

Call for evidence: response form

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Submissions on similar topics

Please indicate any other submissions you have made on relevant topics, noting the particular material or information you think we should be aware of.

Answer:

Evidence is also in submissions to:

Productivity Commission Inquiry into Low Carbon Economy

www.bioenergy.org.nz/documents/resource/submissions/Productivity-Commission-Submission-180608a.pdf

MBIE Process heat discussion document www.usewoodfuel.org.nz/resource/process-heat-in-nz-opportunities-and-barriers-to-lowering-emissions

MfE Zero carbon Bill www.bioenergy.org.nz/resource/climate-change-response-zero-carbon-amendment-bill

Note that the Bioenergy Association response is structured to provide separate evidence on opportunities for greenhouse gas emission reduction for each of the areas of expertise covered by the membership:

- 1) Replacing combustion of fossil fuels by solid, gaseous and liquid biofuels to produce heat
- 2) Reducing methane and carbon dioxide emissions by processing of residual food waste to produce biogas and biofertiliser and avoid disposal to landfill.
- 3) Reducing methane and carbon dioxide emissions by best practice anaerobic digestion at waste water treatment facilities.
- 4) Assisting agriculture and horticulture farms adoption of circular economy principles and practices to reduce net farm greenhouse gas emissions.
- 5) Reducing carbon dioxide emissions by replacement of fossil fuels by gaseous and liquid biofuels for transport.
- 6) Reducing carbon dioxide emissions by use of wood fuel for space and water heating.

All relevant evidence which is available to support the Association's submission is available from reports, workshop presentations and webinars available from the Bioenergy Knowledge Centre www.bioenergy.org.nz/bioenergy-knowledge-centre and the Association websites:

www.bioenergy.org.nz
www.biogas.org.nz
www.usewoodfuel.org.nz
www.liquidbiofuels.org.nz

Open access to all material can be made available to ICCC staff.

This submission complements specific individual submissions from members.

Commercially sensitive information

Do you have any objection to the release of any information contained in your response, including commercially sensitive information?

If yes, which part(s) do you consider should be withheld, together with the reason(s) for withholding this information.

Answer:

No

Questions for consideration:

Section A The first three emissions budgets

Under the proposed Zero Carbon Bill, the proposed Commission will have to provide advice to government on the levels of emissions budgets over the coming decades.

Currently, the Zero Carbon Bill requires budgets to be set from 2022-2035 (three separate budgets covering 2022-2025, 2026-2030, and 2031-2035). When preparing this advice the proposed Commission will have to consider the implications of those budgets for meeting the 2050 target. The Commission will also need to consider the likely economic effects (positive and negative) of its advice.

Question 1:

In your area of expertise or experience, what are the specific proven and emerging options to reduce emissions to 2035? What are the likely costs, benefits and wider impacts of these options? Please provide evidence and/or data to support your assessment.

Answer:

Currently 11% of consumer energy is supplied from biomass. Considering only process heat and use of waste this could increase to 15% by 2050 and reduce net greenhouse gas emissions by 3-6%, but with biofuels use by heavy transport this could increase to 27%

energy with 15% reduced greenhouse gas emissions. www.bioenergy.org.nz/resource/is44-emissions-reduction-bioenergy-biofuels-sector-can-achieve-by-2050

The level of reduction in greenhouse gas emissions from bioenergy and biofuels below 2017 levels and the amount of energy produced are set out in Figures 1 and 2.

Figure 1: Greenhouse gas emission reduction below 2017 levels (kt CO₂-e pa)

	Reduction of use of fossil fuels in process heat ^{1, 5} (kt CO ₂ -e pa)			Methane reduction from waste to energy ² (kt CO ₂ -e pa)			Emissions reduction from use of biofuels in transport (kt CO ₂ -e pa)		
	Year	BAU	Transition ³	Transformation ⁴	BAU	Transition ³	Transformation ⁶	BAU	Transition ³
2030	200	400	700	0	180	1450	140	200	1500
2040	500	1000	1500	+20	210	1640	300	400	3500
2050	700	1300	1800	+40	320	1811	600	950	5000

Figure 2: Energy increase above 2017 levels⁷ (PJ)

	Reduction of use of fossil fuels in process heat ^{1, 5} (PJ)			Methane reduction from waste to energy ² (PJ)			Emissions reduction from use of biofuels in transport (PJ)		
	Year	BAU	Transition ³	Transformation ⁴	BAU	Transition ³	Transformation ⁴	BAU	Transition ³
2030	2	4	8	0	1.1	3.2	3	3	20
2040	5	11	17	0.05	1.5	3.9	6	6	48
2050	7	15	20	0.1	1.8	4.6	12	12	68

Notes

1. Bioenergy Association Information Sheet 48 – Greenhouse gas emissions reduction using biomass energy for industrial and commercial heat, September 2018
2. Bioenergy Association Information Sheet 47 – *The role of organic waste and biogas in the transition to low carbon economy in New Zealand*, November 2018
3. Based on implementation of NZECS
4. Requires greater incentives than set out in NZECS. Transport biofuel based on Scion Biofuels Roadmap, 2018

1) Replacing combustion of fossil fuels by solid, gaseous and liquid biofuels to produce heat

Greenhouse gas emission reductions can be achieved by replacing the use of fossil fuels by gaseous, solid or liquid biofuels to produce heat. The use of solid biofuel for process heat is well proven and already extensively used in New Zealand. Currently 10% of New Zealand's consumer energy is sourced from biomass fuel.

