have to go back up the pipe

So far Aotearoa has focused on *managing our waste problems.* Much of the capex and opex investment has been channeled into creating systems for safely collecting, transporting and storing domestic and commercial rubbish in landfills. Recycling is a popular activity but the methodologies being used for many collection systems result in low quality materials that do not meet the specifications of reprocessors or export markets.

The poor performance of our recycling systems and the rising volumes of waste to landfill are documented in The Sector State of Play: Resource Recovery and Waste discussion document[2] which focuses its attention on the infrastructure used to *manage* New Zealand's waste including landfills, material recovery facilities and processing facilities.

International comparisons put Aotearoa at the bottom of the heap when it comes to recycling, we generate more rubbish per capita than the people of almost every other country. We also generate more emissions per capita than most global citizens[3]. These statistics are a poor fit with our values and how we want to see ourselves. We want this to change. 85% of "Aotearoa 2050" respondents said we should definitely produce less waste[4].

The traditional approach has been to blame consumers for not caring enough, not making the right choices or just being generally lazy and irresponsible. But the missing piece of the puzzle is the structural solutions that would make it easy for households and businesses to do the right thing. It is time to pull our heads out of the sand and move beyond the 'out of sight, out of mind' approach so we can start solving our waste problems.

Waste is inefficiency and pollution

In the past waste was seen as an inevitable output of our production and consumption system. We buried it or burnt it to make it go away. But waste is better understood as pollution and inefficiency. The framing and language in the Infrastructure Strategy needs to change to enable a different conversation. We need to start talking about how we can prevent and reduce waste at source and how we can redesign products and processes to make the best long term use of the materials and energy we consume.

We are slowly growing alternatives to the 'take-make-waste' approach to running our economy. Over the last 20 years ideas like cradle-to-cradle, the performance economy, biomimicry and industrial ecology have been cross pollinating. The concept of the circular economy has emerged as a useful frame for this thinking. It enables us to think more clearly about how we can use resources, like materials and energy, to meet our needs within social and environmental limits.

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[2] New Zealand Infrastructure Commission Te Waihanga 2021 Sector State of play: Resource Recovery and Waste- Discussion Document. Retrieved from https://infracom.govt.nz/strategy/state-of-plays/resource-recovery-and-waste/

[3] NZ Govt data 2019 Evidence for Well being Budget priorities

[4] P51 Infrastructure Strategy Consultation Document

Concepts like sustainability, wellbeing, and outcomes are being brought into play to enable us to think consciously about the trade-offs we make every day. Between looking after ourselves now and keeping options open for the people that are yet to come. Between investing to grow local capacity and resilience and giving our cash to multinationals in exchange for their one size fits all 'solutions'. Between protecting and regenerating ecosystems, local economies, communities and families or exploiting them. These are the questions the Infrastructure Strategy is wrestling with.

Our waste management system is running on 'dial up'

Big, fast change is possible. 30 years ago we were running our country on 'dial up'. Hardly any of us had an email address. We used to send messages by post or via Fax machines. We used to speak to people in other places using a phone attached to the wall by a cord. By 1996 only 1 in 5 New Zealanders had heard of the internet[5].

Those of us that had modems were getting about 56 kbps. It's hard to believe that nowadays, when the average speed is more like 45,000kbps and the Internet of Things allows us to check what's in the fridge from the supermarket and turn on the heater as we ride home on the bus. We have invested, adapted, learned new skills and tried out a lot of new ideas to make the shift.

The reason we are not diverting or reducing much waste at the moment is that New Zealand's waste and resource efficiency systems are functioning at a very low level. Our approach to resource and energy flows has been stuck on the extractive, linear take - make - waste path popularised by the Industrial Revolution.

The limits to this approach are becoming obvious. Climate change, resource scarcity, inequality, waste and pollution, biodiversity and soil loss issues are pushing us to rethink how we use materials and energy to meet our needs and wants. We are faced with the challenge of making the shift to a regenerative, circular economy over the next 30 years. To do that we have to revolutionise our resource recovery infrastructure just like we have transformed our use of communications technologies.

If recycling is the answer, we are asking the wrong question

More recycling is the easy answer but it keeps us focused on the stuff coming out the end of the pipe. If we are serious about reducing throughput of materials and energy we need to go back up the pipe and change what is getting put in at the top.

The Waste Hierarchy puts activities in order based on the impact they have on waste generation. In simple terms it is best to reduce waste at source and to reuse goods and materials for as long as possible. It is good to use closed loop systems to recycle materials and compost organics. Downcycling, landfill and waste to energy are a last resort when we run out of good ideas.

There is a disconnect between the supply chain which pumps out our stuff and our recovery chain which (in theory) gathers it all back up and sends it around again to be reused, repaired,

[5] https://teara.govt.nz/en/digital-media-and-the-internet

remanufactured or to become recycled content in new products or compost for our soils. The companies that make products and materials have no obligation to consider what will happen to it at the end of it's often too short life.

Councils have been trying to make a difference by catching the rubbish that's coming out the end of the pipe since the 1990's. In 2006 the Office of the Auditor General looked into Waste Management Planning by territorial authorities. Their 2007 report[6] found that councils focused on waste diversion and waste disposal. Most of their activities involved managing waste that already existed, rather than reducing the quantity of waste generated over time.

The report noted that without reducing the amount of waste generated they could expect to have to manage steady or increasing quantities of waste. The Auditor General's office pointed out that this would place increasing demands on systems and budgets over time. They also noted that with no reduction in waste, and limited diversion, large quantities of waste would continue to flow into landfills.

They questioned the sustainability of this and the impact on community well being. The implication being that Councils were locking themselves (and their ratepayers) into an unsustainable and unaffordable trajectory. Since then nothing much has changed.

Councils are only one player in the system. They don't have the power to pull the big levers that would stop waste pouring into their districts. To do that we need to use product stewardship mechanisms to incentivise waste reduction by creating strong feedback loops across the supply and recovery chain. That will require Government leadership, coordination, regulation and hard and soft infrastructure investment.

In a recent Listener article[7] Alan Bollard pointed to "Poor infrastructure as one of the enduring causes of our low productivity". He also flagged a wider definition of infrastructure which included "many specialist public facilities." An effective resource recovery system is a necessary public good just like our transport network and our 3 waters infrastructure.

To increase productivity and make the jump to a regenerative economy we urgently need to invest in the hard and soft infrastructure required to create reuse, repair, remanufacturing, closed loop recycling and composting systems.

Transforming the way we do things

We have been talking about sustainable development since the Brundtland Report came out in 1987. It shone the spotlight on the tension between economic development, environmental protection and social equality. It name checked biodiversity loss, water issues, global warming, resource consumption and doing 'more with less'.

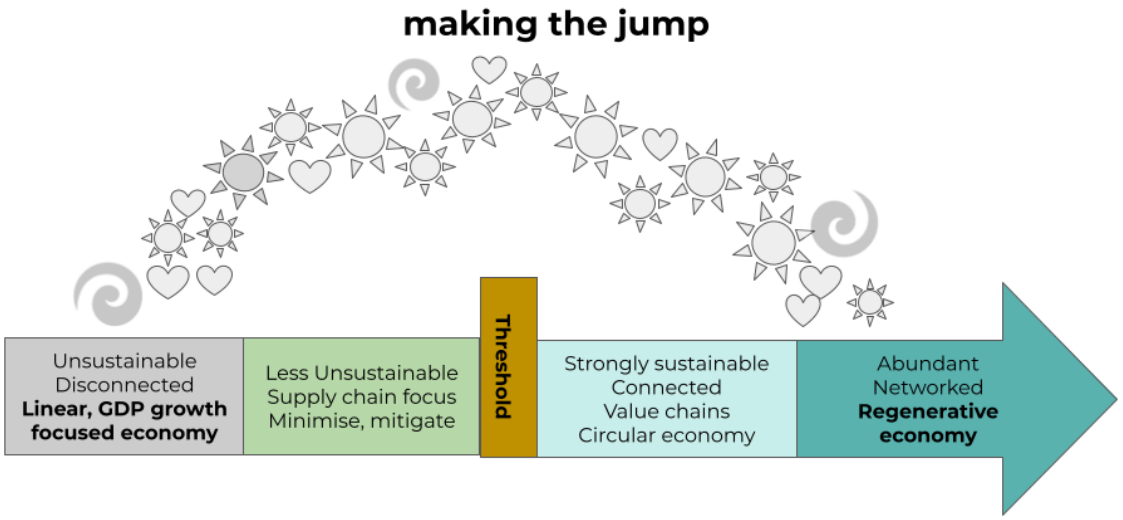
It pointed out that we live in a finite world and flagged the risks posed by an economy focused on infinite growth. It's definition: 'Sustainable development is development that meets the

[6] Retrieved from https://oag.parliament.nz/2009/performance-audits/waste-management.htm
[7] P18 Listener May 22 2021 Digging Deep

needs of future generations without compromising the ability of future generations to meet their own needs" made it clear that we have an obligation to behave fairly, not just to the people and other life forms we share planet earth with now, but all those that are yet to come.

The Brundtland Report challenged us to be good ancestors. It echoed the mātauranga Māori approach that has been practised by tangata whenua for many generations. It has taken a long time for us to take these calls seriously. Sustainability, inequality and productivity pose just as many questions for us now as they did back then. Slowly it is dawning on us that waste, climate change and quite a few of our other problems are symptoms of deeper issues with the way we produce and consume to meet our needs and wants.

We are realising that we need to transform our relationships with our stuff, one another and our place to pull back from the brink. A regenerative, circular economy has become the new utopia but we are all going to have to change the way we think and act, at work and at home in our communities so we can make the jump[8].



Adapted from SANZ Strong Sustainability for New Zealand 2009

We have a short window of opportunity to invest Waste Levy revenue to transform our resource recovery systems. It is critical that we use this to make the jump to a zero carbon, zero waste regenerative circular economy. Making do with an incremental shift to 'ever so slightly less unsustainable' options will burn our cash and leave us on the wrong side of history.

Pulling together to make a real difference

One reason we are not making much progress is that we haven't really changed the way we do things. We can solve complex problems if we take a systems approach and innovate across the board to achieve outcomes we all agree are worthwhile. To do that we need to go beyond goals and objectives. We need a Mission that we can all get behind.

[8] Adapted from Strong Sustainability for New Zealand 2009 Sustainable Aotearoa NZ

Economist Mariana Mazzucato[9] points out that Governments are the only entities with the capacity to drive change on the scale we need to tackle the big issues of our time. She argues that by taking the lead to catalyse collaboration across sectors, the Government can 'crowd in' solutions and investment by all types of organisations to solve key problems.

Channeling capacity and investment towards common good outcomes gives stakeholders across the economy a clear sense of direction. It embeds shared values into the production process so our economy creates the things we value as a society as whole. We can think of this as creating public value.

The Infrastructure Commission has the scale and capability to operate in this way. By aligning its vision, principles and outcomes framework with those of other big change agents like the Climate Commission it can help bring everyone in behind the same big picture goals. This will give us a much better chance of success on our mission by establishing infrastructure that enables a just transition to a circular economy.

Well being and the just transition

The Government is already some way along this road. The wellbeing budget process looks beyond simple GDP growth to the indicators of well being we used to hope this growth would deliver to us. The basic idea is that deliberately investing to achieve the outcomes we want is a more direct path than hoping the economy will deliver them by happy accident[10].

Economist Girol Karacaoglu[11] explains that the intention of a well being approach is to enable and empower people and communities to look after themselves, by investing strategically to increase resilience and well being across the board. The emerging well being approach underpins the big change processes going on across government which includes the work being done by the Infrastructure Commission.

One of the five wellbeing budget priorities has particular relevance to the Commission's work: "*Just Transition - supporting New Zealanders in the transition to a climate-resilient, sustainable, and low emissions economy.*" This wellbeing approach has flowed through into the Government procurement rules which shape a process for creating public value by using procurement to deliver broader outcomes. One of the four priorities being to *"support the transition to a zero net emissions economy and assist the Government to meet its goal of significant reduction in waste."*

It is clear that reducing waste and emissions and making a transition to a resilient, inclusive and sustainable economy are things we value as a society. The question is how to harness our collective power to deliver them. The Infrastructure Strategy is a key piece of the puzzle.

Alignment with other big moves across Government

Institutional and Governance reform is one of the Infrastructure strategies 5 priority areas. We agree that it is necessary to align work being done. This needs to happen at several different

[9] Mazzucato, M 2021 Mission Economy a moonshot guide to changing capitalism

[10] The idea that benefits from growth will 'trickle down' has been questioned since the 1970's. Recent evidence on inequality and externalities/spillovers shows that it tends to work the other way around.

[11] Girol Karacaoglu 2021 Love You - Public Policy for Intergenerational Wellbeing Tuwhiri project p33 p130

levels, one of these being high level cross Government. There are a number of processes going on across Government that aim to transform the ways we deliver value and generate well being across the public and private realms. It would be useful if these processes were aligned around a common language, principles and outcomes. At the moment it feels as though each entity is developing its own variation on the theme.

UNEP[12] recommends using a strategic approach to infrastructure investment that aligns with global agendas (zero carbon, resource efficiency, SDG's) and is supported by enabling budgets, policy, regulation and institutions. Horizontal and vertical coordination of government, business and civil society actors through time and across space is critical. This means cutting across silos between, and within, institutions. Certainty about direction of travel is the key to aligning action and investment.

It would be useful for the Infrastructure Commission to cross reference with other teams, commissions and departments to make sure the Infrastructure Strategy principles and outcomes align. We are aware of work being done in a wide range of related areas:

- Well being approach - well being budgets and living standards framework
- Reform of Vocational Education
- Economic plan including Industry Transformation Plans
- Climate Commission's advice and Governments Emission Reduction Plans
- Future for Local Government Review
- Government Procurement Rules (social procurement)
- Resource Management Act reforms
- Waste strategy, Waste Legislation and Investment and Action plans.

We see two key themes underpinning this transformation work, they are referenced in many of the pieces of work being done.

1. Commitment to a partnership with Māori as a key principle of Te Tiriti o Waitangi. This includes recognising the value te Ao Māori and mātauranga Māori as a compass to guide us as we move through this time of change.

2. Just transition to a zero carbon, zero waste Circular Economy. This will enable us to meet our emissions reductions budgets and reduce materials throughput by designing out waste and pollution and slowing down flows of materials and products. Increasing circularity is a key strategy for reducing both waste and emissions.

Using the Emerging Wellbeing framework

Good practise in Public Management changes over time, and the Emerging Well Being Approach is shifting us towards a more integrated and proactive systems approach. The focus on well being outcomes extends the time horizon. The intervention focus is on building capability and creating opportunities that enable people to' live lives they have reason to

[12] Principle 1 - UNEP 2021 International Good Practise Principles for Sustainable Infrastructure Nairobi

value'[13]. To achieve this infrastructure investments need to be made in ways that enable ecosystems, people and local and regional economies to flourish.

	Public administration	New Public Management	Emerging well being approach
Aim	Welfare	Welfare	Well being
Measurement	Input focus	Output focus	Outcome focus
Structure	Silo based	Silo based	Horizontal Integration (Whole of Govt)
Management	Command and control	Command and control	Vertical Integration (Localism)
Service approach	Professional	Managerial	Participation
Interventions	Universal care services and welfare for those in need	Universal care services and welfare for those in need	Universal care services and support for those at risk (prevention)
Wallace 2019 cited in 2021 Girol Karacaoglu Love You - Public Policy for Intergenerational Wellbeing Tuwhiri project p130			

Key features of this approach need to be carried forward into the Infrastructure Strategy. The Commission's Vision already acknowledges the role of Infrastructure as a means to deliver well being through a focus on outcomes, rather than as an end in and of itself.

The idea of centralisation speaks to the need for horizontal integration across the whole of government around purpose, framing, procurement and outcomes sought. Localism speaks to the need to ensure opportunities and capability building are decentralised to build Māori and Pasifika enterprise, community resilience and revitalise local and regional economies.

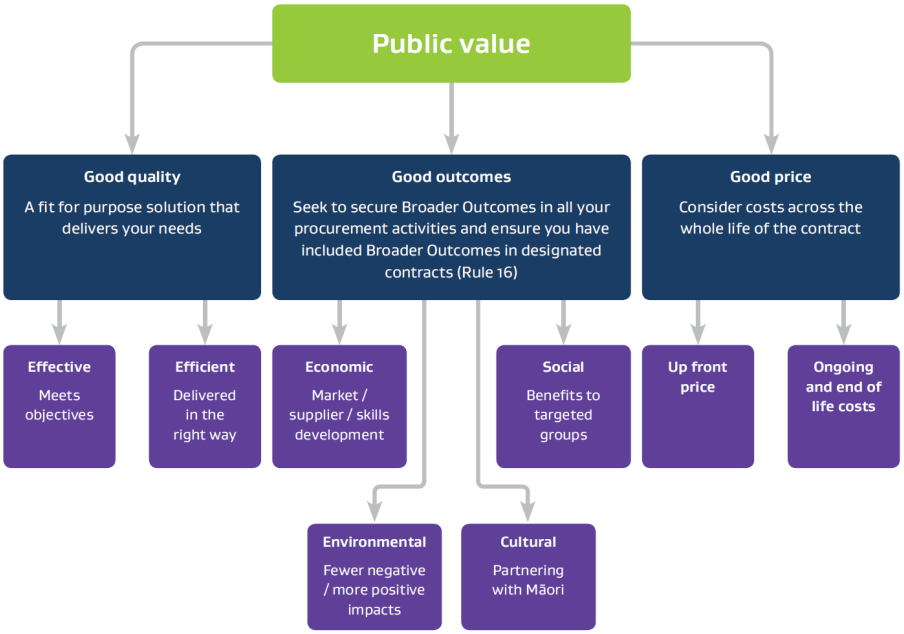
Participation speaks to Partnership, engagement, social procurement, the intentional design of processes to build long term relationships based around common goals and the ability of communities to solve their own problems through collective action.

How can infrastructure spending generate well being?

The New Zealand Government Procurement Rules (rules for sustainable and inclusive procurement) v4 were updated in 2019. The rules outline the concept of Public Value and how it can be achieved. The rules create an obligation for Central Government agencies to use their purchasing power to achieve broader outcomes when they buy goods and services.

The focus is on delivering 'public value' through procurement processes. Public value accrues when purchasing decisions are made that satisfy the requirement to achieve three goals at the same time: good quality, good outcomes and a good price.

[13] Wallace 2019 cited in 2021 Girol Karacaoglu Love You - Public Policy for Intergenerational Wellbeing Tuwhiri project p130



The work that has been done on the Government Procurement Rules[14] contains some useful framing. It helps us think about the relationship between effectiveness and efficiency, up front and whole of life costs and how we can create mutually reinforcing co-benefits that deliver desired outcomes. This Framework could also be used to inform and refine the principles and outcomes section of the Infrastructure Strategy.

The Local Government (Community Well-being) amendment act 2019 has reinstated the concept of wellbeing into the purpose, principles, decision making process, and the definition of community outcomes. This creates a solid platform for local communities to determine the outcomes most important to them. These outcomes can be used as 'goal posts' by council and community to guide future investment, budget allocation and purchasing decisions. This has implications for infrastructure development that aligns with and supports community priorities and helps to build strong and revitalised regions.

The use of a strategic social procurement approach gives central and local government, Māori, communities and enterprises a mandate to explore new ways of working together to co-create infrastructure. Social procurement has been essential to the development of the Auckland Resource Recovery Network which is a key initiative for delivering on Auckland Councils Waste Minimisation and Management Plan. It also supports the delivery of the Council's Low Carbon and Social Development Action Plans.

Te Ao Māori and Mātauranga Māori at the forefront

(this section relates to questions 15,16,17)

We fully support the overarching principle that "All decision making must be guided by Te Tiriti o Waitangi (the Treaty of Waitangi) and it's principles - most specifically the obligation to

[14] https://www.procurement.govt.nz/assets/procurement-property/documents/government-procurement-rules.pdf

partner with Māori." We believe that upholding Te Tiriti requires a genuine, active and enduring partnership with Iwi/Māori.

We welcome the Infrastructure Commission's statement of intent to work in partnership and note that it is a common theme across government and allied independent organisations at the moment. We agree that it is critical that government and its agencies work with Iwi/Māori to develop and implement plans and policies, especially where impacts on and opportunities for Iwi/Māori are likely[15].

In order to increase collaboration with Māori, unlock Māori investment in infrastructure and increase the participation and leadership of Māori in infrastructure the commitment to partnership needs to go beyond talk, to action. The principles of Tino Rangatiratanga, Equity, Partnership, Active protection and Options need to be fully embedded in the decision making and implementation phases of all infrastructure development.

The alignment of te Ao Māori with circular economy principles[16] and other 'global megatrends' is being acknowledged[17]. Mātauranga Māori precedes the current western interest in wellbeing, sustainability and circularity. There is much that can be learned by building an effective long term working relationship between partners with diverse world views.

Through a tuakana-teina relationship an older or more expert partner can support and guide a younger and less experienced partner. And by creating a relationship that acknowledges the value of ako, or learning together, the roles of teacher and learner can be reversed day by day as each party shares their forms of knowledge and respective expertise.

This kind of partnership needs to be valued and given time and space to develop. Resources need to be put in to support Māori to engage and have a voice in the decisions that affect them. These relationships need to go beyond involvement in governance and decision making. Infrastructure Investment creates long term patterns of ownership, revenue generation and cash flow. The Infrastructure Commission needs to create a real commitment to creating new enterprise opportunities that are a good fit for Iwi, Hapu and Whanau.

When Māori have a stake in the future of infrastructure, and its development is relevant to their aspirations and reflects their values, it is likely that positive engagement will increase. Creating enterprise opportunities that acknowledge Māori expertise in holistic and relational thinking and mechanisms for this wisdom to be embedded in new forms of grey/green and soft infrastructure will help Aotearoa make a just transition to zero carbon by 2050.

Putting well being at the heart of decision making and life at the heart of the economy is deeply embedded in te Ao Māori. These ideas resonate across cultures that there are limits to the

[15] As suggested by P vii He Pou A Rangi Climate Change Commission - Māia tonu nei : a low emissions future for New Zealand https://ccc-production-media.s3.ap-southeast-2.amazonaws.com/public/Inaia-tonu-nei-a-low-emissions-future-for-Aotearoa/Inaia-tonu-nei-a-low-emissions-future-for-Aotearoa.pdf

[16] May 2019 Circulate What the world can learn from Māori Thinking retrieved from https://medium.com/circulatenews/what-the-world-can-learn-from-m%C4%81ori-thinking-22f9fb6a79ee

[17] As cited p47 **Aotearoa Agritech Unleashed** Imdustry transformation plan notes that 'the Māori world view is aligned with global megatrends' retrieved from https://www.mbie.govt.nz/dmsdocument/11601-aotearoa-agritech-unleashed-pdf

natural world and social licence to operate[18], that we should strive to be good ancestors, that everything is connected, that enhancing the health and wellbeing of people and the ecosystems they depend on makes them more resilient and enduring and that actions should deliver common good outcomes like equity, innovation, resilience, regeneration and Intergenerational learning.

[18] See Te Takarangi which put a te Ao Māori lens on Donut Economics
https://www.resilience.org/stories/2020-10-08/an-indigenous-maori-view-of-doughnut-economics/

Part two - Increase Circularity to reduce waste and emissions

We are so far behind that we can take a shortcut, learning from the work that has been done by others in the last 20 years. Instead of taking the slow road and heavily investing in recycling, we can become' fast followers'. Leapfrogging forward to tackle organics, reuse and redesign will serve us better in the long run than patching over the cracks of our weak recycling system.

We do create too much waste and we can't keep up with its growth. If we are serious about solving our waste problems one of our best options is going back up the pipe and turning the tap off. We can use advanced forms of Product Stewardship to change the game around what is produced and how long it lasts so we can meet our needs with fewer materials and resources.

As the Commission's state of play; Waste and Resource Recovery[19] points out, accelerating the adoption of the circular economy is a key outcome of SDG 12 Responsible Consumption and Production which aims to reduce waste generation through prevention, reduction, recycling and reuse. Producing less waste will help us mitigate and adapt to climate change,

Zero waste Cities and Circular Cities Like Amsterdam and Glasgow are integrating thinking about resource efficiency, emissions reductions and intergenerational wellbeing to create coherent frameworks for policy and action. They recognise the negative spillovers (waste and emissions) generated by economic activity are not inevitable or desirable. This creates the possibility of a conversation about what sustainable consumption might look like and establishes a platform for action and investment in infrastructure that supports circularity.

Making the shift to more circular resource flows

The circular economy is being championed globally by the Ellen MacArthur Foundation. The basic idea is that we need to design out waste and pollution, keep products and materials in circulation for longer and regenerate natural systems. This is a neat fit with the Waste Hierarchy which is used to prioritise action: it is good to recycle in closed loops, better to reuse and repair and best not to make unnecessary items in the first place.

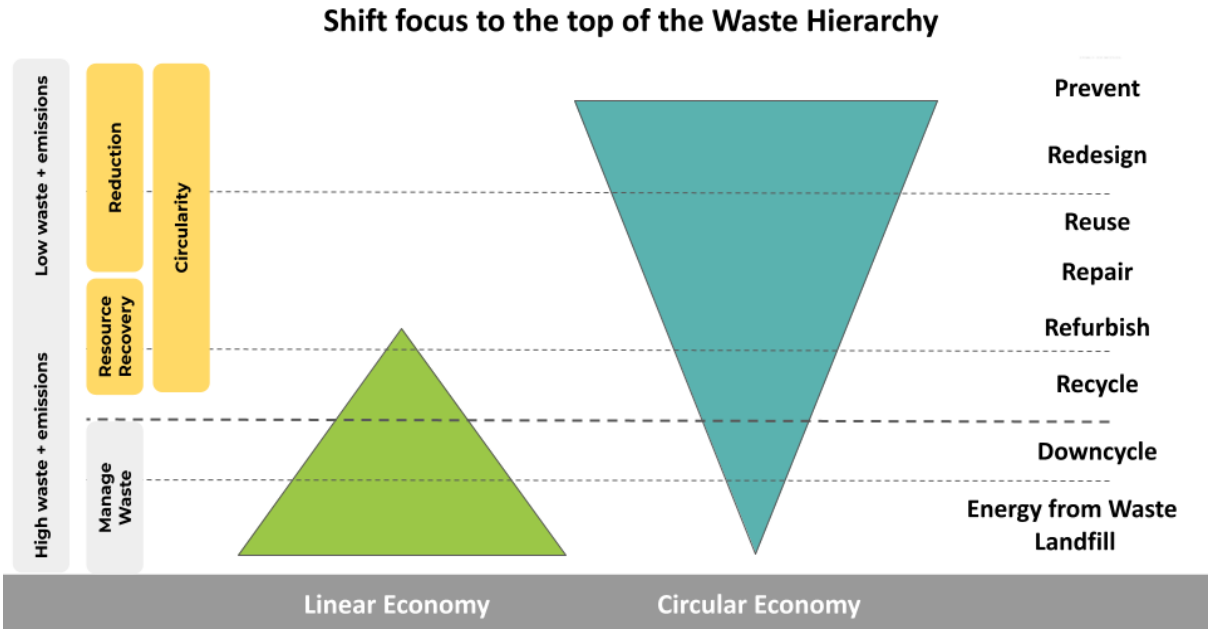
The Waste Hierarchy is a tool for prioritising action and investment in order of effectiveness. Actions at the top of the hierarchy are more resource efficient than those at the bottom. For example Reloop analysis shows reusable glass bottles produce 85% fewer carbon emissions than single use glass bottles. Zero Waste (resource efficiency) strategies increase the potential for circularity through redesign, and support the practise of circularity through reuse, repair, refurbishment, product sharing and closed loop recycling.

In New Zealand investment and attention has focused on managing waste at the end of life. To reduce waste and emissions we need to shift investment, energy and focus up the Waste Hierarchy, using it as a strategic framework for transforming our economy.

[19] State of play Op cit P13

UNEP[20] take a comprehensive life cycle approach to infrastructure provision. The waste hierarchy demonstrates the benefits of reducing demand for services and infrastructure by reducing and slowing down flows of products and materials. Not making a single use or poor quality object in the first place saves money and emissions downstream. Upstream interventions in the production and consumption system will save service costs, infrastructure costs and clean up costs.

Not creating and filling a landfill avoids the risks associated with perpetual storage of mixed materials in a hole in the ground: inundation, escape of materials, leachate and methane to the environment etc. Trans-national consumption related costs are also avoided consumption emissions, biodiversity loss, social relations of production. This is in line with the Infrastructure Strategy's aim of finding non-built solutions to infrastructure problems.