The use of wood processing residues as fuel for making process heat is proven and well established in the wood processing sector where heat plant owners have easy access to biomass fuel from their own operations.

Where heat plant owners do not have access to biomass fuel from their own operations eg school or hospital they are dependent on purchasing biomass fuel. Over the last decade, the sale and purchase of biomass fuel to such heat plant owners has been established, although there are some parts of New Zealand where the market for purchase of wood fuel is not yet well established.

Some organic wastes such as paper and cardboard can be briquetted so that they can be used as a biomass fuel for process heat, and not disposed of to landfill.

Construction and demolition wood waste which is currently disposed of to landfill could instead be combusted in appropriately designed and emission monitored heat plant. Inappropriate regulations currently allow only for combustion of clean wood yet the RMA is effects based and so control should be on the outputs and not on the inputs of fuel to a heat plant. This is lazy regulation.

Internationally gaseous and liquid biofuels are used extensively for the making of process heat. Such applications have been slow establishing in New Zealand because of the relative low cost of fossil fuels.

Where a food processing business adopts circular economy principles, and processes its food processing residues into biogas and biofertilizer, the biogas can often be used as a fuel in existing heat plant for process heat.

A summary of the level of greenhouse gas emissions reduction achievable from combustion of solid biofuels is available in the report www.bioenergy.org.nz/resource/is48-GHG-reduction-using-wood-energy

2) Reducing methane and carbon dioxide emissions by processing of residual food waste to produce biogas and biofertilizer and avoid disposal to landfill.

Where a food processor who has adopted circular economy principles treats residual food waste through anaerobic digestion equipment to produce biogas and biofertilizer the biogas can be used to produce process heat, generate electricity or be used as a vehicle fuel. This is proven technology and was extensively used in New Zealand in the 1980's but then went out of favour because of the relatively low cost of fossil fuels.

The processing of organic waste in anaerobic digestion plant instead of disposal to landfill reduces the leakage of fugitive methane to atmosphere from landfill and through combustion converts the methane to CO₂ and water. The CO₂ being 22 times less potent as a greenhouse gas than methane. If the biogas is used to replace fossil fuel for say process heat then there is a double benefit as the CO₂ from combustion of coal is avoided.

The biogas produced from residual food waste can be used as a boiler fuel, for the generation of electricity or as a vehicle fuel.

The economics of processing residual food waste into biogas is assisted by the revenue gained from sale of biofertilizer. The biofertilizer produced from residual food waste is very high grade and pathogen free.

The evidence is that New Zealand had more anaerobic digestion facilities in 1985 than it has today.

A summary of the level of greenhouse gas emissions reduction achievable from processing of organic waste into biogas and biofertilizer is set out following reports:

www.bioenergy.org.nz/resource/is47-role-of-biogas-in-transition-to-low-carbon-economy

BPO, Assessment of Potential for Energy Generation from Expanding Industrial Wastewater Treatment Facilities, March 2018,

www.bioenergy.org.nz/documents/resource/Reports/Industrial-Waste-Treatment_rev1.pdf

www.biogas.org.nz/resource/web190416-energising-circular-economy-by-use-of-putrescible-organic-waste

H Thiele (2007). National Putrescible Waste Biofuel Potential Assessment. Energy Scape Project Report for SCION and Foundation for Research, Science & Technology;

J H Thiele (2005) Estimate of the Energy Potential for Fuel Ethanol from Putrescible Waste in New Zealand Technical Report prepared for the Energy Efficiency and Conservation Authority. June 2005,

The oral evidence provided to ICCC at the workshop on 30 October 2019 forms part of this submission. www.biogas.org.nz/resource/wshop191030-evidence-for-processing-organic-waste-to-biogas

3) Reducing methane and carbon dioxide emissions by best practice anaerobic digestion at waste water treatment facilities.

Treatment of waste water by communities or business can be done aerobically or anaerobically. The aerobic process consumes a lot of electricity and produces biosolids which generally have to go to landfill because of contaminants. With increased cost of electricity the anaerobic treatment processes have significant economic benefit because the biogas produced can be used to replace fossil fuels for production of process heat, generation of electricity or use as a vehicle fuel. With anaerobic digestion the methane is collected and thus not discharged to air and the biogas avoids the combustion of fossil fuels.

Reform of the methods for treating waste water by use of proven anaerobic technologies generally only occur when old treatment plant is replaced, or additional treatment capacity is required. Adoption of emission reduction treatment options generally does not occur because reducing greenhouse gas emissions has generally not been part of local authority decision making criteria.