(Image; Zero Waste Network stock file)

Waste Reduction is a pathway to zero carbon

People have already signed up for the mission to reduce waste. Colmar Brunton's Better Futures 2021 report has three 'waste' issues in the top 10 concerns: #6 build up of plastic in the environment, #7 not enough waste is recycled and #10 overpackaging, non recyclable packaging and landfill.[21] We can harness this passion for solving our waste problems to make progress on less tangible goals like emissions reductions and inequality.

Waste is front of mind because we deal with products and packaging all day, every day. Households, businesses and communities are starting to use zero waste strategies like reuse, repair, composting and recycling to keep products and materials in circulation for longer. And to avoid making or buying unnecessary goods or packaging in the first place.

[20] Principle 3 - UNEP 2021 International Good PractisePrinciples for sustainable infrastructure Nairobi
[21] Colmar Brunton (2021) *Better Futures 2021*. Retrieved from https://www.colmarbrunton.co.nz/better-futures-reports-2021/.

Better futures 2021 noted a growing commitment to sustainability, but 49% of participants still think climate change problems are in the future. Waste issues are tangible, real time intrusions into our wellbeing bubble. Big global problems like climate change and tough socio-economic issues like inequality are harder to get a handle on. It's easy to push them into the "I'll worry about that one day" box.

Using zero waste strategies to prevent waste and keep things going around has a handy co-benefit. It reduces emissions at the same time. People and organisations getting started with sustainability often begin by sorting out their waste piles. We think this can be leveraged to engage people in taking steps to reduce their emissions. When we explain to people that by reducing, reusing and recycling they are reducing GHG emissions, they start to smile.

They begin to see themselves as someone who is already taking action on climate change. They realise that it's the little things they do every day that will get us there in the long run. They don't have to wait until they can afford an electric vehicle to start making a difference. Investing in resource recovery systems infrastructure that supports New Zealanders to make some real progress is a way for the Infrastructure Strategy to pick some low hanging fruit.

So how does the circular economy tie it all together?

The Circular Economy concept is a useful reframe that pulls together lots of different threads[22] to create a coherent theory of change. It has a simple narrative that describes how we can work together across the supply and recovery chain to design out waste and pollution, keep materials and products in use for longer and regenerate natural (and social) systems. It is a story we can all understand.

Circular Economy speaks to the elephant in the room which is the need to make the shift to responsible consumption and production systems (SDG #12). We need to transform the way we use our economy to resolve our waste, emissions and resilience problems. The way the economy works now is an outcome of the way the system is organised and the ways the different players relate to one another,[23] we can do better.

The Climate Commission has put increasing the circularity of the economy into a more prominent position in its final advice[24] to the Government. They recognised the "potential of a circular economy to reduce emissions across the economy and generate numerous social, environmental and economic co-benefits." They also acknowledge the important role that increasing circularity plays in a consumption based perspective on emissions reductions.

The Climate Commission recommended[25]:

- Developing a long term strategy for moving to a circular economy

[22] Biomimicry, zero waste, cradle to cradle, natural capitalism, industrial ecology, the performance economy, lean production etc

[23] Mazzucato,M 2021 op cit

[24] Climate Commission Inaia- tonu-nei: a low emissions future for Aotearoa section see 13.4 page 250 and

[25] Recommendation 14 Increase the Circularity of the Economyp252 (Recommendation 15 covers the parallel bioeconomy.)

- Acting in partnership with Iwi/Māori in line with Te Tiriti o Waitangi principles, embedding a mātauranga Māori approach and enabling Māori collectives to participate in associated business opportunities
- Investing in the ability to measure progress towards circularity and impact on emissions
- A clear Governance structure including a minister and lead agency
- Setting up a mechanism that enables active collaboration with Iwi/Maori, civil society, local government and industry.

These initiatives align well with work outlined in the Infrastructure Strategy and we encourage the Commission to explore opportunities to contribute to this work as it evolves. We see infrastructure issues around waste reduction and resource recovery best fitting into Priority area 4: Supporting a zero carbon economy and preparing for climate change. We would like to see this expanded out to become Priority Area 4: ***Supporting the shift to a zero carbon, zero waste circular economy[26] to reduce emissions and material flows and prepare for climate change.***

This is in line with UNEP's[27] aim to decouple infrastructure from resource consumption, GHG emissions, pollution and waste which can be achieved by:

1. Minimising resource use - in infrastructure projects - design, toxicity of materials, construction and operation (inputs eg water and energy needs), demolition.
2. Closing material loops across product life cycles - circularity and industrial symbiosis - to increase resource efficiency and reduce emissions, waste and pollution.
3. Sustainable public procurement - Life cycle costing vs lowest cost, co-benefits, innovation using strategic social procurement approaches.

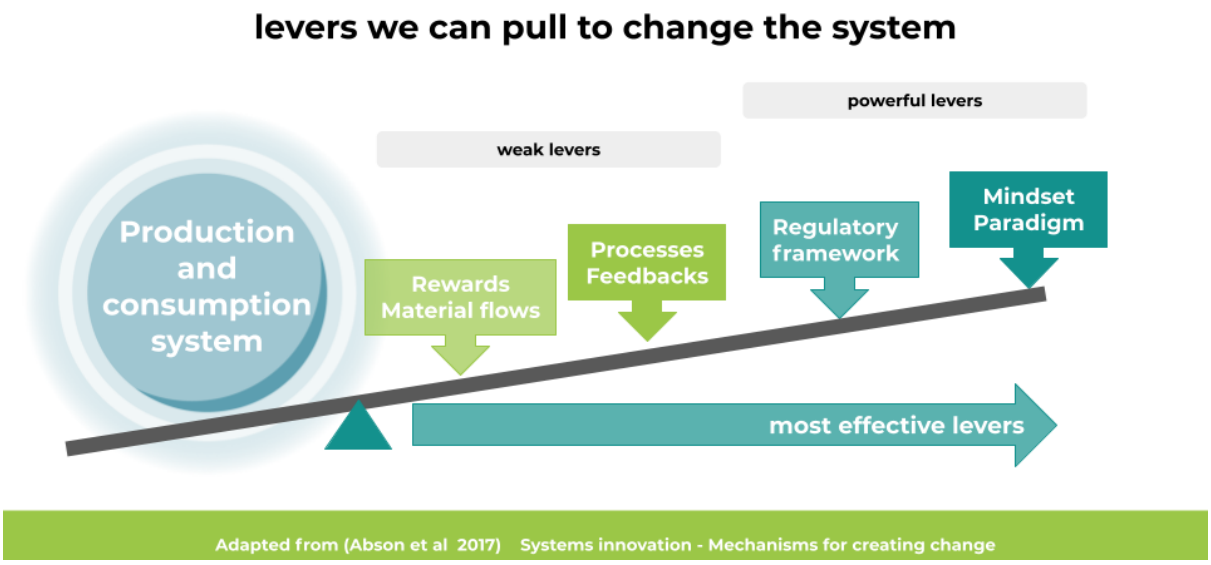
We are going through a paradigm shift

David Attenborough said in his recent documentary that when he was a young man the world seemed like a very big place. Over the course of his 90+year life, he has seen the impacts of our linear extractive approach to meeting our needs seriously impact all corners of the globe. These effects are now becoming obvious to us all and we can feel the need for a paradigm shift.

Shifting our economic paradigm from Linear extractive to Circular regenerative requires a major change in mindset. Systems innovation theory[28] sees mindset shift as the most powerful lever for creating change. The idea that culture change underpins system change is a key feature of strategies and legislation designed to drive a shift towards circularity.

The Circular economy is a big idea that requires a radical change in the way we work together. Transforming our relationships with materials, energy, each other and our planet requires new 'software'. We need to think and value differently to change the way we do things at home, at work and in our communities.

[26] This aligns with the Climate Change Commissions advice to Government - detail in a later section
[27] Principle 5 - UNEP 2021 International Good Practise Principles for Sustainable Infrastructure Nairobi
[28] See this article for the basic idea https://donellameadows.org/archives/leverage-points-places-to-intervene-in-a-system/



The Infrastructure Strategy makes a good start on this with it's recognition for the need to:

- make the best use of what we have
- explore non built solutions to infrastructure problems
- generate co-benefits through infrastructure investment and
- use hard and soft infrastructure to generate well being outcomes.

However we think a deeper understanding of the links between waste prevention, emissions reductions, community resilience and infrastructure investment would be useful to include in the final version of the infrastructure strategy. Shifting the mindsets of decision makers in the infrastructure space is a critical task if we want to see these ideas flow through into reality.

Australia's National Science Agency CSIRO[29] is developing a Circular Economy Roadmap. They consider building a national zero waste culture to be one of three primary enablers of the shift to a circular economy: "*Every channel should be used to support that vision, to change mindsets and guide behaviours both at home and at work*[30]. CSIRO sees the responsibility for making the shift to a circular economy shared across all participants.

Establishing infrastructure is a relatively weak lever for changing the system as it sits at the material flows, processes and feedbacks end of the scale. However infrastructure investment has real power when it opens up new kinds of opportunities for enterprise, shifts us up the Waste Hierarchy into the reuse and repair space and creates complex webs of co-benefits. These actions signal a major change in approach and activate multiple positive feedback loops.

We can be fast followers and learn from the work of others

Collaboration is a common theme in work describing how we can make the transition. Recent work by the Ellen MacArthur Foundation outlines five universal circular economy policy goals. *Number 5: Collaborating to change the system* describes the different ways we need to work

[29] CSIRO 2021 A Circular Economy Roadmap for Plastics, Glass, Tyres and Paper. Retrieved from https://www.csiro.au/en/research/natural-environment/Circular-Economy
[30] CSIRO 2021 Circular Economy Roadmap Summary p5

together and grow capacity[31]. Building a diverse and inclusive coalition for action across public, private and civil society is the focus.

The Infrastructure Strategy has a key role to play in setting out processes for bringing together a wide range of stakeholders who can work at different scales to achieve shared goals. One example of this is pulling together a coherent and integrated nationwide resource recovery network drawing on the assets already available through the transfer station and the new Community Resource Recovery Centre model that is working well across the country.[32]

The 'Circular Economy' concept pulls together action on waste, resource efficiency and emissions in a way that captures hearts and minds. *Circle Economy* describes it as '*society central, resource smart and climate safe*'. Scotland is a country with a similar population to New Zealand and a slightly different emissions profile. 80% of Scotland's carbon footprint is from production, consumption and waste of goods, services and materials.

Zero Waste Scotland works across the board to implement zero waste, resource efficiency and emissions reduction strategies to create a circular economy. The focus is on building capacity and relationships across supply and recovery chains to support everyone to play their part. The Scottish Government believes a circular economy is the key to reducing both waste and emissions. Their landmark 2016 strategy, Making Things Last,[33] highlighted the economic, community and environmental benefits of making the shift.

Scotland uses and develops tools for measuring flows of materials and energy through the Scottish Economy. They use two data sets in tandem to monitor progress.

1. A detailed national material flows account - Recently the first Scottish Material Flow Accounts[34] were published. These show the "inextricable relationship between what Scotland consumes and it's global climate impact".
2. Scotland's carbon footprint - Carbon footprinting measures consumption emissions[35] to show the onshore and offshore carbon impact of consumption and production.[36]

Increasing Circularity

We need a deep understanding of material and energy flows and a clear picture of our operating context and constraints to effectively tackle waste and emissions. To transform our

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[31] Ellen MacArthur Foundation, Universal Circular Economy Policy Goals (2021) retrieved from https://emf.thirdlight.com/link/kt00azuibf96-ot2800/@/preview/1?o p26-27

[32] See later section for detail on this concept

[33] The Scottish Government (2016) *Making Things Last: A circular economy strategy for Scotland* (Edinburgh: The Scottish Government). Retrieved from https://circulareconomy.europa.eu/platform/sites/default/files/making_things_last.pdf.

[34] https://www.zerowastescotland.org.uk/research-evaluation/material-flow-accounts-mfa
https://www.zerowastescotland.org.uk/press-release/true-size-scotlands-raw-material-consumption-footprint

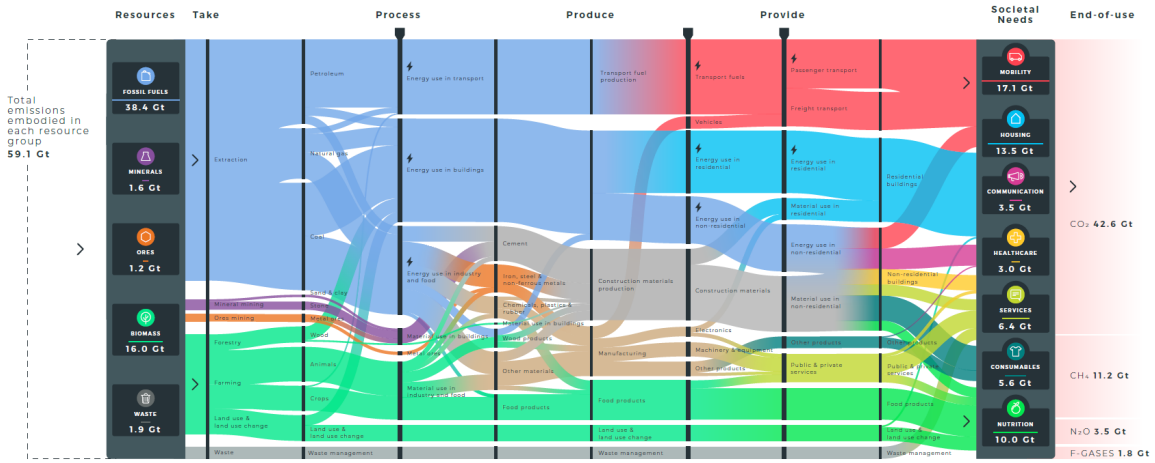
[35] Nwabufo, Chidubem and Warmington, Jamie (2020). 'Measuring Scotland's progress towards a circular economy to help combat the climate emergency. Results from a preliminary scoping study reviewing key indicators.' Edinburgh: Zero Waste Scotland. Retrieved from https://www.zerowastescotland.org.uk/sites/default/files/Branded%20Report%20MetricsV1.pdf.

[36] See various resources on the Zero Waste Scotland website: "Scotland's Path to Net Zero" at https://www.zerowastescotland.org.uk/netzeroplan; "What is the Carbon Metric?" at https://www.zerowastescotland.org.uk/our-work/what-carbon-metric; and "Carbon Metric Publications" https://www.zerowastescotland.org.uk/our-work/carbon-metric-publications. See also ACR+ "More Circularity, Less Carbon". Retrieved from https://www.acrplus.org/en/morecircularitylesscarbon.

relationship with waste we need to know what we are dealing with. Naming things is a useful way of unpacking the complex and messy pile that is 'waste'.

Separating and sorting things into groups; following materials, energy and products as they flow through supply and recovery chains; understanding how pollution, inefficiency and emissions are generated along the way - these all help us to get a better understanding of the complex, dynamic global consumption system we are all part of. This understanding creates the platform for establishing effective product stewardship approaches.

This 'X-ray' of the global economy produced by *Circle Economy* in their 2021 Circularity Gap Report[37] shows how organic and inorganic resources get combined to create the products and services we value.



On the right are key inputs: fossil fuels, minerals, ores and biomass. On the left are key outputs: mobility, housing, communication, healthcare, services, consumables and nutrition. The grey bar at the base shows waste created and the pink sidebar details the emissions generated. The large green biomass input flags the importance of organics in a resource recovery strategy.

Circle Economy uses their data to create global and regional circularity indexes.[38] They calculate the global economy to be 8.6% circular (sadly that makes us 91.4% linear). The good news is they estimate that we could stay within 1.5 degrees of warming if we double circularity by 2032 to get us to 17%[39]. Increasing circularity requires interventions at multiple points across supply and recovery chains. We urgently need to invest in the new forms of infrastructure required to enable this.

Their analysis shows that material handling and use account for 70% of GHG emissions. *Circle Economy* points to the urgent need to move beyond a narrow energy focus on emissions reductions to 'apply circular strategies where materials and emissions intersect'. By their

[37] Haigh, L., de Wit, M., von Daniels, C., Colloricchio, A. and Hoogzaad, J. (2021) *The Circularity Gap Report* (Amsterdam: Circle Economy) p 20-21 https://www.circularity-gap.world/2021.

[38] Haigh, L. et al (2021) op cit

[39] The really sad news is that we are going backwards at the moment, the 2018 index was 9.1%.

calculations this would enable us to reduce GHG emissions 39% and virgin resource use by 28% to help keep our impacts within planetary boundaries.

When framed from the perspective of the problem (Waste) rather than the solution (zero waste and circular economy strategies) it is easy to miss the potential for the waste and resource efficiency sector to achieve emissions reductions. The marginalisation of zero waste and circular economy strategies in climate policy and analysis is the subject of a growing body of research locally and internationally.[40] This is being addressed in many jurisdictions with recognition that zero waste strategies like prevention, reuse and repair play a key role in reducing upstream emissions.

Resource Efficiency

In the UK, WRAP has been working on the links between resource efficiency, waste and emissions for many years. Key strategies identified in their seminal 2009 work included:

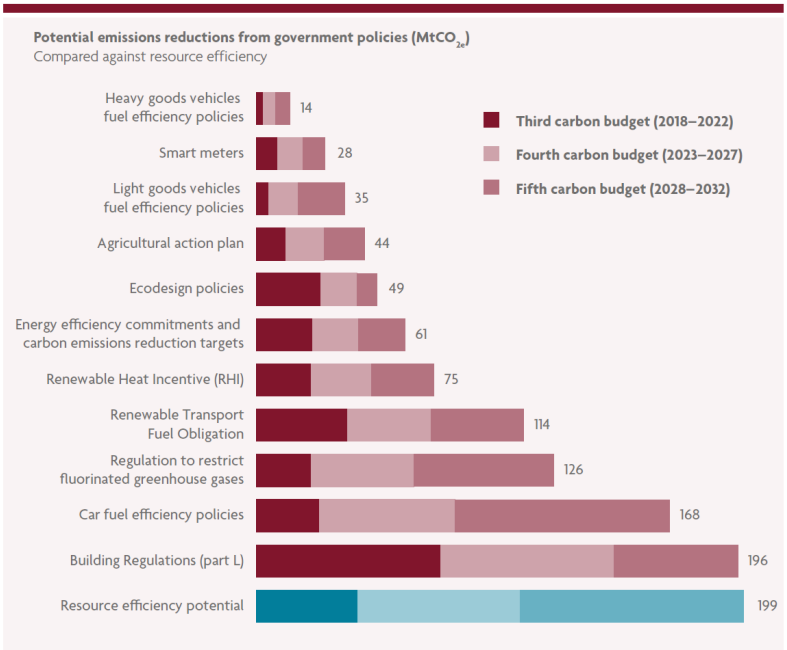
- life time optimisation - making things last longer
- changing the way we consume - goods supplied as a service - e.g. car share.
- shifting to a restorative circular economy - reduce, reuse, repair, recycle, compost.

Zero waste strategies like these maintain widespread access to goods and services while reducing the impacts associated with linear production and consumption. Shifting to new ownership and delivery models means we can get the same value with lower inputs through durability, right to repair, reuse and sharing mechanisms.

WRAP's recent comparisons[41] of the relative emissions reductions potential of a range of Government policies for the UK's third, fourth and fifth carbon budgets, shows resource efficiency coming out on top.

[40] Ballinger and Hogg (2015) *The Potential Contribution of Waste Management to a Low-Carbon Economy* (Bristol, UK: Prepared by Eunomia Research & Consulting for Zero Waste Europe). Retrieved from https://zerowasteeurope.eu/downloads/the-potential-contribution-of-waste-management-to-a-low-carbon-economy/; Ellen MacArthur Foundation (2019) *Completing the Picture: How the Circular Economy Tackles Climate Change*. Retrieved from https://www.ellenmacarthurfoundation.org/publications/completing-the-picture-climate-change; Julie Hill, Patrick Mahon and Peter Maddox (2020) "How can a circular economy help us meet net zero?" *Environmental Scientist* February issue; Maggie Clarke (2 December 2020) "Consumption, Climate, Zero Waste, and the Green New Deal" (Presentation at the National Recycling Coalition's Zero Waste Conference 2020). Retrieved from https://nrcrecycles.org/2020-national-zero-waste-conference-webinar-recordings/; Maggie Clarke (2012) "The Importance of Zero Waste in Climate Action Plans" (Paper 2012-A-484-AWMA). Retrieved from http://www.maggieclarkeenvironmental.com/AWMA2012-The-Importance-of-Zero-Waste-in-Climate-Action-Plans-Paper-484-v.2.pdf; Brenda Platt, David Ciplet, Kate M Bailey and Eric Lombardi (2008) *Stop Trashing the Climate* (Institute for Local Self-Reliance, Eco-cycle and GAIA). Retrieved from https://ilsr.org/stop-trashing-the-climate/; Material Economics (2018) *The Circular Economy - A powerful force for climate mitigation: Transformative innovation for prosperous and low-carbon industry* (Stockholm: Material Economics Sverige AB). Retrieved from https://www.sitra.fi/en/publications/circular-economy-powerful-force-climate-mitigation/.

[41] Hill, Maddox, Mahon. (Feb 2020) 'How can a Circular Economy help us meet net zero?' *Environmental Scientist The World Wakes Up to Waste*, p. 22. Retrieved from: https://www.the-ies.org/resources/world-wakes-waste.



▲ **Figure 4. Resource efficiency has great potential to cut UK emissions (in million tonnes of CO_{2e}). (© Green Alliance)[9]**

Links between waste and emissions

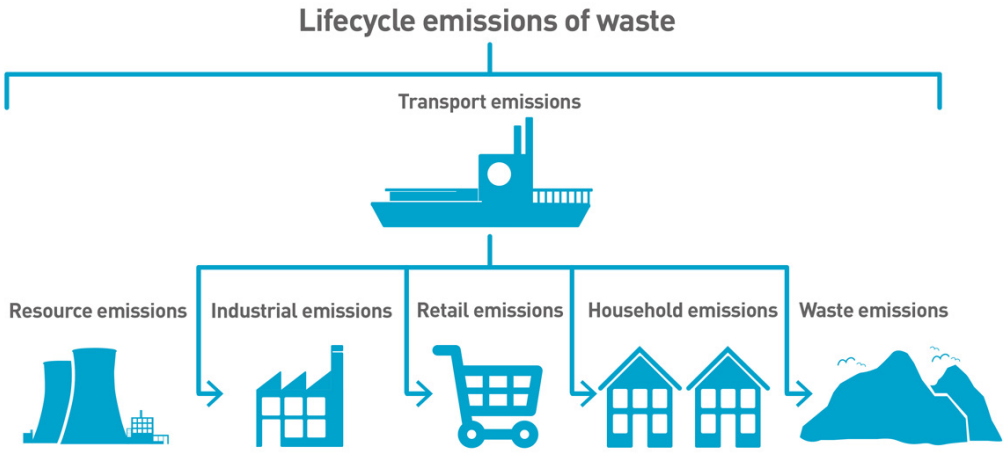
There are three main types of emissions generated from the 'waste' our economy creates as a side effect of production and consumption systems.

1. Emissions from landfill: mainly biogenic methane from organics stored in landfills
2. Consumption-based emissions: greenhouse gases generated across the product life cycle (mainly CO2 and N2O)
3. F-Gases: HFCs escaping to the atmosphere from products eg. air conditioning units.

Biogenic methane emissions show up in production-based emissions accounting. This is the main component of the 4.9% of GHG emissions the waste sector contributes to New Zealand's emissions profile. The long-lived consumption-based emissions generated upstream from extraction, production, transport retail, use and resource recovery of packaging, and all our other stuff, show up in carbon foot printing analysis.

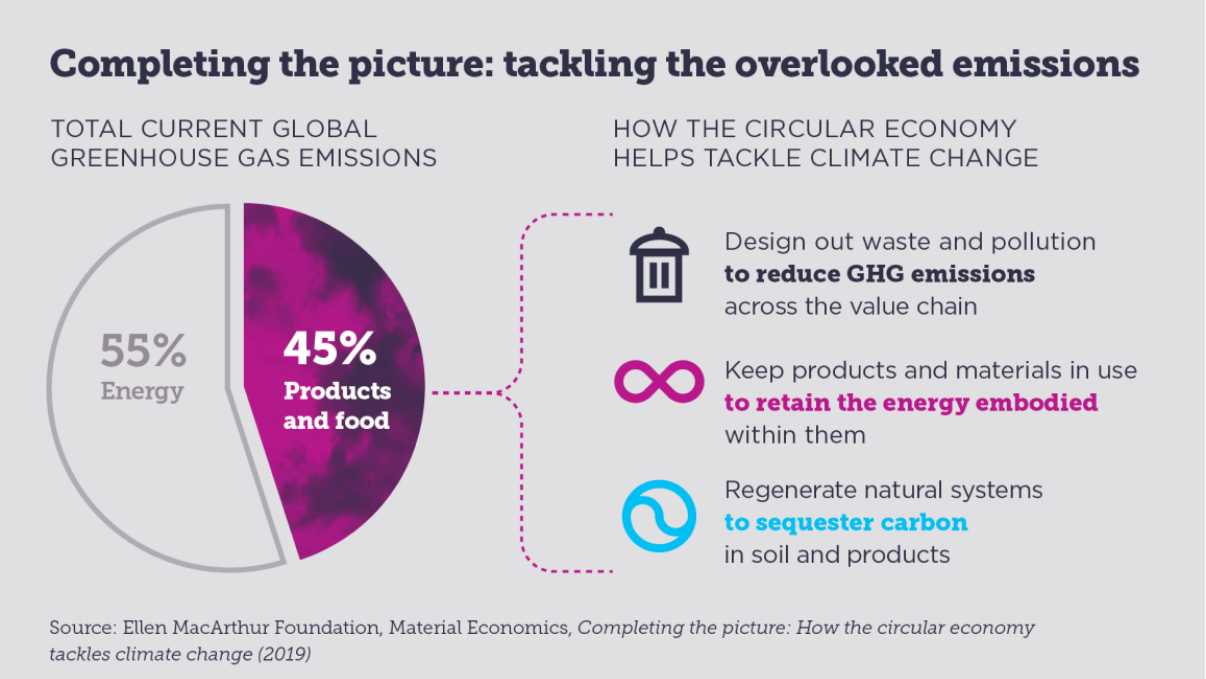
Scotland uses both forms of analysis to guide decision making as part of its commitment to shift to zero carbon by 2045.[42] StatsNZ produced its first set of consumption based accounts in 2020. The Climate Commission's advice recognises the critical role resource efficiency plays in reducing onshore and offshore consumption emissions. This graphic from Zero Waste Scotland shows how emissions are generated across product life cycles.

[42] Nwabufo, Chidubem and Warmington, Jamie (2020). 'Measuring Scotland's progress towards a circular economy to help combat the climate emergency. Results from a preliminary scoping study reviewing key indicators.' Edinburgh: Zero Waste Scotland. Retrieved from https://www.zerowastescotland.org.uk/sites/default/files/Branded%20Report%20MetricsV1.pdf.



(Image from Zero Waste Scotland website)[43]

Only half of our emissions are directly related to energy consumption[44]. To achieve our emissions reduction targets we need to decarbonise and reduce throughput of goods. Reducing emissions from the transport sector needs to go well beyond electrifying the private vehicle fleet. Prioritising access to EV's through car sharing schemes, public transport and shifting across to active transport modes including electric bikes, will reduce the number of vehicles that need to be produced, maintained, parked and recycled.



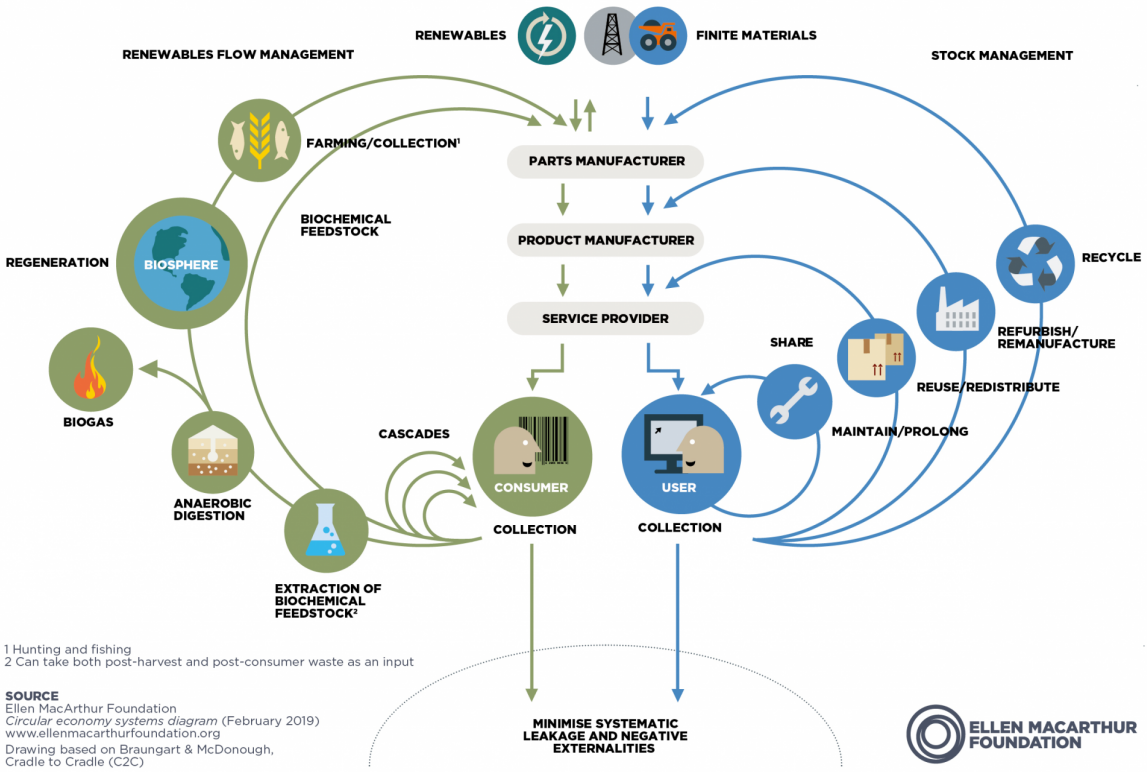
Keeping products and materials in use retains the use value of embodied energy as well as the materials. Plastics, textiles and e-waste all generate high emissions upstream. Scottish research found that textiles comprise 6% of the average domestic rubbish bag but account for 34% of the emissions profile.

[43] Image taken from Zero Waste Scotland "What is the Carbon Metric?" at https://www.zerowastescotland.org.uk/our-work/what-carbon-metric.
[44] Image retrieved from https://www.ellenmacarthurfoundation.org/our-work/activities/finance?gclid=Cj0KCQjw24qHBhCnARIsAPbdtlJsfB864PvFSrIS2WsRvj8EWIQJfmQ0PYvI-sCenF0tCN0D4WdPoacaAqxiEALw_wcB

How do organics fit in?

The concept of a circular economy is a useful reframe of an old idea 'Cradle to Cradle',[45] which considered resource use in industrialised economies It made the distinction between two types of material flows. One being organic/biological materials that can go safely back around into biological systems. The other being inorganic/technical materials that can be fed back into industrial systems. This is reflected in the butterfly diagram below.

The writers cautioned against the use of 'monstrous hybrids' that are created by combining material types which makes it very difficult to separate them back out again. Short life multi-material packaging or building materials are problematic for this reason. The Climate Commission's advice recognises the value of a strategic approach to the bioeconomy. However current thinking about organics tends to follow the same 'end of pipe' approach that has limited action to reduce inorganic waste and material flows.



Retrieved from https://www.ellenmacarthurfoundation.org/assets/images/_bigImage/Butterfly-Infographic.png

The Infrastructure Strategy narrowly focuses on reducing methane emissions from organics that end up in landfills. There are several problems with this. The label 'organics' spans a huge range of materials and products: food waste, greenwaste, fibre: paper, card, textiles, timber, composite boards and mixed materials e.g. Tetra Pak and plastic laminated composite board, single-use packaging for consumer goods and takeaways, sewage sludge, farm manure/effluent, dead animals/livestock and byproducts from food processing. Creating strategies to make organics flows more circular has to take this complexity into account.

[45] https://en.wikipedia.org/wiki/Cradle_to_Cradle:_Remaking_the_Way_We_Make_Things

We need to look at organics through a soil and food lens rather than a waste lens

In 2015 the UN Food and Agriculture Organisation estimated that we had 60 years of topsoil left on a global scale.[46] The way we are going by 2050 we will have 25% of the arable land available per person that we had in 1960[47]. Healthy soil absorbs carbon, filters water and supports life. Degraded soils lose the ability to provide these services. Eventually they can lose the ability to support life altogether and become deserts.

We depend on healthy soils for the food we eat, around 70% of the material inputs to our industrial systems and the biodiversity that supports life on our planet. This critical limit means we need to feed as much organic material back into soil through high quality composting as possible. This will help to replace the organic material used to grow food and fibre in the first place. It will offset use of synthetic nitrogen fertilisers, restore and regenerate soil life, depth, structure, organic content and fertility.

In the same way that extracting inorganic materials through mining damages and destroys ecosystems, creates political instability and reduces resilience, the destruction of arable land means moving food production activity into more marginal land which has the same impacts.

The health and productivity of topsoil is a critical issue for our primary industries. Aotearoa loses 720 tonnes of soil per square kilometre each year, which reduces our land's productivity and harms aquatic ecosystems[48]. Collecting, composting and returning high quality organics to farms and horticultural blocks will support regenerative farming practises.

It also creates connections across the food supply and recovery chain as consumers become better connected to the people and places their food comes from. High quality composting systems depend on source separation. People have a strong incentive to get it right when they know the compost is going back onto the farms and gardens their food is grown on.

UNEP[49] prioritises investing in nature to complement or strengthen its ability to provide services as well as its intrinsic value. Urban and regenerative farming build the capacity of soils to support life, increasing net biodiversity. Returning high quality compost to soil so it can grow more food and sequester carbon makes a lot more sense than putting it in a landfill and burning off the methane it emits.

Organics can be diverted before they reach landfill. The waste hierarchy is a useful tool for prioritising these. As always the higher up the hierarchy you target your action the better the outcome. Using simple zero waste strategies like supply chain management, separation at source, separate collections, composting and reuse would reduce both biogenic methane emissions and consumption based emissions across the lifecycle. For example

- Junk mail can be eliminated to reduce paper recycling flows through kerbside

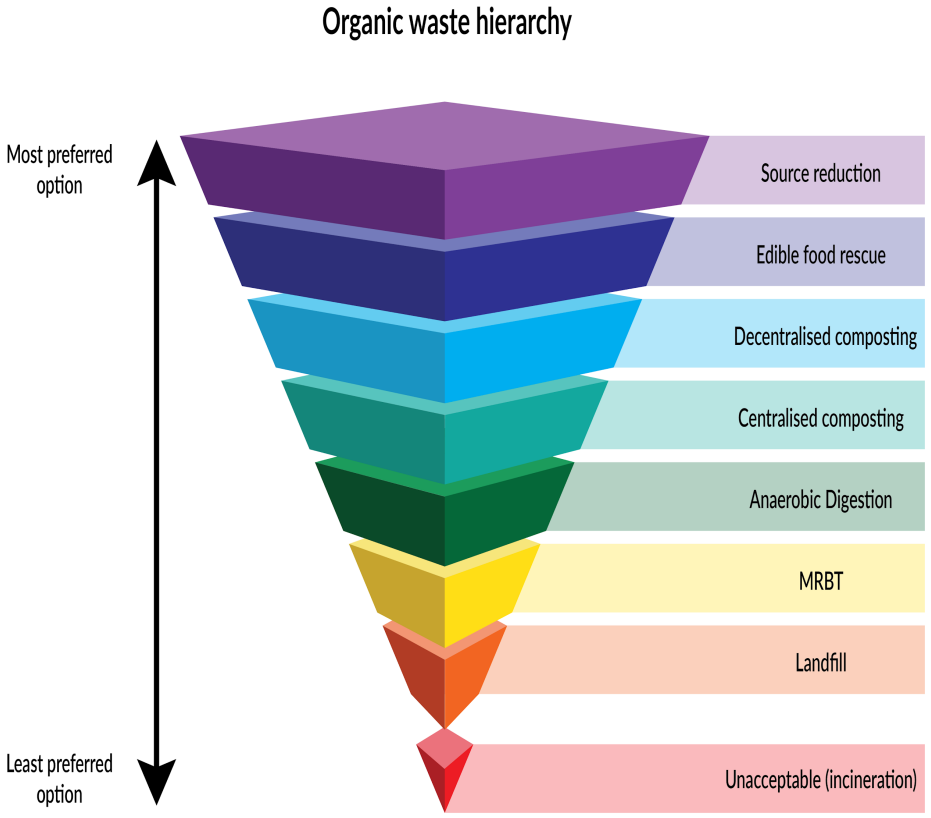
[46] Food and Agriculture Organisation of the United Nations (2015) *Status of the World's Soil Resources* (Rome: FAO). Retrieved from http://www.fao.org/documents/card/en/c/c6814873-efc3-41db-b7d3-2081a10ede50/.
[47] Due to population growth and soil loss and degradation see FAO paper for detail
[48] NZ Govt Data 2019 - Evidence for Well being budget priorities
[49] Principle 4 - UNEP 2021 International good practise principles for sustainable infrastructure Nairobi

- By products from food processing can become inputs for other food processors to create 'industrial symbiosis'
- Unsold edible food can be passed on to people or become animal feed
- Food and green waste can be collected and processed using simple composting systems at the local and regional scale
- Textiles flows can be slowed down by buying fewer quality items and wearing them for longer, and they can be sorted and diverted to reuse or reprocessing options
- Building design and construction processes can reduce waste generated
- Construction and demolition materials can be diverted for reuse and remanufacture
- Design for deconstruction makes it safe and easy to dismantle objects into their component parts

Strategy and Regulation

Some key regulatory and strategic opportunities to influence organics flows are coming up in the short term with the review of the Waste Minimisation Act 2008 and the 2010 New Zealand Waste Strategy, increases to the Waste Levy and and the associated action and investment plans. We need to use these to divert a large proportion of organics from landfill.

The Infrastructure Strategy can support and guide this work by aligning goals, requirements, investment and practice at the national and local scales. It is important that the Commission becomes a strong advocate for maximising the amount of organic material being composted and returned to soil to support carbon sequestration as well as emissions reductions.



For food and green waste - post consumer and post production[50]

[50] Zero Waste Network stock image from file

Policy guidelines and investment around organic waste infrastructure development must follow the waste hierarchy for organics, which prioritises prevention, redistribution, reduction, and local processing over tech-heavy, large scale infrastructure.[51] This will give the best long term outcomes by creating multiple co-benefits that build local capacity and resilience.

Creating pathways for diverting organics to return them to soils and avoid biogenic methane emissions from landfill is a key priority for infrastructure investment. Signalling and implementing bans for the disposal of organic material types to landfill will create an incentive to invest in alternative strategies for managing these. Minimising edible food waste, which is estimated to account for 6-8% of global GHG emissions,[52] will have a substantial emissions reduction impact alongside positive social outcomes such as redistributing surplus food to those who can make good use of it.

There is a big shift to compostable packaging happening in response to the publicity about the environmental impacts and poor recycling outcomes for plastics. As noted the organics stream comprises a wide variety of different materials. Composting systems are focused on creating value for end users. While 'waste' streams are sometimes good feedstock the quality of the finished compost depends on the quality of the inputs.

We will probably need at least 3 streams for composting:

1. High quality food and organic material to go back onto land that is producing food
2. Compostable packaging, fibre and other organic material containing chemicals and toxins
3. Biosolids and other feedstock containing chemicals that can go to land producing fibre - forestry or roadside landscaping, remediation etc

There is no current harvesting or processing system for most of the compostable packaging that is coming onto the market. It is reasonable to expect that the producers and users of this packaging would fund the development of systems to handle it at end of life through eco taxes or advance disposal fees so the burden does not fall on the public through general rates or taxation.

Fresh approach to 'Product Stewardship'

Across our network we hear that households and SME want to do the right thing. They may be aware of options but they struggle to reduce waste through their day to day activities because our economy incentivises wasteful, high emissions choices. Government needs to focus on creating the structural change that will normalise the best choices and make them practical and accessible. This will be more effective than trying to educate people to go against prevailing price and convenience signals.

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[51] Apart from the benefits of reducing and redistributing edible food waste discussed elsewhere in our submission, see this useful discussion on choosing between composting and anaerobic digestion: https://zwia.org/composting-and-anaerobic-digestion-policy/

[52] Ritchie, H. (18 March 2020) "Food waste is responsible for 6% of global greenhouse gas emissions", *Our World in Data*. Retrieved from: https://ourworldindata.org/food-waste-emissions; Food and Agriculture Organization of the United Nations (FAO), "Food Wastage Footprint & Climate Change", Sustainability Pathways. Retrieved from http://www.fao.org/3/bb144e/bb144e.pdf.

Product stewardship is a tool derived from zero waste and circular economy theory. It aims to internalise social and environmental costs to trigger product and system redesign. Product stewardship is about the whole life cycle of products so it needs to go beyond the traditional end-of-life, landfill-centric analysis.

To reduce demand for waste and recycling infrastructure product stewardship needs to focus on the full product lifecycle and achieve outcomes at the top of the waste hierarchy. So far we have used it as a vehicle to establish open-loop recycling schemes for hard-to-recycle products, or to ensure safe disposal of waste.

Product Stewardship schemes are being developed under the provisions of the Waste Minimisation Act 2008 and the Infrastructure Strategy needs to clearly signal the importance of looking upstream to reduce waste and emissions. Most existing or proposed product stewardship schemes in Aotearoa rely on open-loop rather than closed loop recycling. Open-loop recycling may divert materials from landfill, but does not put the brakes on raw material extraction[53] and it can easily become downcycling[54] or tokenism[55] .

Effective product stewardship increases circularity. It includes upstream interventions that extend the life of products. It influences the design and delivery of goods and services to reduce the amount of material and energy consumed to generate a useful product life. Closed loop recycling keeps resources in circulation by turning them back into the same product, with the same function, reducing the need to endlessly repeat the energy intensive process of extracting and processing raw materials.

Collaborate across the supply and recovery chain

Responsible consumption and production processes increase circularity at each stage of the product life cycle. This requires cooperative relationships between actors right across the supply and recovery chain. These are very patchy in the current linear economy model. A more holistic approach that develops collaborative and inclusive circular economy roadmaps and uses multi stakeholder alliances to transition value chains would reduce waste and emissions[56].

The aim is to establish "*multi-stakeholder, cross-value-chain, inclusive and responsive working mechanisms*" that cut across traditional silos[57]. The Government needs to be hands on to get collaboration across the supply and recovery chain, creating the regulatory framework and coordinating and supporting actors. A lack of integration and dialogue will result in incremental changes at best. More effective feedback loops between the players that work across the supply and recovery chain creates multiple opportunities to increase circularity. It enables all the stakeholders to adapt and change their practises over time as new information comes to hand about materials, systems and outcomes.

Using a whole of life value chain focus for product stewardship would help:

- *designers and producers* to design-for-subsequent uses, recycling or composting

[53] As WRAP say "If recycling is the answer, we are asking the wrong question."

[54] Material collected and becomes recycled content in a product which has a short life and is destined for landfill e.g. a rubbish bag

[55] Very small percentage of the total material stream recovered and recycled e.g. soft plastics

[56] The Circularity Gap Report 2021 also highlights the power of coordination to create value chains.

[57] Ellen MacArthur Foundation 2021 op cit p 28

- *refurbishers and recyclers* to supply valuable secondary material streams to market
- *users* to get best value from products - maintenance support, closed loop recycling
- *policy development* to support value creation across the supply and recovery chain
- *training, innovation and research* focused on solving the problems that matter to us.

This might include policies to increase reuse, maintenance and sharing, such as reuse targets or quotas for packaging, product design specifications for reusability and durability, or levers to normalise the sharing or service economy and reduce the duplication of resources inherent in the ownership model.

Product stewardship schemes should also set binding reduction targets and import levies or restrictions for certain products, materials and additives, bans on certain products, and facilitate a move away from single-use applications of certain products (such as takeaway packaging) towards reuse systems.

Creating real change in the way we do things

It is important to recognise that interventions required to reduce material and energy consumption would trigger significant shifts in current business and economic practices. At the moment companies can put packaging and other products into the market with little thought given to what will happen at the end of it's often too short life. This imposes infrastructure costs on the public to mop up litter and marine pollution as well as to create recovery systems for end of life products and materials.

We think product stewardship should be normalised and applied to all products in our economy, not just problematic products. Focusing on specific classes of products (i.e. high emissions potential or toxicity) misses product stewardship's potential as a key tool to incentivise and guide product redesign in order to circularise our economy for all material flows and consumption patterns. This would ensure the recovery chain gets as much attention and investment as the supply chain.

The design and implementation of product stewardship requires an overhaul if schemes are to meet our waste and emissions reduction expectations. The government's current approach to mandatory product stewardship is for industry to lead 'co-design' of schemes for priority products. It does not make sense to us that the regulated party should get to create the terms of its own regulation. Industry has a vested interest and often benefits from the status quo. There is little incentive to foreground community or environmental interests[58].

Product stewardship should be led, designed, monitored and enforced by the government, not industry. Government should provide neutral facilitation and oversight of the scheme design process. Such oversight recognises that properly designed product stewardship schemes are a public good necessary to reverse the harm caused by economic practices that externalise social and environmental costs.

[58] Securing social license to operate is more likely to be a greenwash exercise than a real shift in impact.

The need for a specific Circular Economy institution

To achieve this Government needs to establish a properly resourced, independent central government agency for Zero Waste and the Circular Economy. This has already been recommended in the Climate Commission's advice. One key function of this agency would be to lead the design, application, monitoring and enforcement of both voluntary and mandatory product stewardship schemes in the public interest.

This is in line with Priority area 1 - Institutional and Governance reform. Entities like WRAP and Zero Waste Scotland are examples of institutions that have been developed to perform this role. They have been:

- making good progress on reducing waste and emissions,
- leading the way in research and development of strategies, knowledge and policy that enable change
- building relationships with others working in similar areas to leverage one anothers IP - eg. Circle Economy, Ellen MacArthur Foundation, Zero Waste Europe.

In Aotearoa EECA performs a similar role for energy efficiency. We think there needs to be a coordinating agency working in the Zero Waste and Circular Economy space. They would:

- Coordinate the public, private and civil society entities working in this area to implement the Waste Strategy.
- Strategically invest the Waste Levy Fund to achieve long term waste and emissions reduction targets.
- Build relationships with International agencies so we can learn from their successes and share knowledge and experiences.
- Undertake research and good practise model building that benefits multiple parties to reduce duplication by councils and other organisations.
- Lead the product stewardship scheme development and implementation (as above)
- Ensure the development of an integrated nationwide resource recovery network.

Part four Detail on the Infrastructure Strategy questions

(Basically just worked through the document so should be in order of sections and questions as they appeared)

Q1 Views on the Vision

Infrastructure lays the foundation for the people, places and businesses of Aotearoa New Zealand to thrive for generations.

We support the proposed vision as it appears in He Tūāpapa ki te ora - infrastructure for a better future because it recognises that infrastructure is a means to an end.

We support this vision because it:

- frames infrastructure in terms of the well being outcomes it generates
- envisages laying the foundations for our environment, our society, and our economy in a way that enables them all to regenerate through time
- creates an expectation that the current generation will 'be good ancestors', prioritising investment and action that enables the future generations of all species to thrive. (We assume that places encompasses ecosystems and the species that inhabit them)

We note that the aims don't specifically mention waste or resource recovery
We suggest including 'zero waste' and circular in the first aim so it reads
A Circular Economy that is productive, sustainable, carbon neutral and zero waste

Q2 Views on decision making Principles

As they stand in the consultation document the principles and outcomes will not enable this vision to be achieved.

Given that the vision is for infrastructure to create a foundation for a broader conception of wellbeing which includes people, places and business, the principles and outcomes need a rethink.

There are four main reasons for this.

- The theory of change about how the decision making process and principles will create action, how the resulting action and investment will generate outcomes, and how these outcomes achieve the vision and create the conditions that enable well being to flourish needs to be more clearly articulated.
- The principles and outcomes need to be aligned with other transformative work that is going on across Government.
- The three outcomes; efficient, equitable and affordable speak mainly to the economic aspects of wellbeing. To us they feel more like principles.

- Your 'Aotearoa 2050' survey respondents were clear that "*Our environment is the top priority when it comes to making infrastructure decisions"*[59]. This is not clearly reflected in the principles and needs to be better integrated.

Suggestions for reframing the Principles and Outcomes

We think it is useful to clearly define and label the two overarching goals described on P8 We also think Oranga Taiao (healthy environment) should be added to the second goal to reflect the interdependent relationship we have with our environment as well as the importance of environmental quality for current and future generations of all species.

Overarching goals

1. All decision-making must be guided by Te Tiriti o Waitangi and its principles, in particular the obligation to partner with Māori.
2. Infrastructure should support oranga taiao and oranga tangata or the wellbeing of our place and our people.

It may be useful to separate the principles and outcomes out across the process to clarify their roles. It is not clear to us why some line items are labelled outcomes and others principles.

For us:
Principles are useful for guiding the decision making processes at the front end. The quality of the decisions we make today create the world we will live in tomorrow. Asking the right questions and holding the principles in mind as we carefully weigh up the options will enable us to make wise choices. Having a clear set of principles also helps us discover co benefits and make trade offs between different options. Principles guide decisions made during the sense making, prioritisation, scoping, planning and implementation phases.

Outcomes are the results or consequences of both the actions taken to provide infrastructure, and the relationships that are built through the process.

Karacaoglu (2021)[60] identifies two critical wellbeing priorities for Aotearoa: stresses on our natural environment and equity issues. It is vital that the Infrastructure Strategy clearly describes how the decision making principles will generate actions that create the conditions for these types of well being to flourish.

Decision making	Action	Outcomes
Principles guide decision making process Future focused Integrated Options	**Outputs generated through delivery phase** Planning Investment Construction	**Generate Well being by providing infrastructure in ways that create the conditions for it to flourish** Systemic Resilience

[59] P6 Infrastructure Strategy Consultation Document
[60] OP Cit

Transparent Broad evidence base Viable - (effective and efficient)) Co-Benefits (affordability) Active protection	Development Operation of Built and soft infrastructure Hybrid grey/green models Co benefits	Just transition (Equity) Regeneration (of natural, social, human, economic capital) Circular Economy (Emissions and waste reduction)
Partnership looks like Tuakana - Teina Te Ao Māori and Mātauranga Māori valued as a worldview with relevance to the big questions of the day Making time and space for and resourcing Māori voices Relevant services	**Partnership looks like** Build capability and create opportunities Ownership Enterprise opportunities Meaningful work Kaitiakitanga Collective impact	**Partnership looks like** Tino Rangatiratanga Equitable solutions Mauri and Mana o Taiao a Tangata enhanced Co-benefits embedded through the whole life span Social cohesion
Community resilience looks like Decentralisation Devolution of responsibility and resources Engagement and participation Relevant services Impact at the local scale attended to	**Community resilience looks like** Build capability and opportunities Ownership Enterprise opportunities Meaningful work Guardianship Collective impact	**Community resilience looks like** Empowerment Equitable solutions Strong local economies Healthy ecosystems Co-benefits embedded through the whole life span Social cohesion

This table outlines our version of the thinking we can see in the Principles section of the Infrastructure Strategy Consultation Document. We believe the Partnership and community resilience dimensions are worth particular attention in your thinking as you develop the Final version.

The relationships with Iwi/Māori and community are critical if investment in hard and soft infrastructure is to create value for people where it really matters. The rubber hits the road for well being at the local scale.

Comment on principles

UNEP[61] have developed 10 principles for sustainable infrastructure it may be worth mapping these against the ones you have to see if they can add any value.

1. Strategic planning
2. Responsible , resilient and flexible service provision
3. Comprehensive life cycle assessment of sustainability

[61] UNEP 2021 International principles for sustainable Infrastructure Nairobi

4. Avoiding environmental impacts of infrastructure systems
5. Resource Efficiency and Circularity
6. Equity, Inclusiveness and Empowerment
7. Enhancing economic benefits
8. Fiscal sustainability and innovative financing
9. Transparent inclusive and participatory decision making
10. Evidence based decision making

Future Focused
Draft version: We think about the future while learning from the past, and ensure that our infrastructure is adaptable and responsive to changing circumstances, including climate change.

Expand to include

- Clearly signal the time frame for decision making so all entities are using the same frame of reference when scoping investment scenarios - 30 years to 2050
- Secure intergenerational well being by investing in the present in ways that create potential opportunities for future generations.
  Building capacity, restoring ecosystems, strengthening communities and local economies and shifting to zero carbon are good investments that create potential for future generations while increasing equity in the present
- Wide scan for options - manage uncertainty by exploring alternative ways to meet needs including non-built infrastructure solutions.
  Making best use of what we already have and carefully prioritising investment. Waste and pollution are forms of inefficiency. Designing it out of the system to reduce waste and recycling flows is a better option than expanding landfill, processing and collection capacity.

Suggest creating an economic focused principle
Bundles up economic outcomes and treats them as a principle (Efficient, Equitable, Affordable)

These three appear as outcomes in the Infrastructure strategy but we think they are a better fit as principles. Adapt to refocus on public value

Infrastructure decisions provide *public value* this encompasses

- Viability - environmental, social, cultural and economic wellbeing are larger than the costs to provide and operate infrastructure.
- Effectiveness - Prioritise longer term outcomes over short term economic interests, cost avoidance, inaction and narrow forms of 'efficiency'.
- Wise investment - procuring for outcomes so that all of our purchasing power is used to deliver 'co-benefits' and support our long term emissions reduction and wellbeing goals.
- Balancing national, regional and local investment to build capacity and resilience, and create opportunities
- Valuing investment in human and social capital alongside infrastructure and technology

Expand Evidence-based: to Broad evidence base
This recognises the importance of diversity, multiple world views, the value of practical experience and local knowledge, qualitative data alongside quantitative analysis etc.

Outcomes

The original version in the Infrastructure strategy has Efficient, Equitable and Affordable as the three outcomes sought. We think these focus on the economic realm. To do justice to the well being approach and current thinking about outcomes a wider frame is needed.

We suggest the following but there is a lot of work already being done on this and we think it would be good for the Infrastructure Strategy to align with other work being done across Government.

Just transition[62] - leave no-one behind, transformation creates opportunities and capability that generates the conditions in which equity flourishes. Co benefits are a key part of making the best use of what we have got. The process of shifting to a low carbon circular economy creates an opportunity to do things differently. It is important that no-one gets left behind.

Resilience[63] - in natural, social and economic ecosystems - Active protection of critical systems ensures resilience. Environmental quality: land, air, water, ecosystems. Community: social cohesion, cultural competency in mutually beneficial relationships, shared purpose. Democracy: participation and partnering models ensure personal freedom and political voice. Local Economies: diverse supply market, local multiplier effect, strong networks., short supply chains. In this time of radical uncertainty the Infrastructure strategy needs to protect our way of life and the systems that underpin it to create a safe space for radical innovation.

Regeneration - of natural, social, human and economic capital - Value flows from the capitals that underpins the 'economy'. Shifting from an extractive, linear approach to a regenerative, circular approach requires a focus on creating rather than extracting value[64]. Natural ecosystems, communities, capacity and local economies need to be continually renewed. Infrastructure Strategy needs to enable positive feedback loops between systems and processes that grow all forms of capital.

Circular economy - zero carbon, zero waste - reduce emissions, slow down material and product flows, design out waste and pollution, meet needs through new provision of service models, effective product stewardship ensures collaboration across the supply and recovery chain to create value chains. Infrastructure strategy needs to support the shift to new models of doing business and creating value.

The Priority areas

Priority Area 4: we would like to see this read

Supporting the shift to a zero carbon, zero waste circular economy to reduce emissions and material flows and prepare for climate change.

62

63 Karacaoglu 2021 op cit sees systemic resilience as a critical output of public policy. "Investing in resilience provides the bridge to achieving sustainable intergenerational wellbeing in a world of fundamental uncertainty." p29

64 Mazzucato 2021 Mission Economy a moon shot guide to changing capitalism. argues that aligning business, government and civil society behind shared goals or missions will shift our economy to a different form of capitalism that focuses on creating rather than extracting value.

We suggest expanding the framing to bring in waste reduction. We think this is the best place for it to fit and it links with work being done by the Climate Commission on the connection between flows of materials and products and emissions.

As outlined in our submission the links between material flows and emissions are intertwined. Reducing waste reduces emissions, it makes sense to tie them in together. This will address both waste generated in infrastructure development and that generated across the economy at large.

Reframe of the Waste Hierarchy model being used (state of play document)
This needs to be adapted to break out waste management activities from resource recovery activities so we can think about the infrastructure needs in relation to each more clearly.

Figure 2: Waste minimisation hierarchy and resource recovery and disposal infrastructure (Te Waihanga, New Zealand Infrastructure Commission, 2020, adapted from s44 Waste Minimisation Act 2008 and Auckland Council, 2018).

We would change the following to reflect a modern approach to thinking about the waste hierarchy.

Delete 'management' from the Waste Hierarchy as it only speaks to the activities at the bottom of the Hierarchy. And reverse the arrow to show increasing order of desirability so it is framed as a positive rather than a negative.

Prevention infrastructure	Resource Recovery infrastructure	Waste disposal infrastructure

Activities that reduce pollution, material throughput and emissions	Activities that keep products and materials in circulation for as long as possible or return organics to soil	Activities that incorporate recycled content into new products and materials	Thermal and waste to energy	Landfills
Redesign of products, materials and systems Elimination of harmful and unnecessary materials and products Effective product stewardship Strategic approach to reduction championed by an institution like WRAP or Zero Waste Scotland	Refilleries Reuse systems eg wash plants Reuse sales - second hand Repair, refurbish, remanufacture Share systems Composting systems Resource Recovery Centres	Closed loop recycling - made into same item for same purpose Open loop recycling made into a different item for similar use value Downcycling to a lower use value Sorting facilities and systems	(Permanently destroys use value of materials) Extracts a (small) proportion of the energy embodied in the material as heat or fuel and none of the energy used across the product lifecycle to produce store and transport it	Stores mixed materials in materials in ground in perpetuity Long term risks associated with leachate, escape of materials into environment, inundation due to sea level rise etc.

Integrate resource recovery and waste management into the body of the document

Resource recovery and waste management is missing from many lists and descriptions in the Strategy document. It would be useful to weave it in so it is clear that the Infrastructure Strategy applies to material flows through the economy.

For example good to include
P29 increasing waste generation and plastic pollution as issues in the list

P29 The need to invest in infrastructure that supports a shift to a circular economy in the improving levels of service bullet point

P31 Major long term trends - weave in global resource efficiency and circular economy drivers coming through emissions reduction, product stewardship, consumer demand and corporate attempts to secure social license to operate and retain customers.

P33 add in resource recovery/circular economy as one of the examples perhaps interconnected - resource recovery system also works best as a network.

P34 add a bullet list for 'Resource Recovery' system - Key points could include:
Issues

- Focus on end of pipe / end of life rather than
- Going back up the hierarchy to intervene in ways that prevent waste and pollution
- Need to reduce risk associated with aftercare in perpetuity of landfills by radically slowing down the flows of materials into them
- Waste is increasing
- Recycling is generally low quality with low recovery rates
- Organics and materials seen as waste rather than as raw material feedstocks or resources

What is on the horizon

- Meet customer and public expectations that products will be durable, repairable, reusable, closed loop recyclable.
- Product stewardship as a mechanism for coordinating feedback loops and revenue flows across supply and recovery chain
- Shift to circular economy requires radical change in the infrastructure
    - Need to establish systems to enable reuse, refillables, repair and refurbishment.
    - Need a nationwide resource recovery network of local resource recovery centres to create a product and material take back system
    - Need an effective harvesting system for organic material so we can compost it and return it to soil to grow food.

P39 Include circular economy discussion in the discussion point on transition to a low emissions economy - all sectors need the support of an effective resource recovery system to be able to make the shift. If you reduce waste and increase circularity you will reduce emissions by default. Survey results showed respondents thought we produce too much waste, and that producing less would help with climate change mitigation and adaptation.

Q3. Are there any other issues, challenges or opportunities we should consider?

This is covered in detail in the body of our submission.

There are opportunities to reduce the infrastructure burden of Waste Management using:

Demand management - Reducing material flows will reduce demand for landfills, collection systems, processing systems, litter and other cleanups. Durability, right to repair and systems that support reuse and refillables will reduce demand by slowing down flows. Eliminating unnecessary items and toxic materials and chemicals will reduce clean up costs. Less material in landfills reduces cost of aftercare in perpetuity and the need to consent and build new facilities.

Funding and financing - It is reasonable to expect that the opex and capex costs associated with infrastructure required to recover materials and products is funded through user charges like advance disposal fees and eco taxes. These systems need to be provided as a public good since no one producer has the scale or the incentive to supply a comprehensive system for everyone to use (free rider problem). But the cost should be recovered in full from user charges rather than an indirect tax or rate on the general public.

At the moment rates and taxes that fund waste management and resource recovery systems subsidise the business models of high materials throughput commerce - single use packaging, wasteful supply chain practises, fast fashion, lack of durability in consumer goods, low quality products, wasteful practices on construction sites etc

Creating user pays mechanisms that ensure those that benefit from the sale of products (producer and consumer) cover the real cost of waste management and resource recovery services will be necessary to meet public expectations about end of life handling eg. packaging, textiles, e-waste.

Securing a social licence to produce and sell packaging and products is going to depend on responsible production strategies like durability, right to repair, reusability, closed loop recyclability etc in the near future. Global and national pressure is shifting attitudes and driving business practises, regulation and legislation around the world.

Productivity Improvements - Waste is pollution and inefficiency incarnate. Circular Economy and Zero waste principles can take it out of the equation. Product stewardship is a useful tool for creating continuous improvement in supply and recovery chains so that we can have the use value of goods and services without the side order of waste and emissions.

Source separation of different materials is the easiest way to create more productive collection and processing systems across the recovery chain. Treating recycling as raw material inputs for the next phase of the production cycle requires clean streams of a single material type. Separation at source and separate collections are commonly required in other countries[65].

Commingled Collections commonly used for kerbside and commercial recycling collections in New Zealand:

- Push cost and risk out into other parts of the system eg. high cost to sort mixed materials, not able to meet material quality specifications so no market for recyclate.
- Poor recovery rates - lower yields as recyclables are lot into rubbish nad cross-contaminate other material streams
- Encourages wish cycling - if in doubt throw it in
- Higher carbon footprint across the collection and processing system than source separated material (MRF process is energy intensive) Reprocessors often have to do a presort on MRF output etc.

[65] https://eeb.org/library/explained-europes-new-laws-for-separate-waste-collection/

- Once a council kerbside collection is commingled there is an incentive for all commercial collection to follow suit - cheap collection/poor outcome model flows into commercial recycling systems.

Priority area 5 - A Digital future

Also covers off F3. Flows of materials and energy through the system in Circular Economy

Technology change has big implications for resource recovery. Connectivity is critical for all the new developments in materials handling across supply and recovery chains.

- Technology will play a big part in traceability by tracking material and product flows as part of the evidence base for circularity. Already being used for chain of custody, audit trails, material content, emissions profiles this will only get more sophisticated. Transparency of environmental impacts of products through data. Block chain for tracking products and materials across the lifecycle.

- Data is a big deal for the materials recovery sector - new forms of measurement and tracking will be important for securing payment for services from various revenue sources, and tracing materials flowing through systems. Monopolies in many parts of the country create issues for data gathering as regional materials flow data is considered by large operators to be critical business information that they do not want to share with competitors. One solution to this is to ensure a competitive, and diverse supply market in each region. Another is to use data collection systems that aggregate to disguise regional patterns but the question has to be asked whether this best serves the public interest.

- Tracking products and following money flows (eg deposits and advance disposal fees) through product stewardship schemes for containers or E-waste eg. Eg. Reverse vending machine technology for container return schemes - return deposits to consumers, track materials to return handling fee to recycler etc.

- Also important for allocating producer fees back to relevant suppliers for the proportion of a certain material, eco taxes per unit for single use packaging etc

- Enable sharing programmes to operate like tool sharing, car sharing apps etc And leasing programmes like clothes leasing, appliance leasing which are ways to ensuring durability of goods.

- Collective sharing of businesses methodologies across networks to replicate services in multiple communities, benchmark and compare performance to support continuous improvement etc

E-Waste Product stewardship

There is an urgent and important need for an effective harvesting system for reuse, repair, refurbishment, dismantling and recycling of all the electronics materials including gadgets,

components and batteries. Most modern equipment including appliances, machinery and vehicles is a complex mix of materials and electronics. E-waste is a very fast growing segment and contains rare and toxic components meaning it needs careful attention.

Needs fall under 3 action areas

Building a better future - resilient to stresses and shocks and ready for change
Question 4 What do we agree, disagree, Gaps?

Agree with the' long life, loose fit' approach.

This is especially relevant to resource recovery where the goal is to transform the system over time so we shift to zero waste (just like we aim to do with zero carbon by 2050).
Radical change will come across our sector over the next 30 years as corporates, governments and communities engage with the idea of increasing circularity.

Facilities and infrastructure need to be owned and operated by parties with an incentive and a desire to change the game and innovate over time. Big Commercial Waste companies have an interest in maintaining the status quo and this has stymied progress on resource recovery.

Land based assets with services, landscaping and buildings that can be converted to new uses over time are best put in the hands of purpose driven Māori, Pasifika and Community Enterprise operators through social procurement processes so that public opex funding and other revenue streams can be converted into a public asset base.

Local ownership generally ensures a wider range of interconnections, co-benefits and a long term view of the impact on the community, local economy and environment of enterprise activity. It is critical that we build diversity in the supply market to grow innovation, opportunity and capacity as well as local multiplier effect.

Ownership and operation by local scale operators is especially important in customer facing activities as service delivery and behaviour change are intertwined. Service users can get advice and support to up the game when the operators with the right approach, knowledge, experience and incentive are running facilities.

Under list of Needs
areas we believe change will be needed we want to see something like

- Transition resource recovery infrastructure to achieve zero waste by 2050 (Or connect zero waste into a new Circular Economy line item)

Agree with the other bullet points - see detail in our submission on Partnering with Māori.

F1 Infrastructure for climate change
We agree that it is critical to pick up the pace on mitigation and adaptation measures in relation to climate change. There are multiple opportunities for the infrastructure strategy to tackle climate change. We agree that embodied energy in materials is one aspect of this, and

that the whole of life implications of infrastructure is important, this needs to include the emissions generated through operational phases as well.

P48 It would be good to include a discussion point on transitional infrastructure eg. making the shift from a Waste Management approach to a Zero Waste approach that supports a Circular Economy.

We need to make some hard choices about whether to invest in maintaining and slightly improving the systems we have now or heavily investing in making the jump to the hard and soft infrastructure that will support the new operating model.

See detailed section on Circular economy, relationship between waste and emissions reduction in our submission.

We agree that the true cost of carbon needs to be factored into decision making across the board.

Q5 The challenge in considering transport journeys re 'waste'
The big picture needs to be taken into account so that good decisions can be made. Decarbonising transport makes sense but it makes even more sense to eliminate unnecessary journeys.

Using electric rubbish trucks sounds like a good idea at first. If they are used to collect ever increasing quantities of waste that has had a very short useful life and has both an embodied energy and associated carbon footprint, it's really just another way of making us all feel better about the rubbish and recycling we are creating. It would be better to do away with the single use packaging, fast fashion, cheap junk consumer goods etc and not have to move them to landfill in the first place.

Consumption emissions which make up our carbon footprint is a substantial component of our emission profile. A large proportion of this is related to transport of items and their components across the lifecycle from extraction to point of sale then back through the recovery chain. Some of this accrues onshore, some offshore. These emissions are best tackled using strategies that reduce waste at source which will enable us to use those electric vehicles for more important jobs.

See detailed discussion on this in the body of our submission.

Q6 How can we use infrastructure to reduce waste to landfill?
See body of our submission for a detailed discussion of this.

In simple terms innovation in the resource recovery space needs to be based on circular economy and zero waste principles. We need to shift to a zero waste approach and goals in the same way as we have recently shifted to a zero carbon approach and goals for emissions.

Key principles are:

- Designing out waste and pollution. Slowing down flows of materials and products. And ensuring activities regenerate natural and social systems.
- Organics should be considered in terms of their value for soil and food production rather than as 'waste'
- Reduction of waste at source is best, reuse, repair, and composting are great, closed loop recycling is good.
- In general short loops are better than long ones (cascades in the Circular Economy butterfly diagram)
- Reducing waste and resource efficiency also reduces consumption emissions which form a large proportion of our carbon footprint. So spending on resource recovery will deliver the co-benefit of emissions reductions

We agree that the following are of particular relevance in infrastructure but we think they should be a subset rather than the whole story.

- Reducing the amount of waste generated in construction and demolition through materials selection, procurement and prefabrication.
- Incentivising reuse and recycling through waste management planning on construction sites, procurement and adoption of rating tools.
- Increasing the availability of infrastructure specifically for recycling construction waste (materials recovery facilities) in regions where construction activity is predicted to remain high, to support waste diversion from landfill.

When thinking about the relationship between infrastructure and 'waste' it is useful to distinguish between:

- the hard and soft Infrastructure that forms the current waste management and
- emerging resource recovery system and
- the construction and demolition waste generated through the building and maintenance of all forms of infrastructure.

It is important that we create an effective resource recovery system for the construction and demolition materials being generated on large and small building sites across the country. But the real wins come when we start to think differently about how we can use resource recovery infrastructure to enable a just transition to a zero carbon, zero waste circular economy.

It is not clear to us how *Investing in transport infrastructure that enables centralisation of specific waste streams at scale* differs from any other transport activity relating to the supply and recovery chain. We don't think it is a critical point for the resource recovery section.

In relation to *Using energy-dense waste products as fuel for existing processes, for example by burning tyres to generate the heat to make cement.* Waste to energy is a contentious issue in our industry. Burning and burying waste have been used in the past to make it 'go away'. In general we would argue it is better to go upstream and find better options for ensuring the materials and their embodied energy are reused in some way.

Anything that burns is, or was organic, many 'waste' products were made with fossil fuels.

The best you can hope for is to capture a small amount of the energy that is embodied in the object. The consumption emissions generated from manufacturing, transport, warehousing, retail etc over the items life can't be recovered.

Managing demand through the waste levy to further encourage diversion of waste from landfill. We agree this is necessary but it is only one piece of the puzzle. There needs to be a comprehensive approach to developing a nationwide resource recovery network so we have a recovery chain that works as well as the supply chain.

F1.7 Drive a culture of waste minimisation.
Needs to be radically expanded! As outlined in the body of our submission.

This seems to apply specifically to infrastructure projects only.
Update procurement guidance to require the avoidance of waste creation as a design/procurement objective:

- Require the design of public-sector projects to evaluate the use of recycled products where feasible.
- Require that all projects of a certain size develop waste minimisation plans as tender deliverables that are considered as part of procurement evaluations.

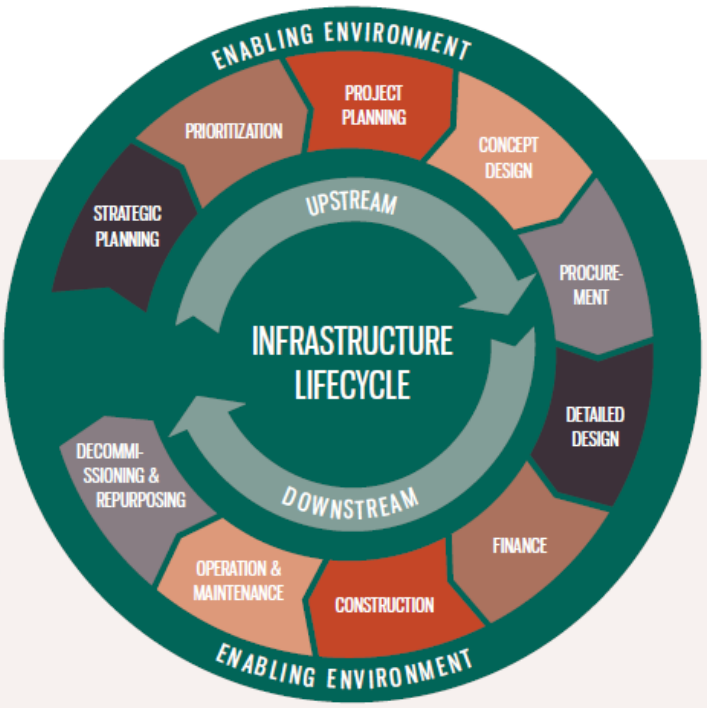
This needs to be expanded to take on board the whole system approach advocated by UNEP[66] so that upstream considerations are taken into account.

FIGURE 3: THE INFRASTRUCTURE LIFECYCLE AND ENABLING ENVIRONMENT

The infrastructure lifecycle encompasses more than the single project lifecycle and includes decision-making phases that are "upstream" of planning for any specific project(s).

The enabling environment is comprised of the institutions, policies, and rules and regulations that govern the planning, delivery, operation, and decommissioning of infrastructure systems. The enabling environment applies to the entire infrastructure lifecycle, although the creation of specific institutions, policies, and rules and regulations necessarily occurs upstream of the lifecycle phases to which they apply.

Source: GIZ and UNEP



[66] P17 UNEP 2021 International Good Practise Principles for Sustainable Infrastructure

F6. Ensure security and resilience of critical national infrastructure

See our submission for a section on the value of a Nationwide Resource Recovery Network. We see this as a critical piece of infrastructure that will enable business and households to make the shift to a circular economy.

Q18 Enabling competitive cities and regions - agree, disagree, gaps?

Enabling competitive cities and regions - support the needs of people in cities and regions and improve our connections with international markets

This misses the importance of maintaining the viability of regional and local economies.
See detail in the Localism section in the body text of our submission

P90 C5.1 Develop a long term national supply chain strategy
This is missing the recovery chain part of the story. This is a linear extractive model approach, we need to shift to a circular regenerative approach to be relevant in the 21st Century. It needs to be a supply and recovery chain strategy.

All the goods, materials and packaging that flow out through the supply chain also need to flow back up the recovery chain so we can reuse, repair, recycle, compost etc. This is the missing piece in the thinking that created our waste problems in the first place. A Nationwide Resource Recovery Network is a critical piece of public infrastructure that needs to be built into the Infrastructure Strategy from the beginning.

We need to be able to do a great job of this so our export industries and tourism industries can prove they are doing the right thing in global markets. We also need to do it so we can hold our heads up high as citizens of Aotearoa knowing that our everyday activities at home and at work are increasing well being.

We urgently need to develop an evidence-based, long-term national resource recovery strategy covering waste prevention, reuse, repair, refillables, composting, remanufacturing, closed loop recycling to support the creation of a fully integrated resource recovery chain network. The strategy could look at competition between modes, ownership structures, regulatory regimes and the infrastructure investment required to improve the effectiveness and sustainability of New Zealand's recovery chains.

P99 Getting the price right

Also covers off F1.8 Efficient pricing of waste

Waste disposal charges that reflect the true cost of disposal to landfill

In a recent listener article[67] Alan Bollard said

[67] Bollard, A Listener May 22 2021 Digging Deep p17

"We are traditionally reticent about charging the users of infrastructure it's true cost, preferring to hide this in general taxation and overall rates."

To think clearly about how this plays out in the waste management and resource recovery sector this needs to be broken out into several different parts. We see these services fitting best into the semi commercial realm with local and central government responsible for ensuring the regulatory framework and basic network are in place and users and producers responsible for covering the capex and opex costs.

Waste disposal
We agree that the price of rubbish disposal needs to increase. It is useful to tax rubbish as a means to collect revenue to invest in making the systemic shift to a circular economy. The increases in the Levy over the next few years will increase the pool of capital available for this work. Increasing the cost of landfill can mean it reaches price points that make resource recovery of different materials viable.

It is hard to see how we can properly price the risk associated with storing large volumes of mixed materials in holes in the ground in perpetuity

Resource recovery as a necessary service
We need to stop thinking about resource recovery as a nice to have and frame it as an essential service. This will bring us into line with global thinking. It will require a new approach to covering capex and opex costs associated with resource recovery. An effective resource recovery network is a public good that needs to be provided through government intervention and it can be paid for through a mix of direct eco taxes like the Waste Levy, advance disposal fees, user charges etc.

This needs to be clear and transparent so the real whole of life costs[68] of different options for providing a particular service are obvious eg. drink of water - out of the tap using a glass or a water fountain compared to a single use plastic bottle compared to a single use glass bottle. At the moment ratepayers and taxpayers are subsidising unsustainable business models.

Making the best use of what you have
Contracts for waste management services are paid for through public sources but we are not getting good value from these. They are not generating innovation or reducing waste flows. We need to rethink how we are using this public cash flow so we can generate better outcomes. Who pays and who benefits are interesting questions to ask. Often the public pays and private operators benefit while providing a low quality service.

The Waste Levy
The Commission should clearly signal the opportunity for the Government to use waste levy revenue and the contestable Waste Minimisation Fund to pivot from a focus on managing waste to a focus on the zero waste strategies that enable a circular economy.

[68] Financial, wase, emissions, affordability etc

This existing hypothecated fund is going to increase as the levy rate increases over the next three years. In theory as the rate increases waste arisings will fall therefore this channel for securing funding is best used for capex and behaviour change work rather than opex. Opex needs to be funded through other channels like advance disposal fees and eco taxes.
We think the Levy fund needs to be used more strategically and transparently to invest in transformative activities that increase circularity and shift behaviour.

This should be based on the waste hierarchy which enshrines zero waste and circular economy principles. Key priorities are waste prevention and reduction, building a healthy reuse economy, effective nationwide resource recovery network and closed loop recycling systems. This includes funding strategic research and development to support the redesign of materials, products and systems.

As discussed in the body of our submission a larger proportion of levy funds should be invested at the local scale. To ensure a just transition, the Government needs to invest in local, community-scale solutions and SME innovators who are driving change. They are working hard in this space already but are starved of capital. This includes iwi and hapū waste minimisation projects. Investing at the local level will support supplier diversity, climate resilience and tino rangatiratanga.

We need investments of waste levy revenue to tip the playing field in favour of actions at the top of the hierarchy. Policy instruments and investment need to drive a shift towards effective reuse systems, closed loop recycling and a circular economy. To achieve this funds need to be made available to a wider range of stakeholders. For example: businesses transforming supply models like Ethique. Urban farmers who collect local organics and convert it into food. The growing network of zero waste grocers who are finding innovative ways to get packaging free

Strategic investment to support transformation
Instead of thinking about what is most urgently needed we need to use the Eisenhower matrix approach to look at what is most important to deliver on our long term strategic goals. Shifting to a regenerative circular economy requires us to leave behind some of our current favourite activities (downcycling) so we can go up the pipe and reduce flows. We need to come up with a coherent plan for how we are going to transform our economy by installing infrastructure that supports effective reuse, refill, closed loop recycling instead of throwing good money after bad to prop up weak and ineffective recycling activities.

Reducing demand
Reducing and slowing down material and product flows through the economy is the best way to reduce demand for waste and recovery services. Using product stewardship mechanisms to go upstream to influence supply chains is cost effective in the medium to long run. The social licence to operate is fast running out for companies which create waste and emissions as a function of their business models.

Ideas about value are changing, just because something gets made does not mean it has lasting value for society. Consumers and value chains are seeking assurances that products and

materials the waste and emissions impacts are being minimised and eliminated over the life cycle.

Fairly allocating capex and opex costs
We need to think about how we can use a comprehensive range of funding mechanisms to cover the capex and opex costs of waste management and resource recovery systems. Thinking about this is in a very primitive phase in New Zealand. We need to explore how all of the following can best contribute and develop the regulatory and legislative support to put this into place. Personal and company taxation, rates, specific levies, developer and producer levies, user charges, advance disposal fees, market pricing, eco taxes, waste and emissions charges.

P101 Role of local Government in waste management and Resource recovery
The political environment of local government is not always conducive for funding growth (or change from status quo)

Local Government has a lot of responsibility for ensuring waste management and resource recovery services are available. There is often a gap between the desire for resource recovery services and willingness to pay through rates. This creates issues when lowest cost tenders are accepted. A race to the bottom ensues, with operators competing to do a worse job for less money rather than to pay a fair price to do a good job.

Commingled collections are a good example of this practise. A cheap collection system reduces collection prices but exports cost and risk to other parts of the system - poor quality materials, high cost sorting systems, high capex cost leads to long contract term with no incentive for innovation, a 'not my problem' approach from collectors to contamination, low prices for recyclate or no markets when it can't meet international specifications etc.

Local Government has tended to go for long term contracts that bundle all waste management, resource recovery (and sometimes even behaviour change and education services) into a single tender process. This creates an opportunity for large companies to win the right to control the waste management and resource recovery market in a particular area for a long period of time. Thus creating an effective monopoly. The contract gives the right to control the local market rather than the right to compete in a continuously operating market.

Usually these contracts allocate the transfer station sites, Materials Recovery Facilities, collection contracts for domestic kerbside and (sometimes commercial as well) to a single operator who then has a large competitive advantage over others. They can run commercial activities off the back of the contract and outcompete other operators working in the district or region. There is very little incentive to innovate and the contract management process often locks in the status quo for long periods of time.

In general waste management gets the lion's share of budget allocation, recycling a big chunk and reuse, reduction, behaviour change are thrown a few crumbs. We invest in what we don't want which supports and encourages wasteful behaviour to continue. This means that enterprises and organisations working up the waste hierarchy in reuse, reduction, source

separated collections, servicing SME and events customers etc are left to fend for themselves with very limited support from public sources.

Most local and regional recyclers and rubbish companies have been bought out or competed out of the market. There is a lack of diversity in the supply market for resource recovery services. It is possible to create willingness to pay and generate a customer book for quality services but it is very tough going. Especially when competing with low prices to landfill material or commingled recycling collection methodologies.

The reason resource recovery systems don't spring up of their own accord is that the sale of recyclable materials only covers a small proportion of the cost of collecting and processing the material to prepare it for market. There is always a market for high quality recyclate but there is usually no price premium. Small operators producing high quality materials get caught in the backwash of big global shifts like China National Sword and Operation Blue Skies. Their materials meet the specifications but the scale is too small to be able to push through the system.

Public and private motives do not often align and although contracts often contain aspirational goals to innovate and reduce flows of materials over time companies whose operating model is based on increasing throughput and returns to shareholders do not have an incentive to deliver innovation that reduces waste. Trying to use contracts and regulation to ensure a fair price, get quality services and innovation has proven to be a tricky business.

Assets created with public money (rates funded opex and capex) like MRF's, transfer stations and collection infrastructure are often 'provided' by private companies and returned to councils at the end of the contract. Contractors have little incentive to maintain or improve these assets, putting in the bare minimum required to do the job and running them down over the contract life.

We need to find a better model for funding and procuring resource recovery services. An effective and innovative resource recovery system is a public good. All industries and households depend on it to be able to deliver the circularity that will drive waste and emissions reductions. We need to turn the current model on its head. Creating a nationwide resource recovery network that is a public asset, like the roading network, that is funded through user pays and value capture mechanisms like eco taxes, advance disposal fees etc.

Value capture mechanisms to fund resource recovery infrastructure
Product Stewardship schemes can be used to create 'value capture' mechanisms for waste and resource recovery infrastructure. Where a producer benefits from the public provision of a resource recovery system the value that accrues to them by legitimising their business model can be captured through some form of eco tax. These are used effectively across Europeand the UK to offset costs associated with single use packaging eg. Norway .

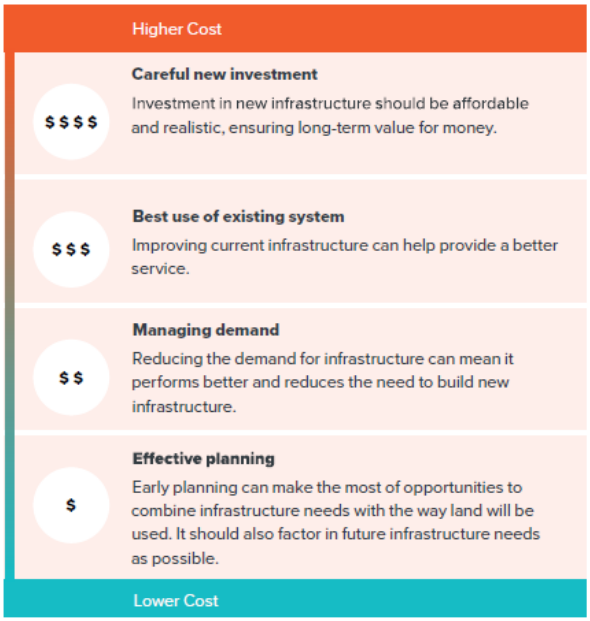
S2.1 Fund tourism infrastructure

User charges levied through product stewardship schemes will help cover the cost of providing infrastructure to meet visitor demand. One example is a container return scheme which includes a handling fee that covers the recycling cost for single use beverage containers.

This means each container pays its own way through the resource recovery system which shifts the burden for paying for recycling off councils and ratepayers and onto those that benefited from the sale of the drink - the producer and the consumer. Visitors (and locals) pay the real cost of recycling each container when they buy the drink. Container Return Schemes use a deposit to incentivise returning the container to a recycling depot or reverse vending machine which also reduces litter and illegal dumping issues.

Re priorities for spending

Figure 14: Better use and management of infrastructure



We agree with the approach outlined and see it aligning well with the Waste Hierarchy as described in the body of our submission.

S4.3 Review the discount rate
Undertake an inquiry into the appropriateness and consistent application
of New Zealand's social discount rate policy.
Yes