A summary of the level of greenhouse gas emissions reduction achievable from processing of organic waste into biogas and biofertilizer is set out following reports:

Calibre Consulting, Biogas Production Potential from Municipal Wastewater Treatment Facilities, April 2018. www.bioenergy.org.nz/documents/memberresource/Biogas-production-potential-from-municipal-WWT-facilities-FinalReport-Proj11.pdf

JH Thiele (2012). Future proofing our wastewater treatment infrastructure. Water New Zealand Annual Conference. 2012;

4) Assisting agriculture and horticulture farms adoption of circular economy principles and practices to reduce net farm greenhouse gas emissions

The agricultural and horticultural farms have an easy ability to adopt circular economy practices so that they can be net emission emitters. Farms produce a wide range of production residues which currently are wasted, allowed to flow into waterways or used inefficiently. For dairy farms where dairy shed effluent is unable to be sustainably dispersed onto land the effluent can be processed by anaerobic digestion to produce a high grade biofertilizer and biogas which can be used on farm for heat, cooling, generation of on-site electricity and use as a vehicle fuel. Supplementary feedstock for digestion can be produced from growing crops.

Around 7-9% of a farm's land is unproductively used and often can be used to grow biomass which could be cropped as a source of biomass fuel. Not only does this produce an additional revenue stream to assist farm business resilience but it can provide a wide range of environmental and ecological benefits. Similar shelterbelts if managed as say a three row crop will not only provide continuous shelter but will be a source of biomass fuel for sale. Farms can move from being simply food producers to be food PLUS energy producers.

Managed riparian and erosion control planting can be a source of biomass fuel as well as meeting their primary role of soil protection.

Many farm crops such as maize, wheat or vegetables produce significant quantities of production residues which can be processed by anaerobic digestion or combustion to produce energy and biofertilizer. For example straw stover currently burnt in Canterbury can be pelletised and used as a biomass fuel.

Except for some work undertaken on the anaerobic digestion of dairy shed effluent the evidence supporting this opportunity is not well collected and organised for New Zealand. All these opportunities are applied in many other countries but there has been no attempt to quantify the scale of the opportunity in New Zealand.

Bioenergy opportunities for rural landowners - potential value propositions for investment
www.bioenergy.org.nz/resource/op12-bioenergy-opportunities-rural-landowners

Methane from Animal Waste Management Systems

www.bioenergy.org.nz/documents/resource/Report-methane-from-animal-waste-MAF-Oct2008.pdf

Regional co-digestion facilities for piggery manure and selected industrial waste

www.biogas.org.nz/resource/regional-co-digestion-facilities-for-piggery-manure-and-selected-industrial-waste

5) Reducing carbon dioxide emissions by replacement of fossil fuels by gaseous and liquid biofuels for transport

The opportunities for reducing greenhouse gas emissions from use of liquid biofuels is primarily in the areas of heavy duty transport such as heavy vehicle road transport, rail,

marine and aviation. Internationally where governments have provided assistance there has been significant use of liquid biofuels to replace fossil fuels.

Rail, marine and aviation are often operated from point sources which means that infrastructure for fuel distribution and storage is most manageable.

Anchor Ethanol has been producing bioethanol for a number of years and Z Energy already produces biodiesel and has the capability to expand production to meet demand.

There are a wide range of technologies for producing liquid biofuels potentially available to New Zealand but waste and lignocellulosic feedstocks are the most available. Many of the technologies can, with minor modification, process different feedstocks so reliability of future fuel supply will be able to be easily managed. For example the Licella technology started on wood but because of the more attractive economics has been broadened to process plastics, but in the future when the economics improve could be used to process biomass to make a drop in renewable fuel. Solray have completed a pilot production of a West Texas Intermediate type biocrude from algae, biomass chip, and municipal sludges.

In the period to 2035 import of liquid biofuels is likely to be a very cost effective means of quickly transitioning from fossil fuels to renewable fuels. Such a transition could start immediately as liquid biofuels are already available and being purchased.

The current economics indicate that processing waste such as plastics and tyres into renewable fuels will be the start point for expansion of current production and as the economics improve and the use of renewable fuels matures then processing of liquid biofuels will expand.

In the period to 2035 the coastal marine and rail applications are the easiest transport sectors to transition to use of renewable fuels and both could be 100% by the end of that period.

Internationally biomethane produced from biogas is commonly used as a vehicle fuel and within the period of 2035 could occur for niche heavy vehicle operations such as buses where biomethane can be produced from large municipal waste water treatment facilities such as in Auckland and Christchurch. For many years the Christchurch waste water treatment facility operated all their site vehicles fuelled by biomethane produced on-site. It stopped when it became unfashionable and was required to meet only pure financial drivers.

The oral evidence provided to ICCC at the workshop on 12 November 2019 forms part of this submission.

A summary of the level of greenhouse gas emissions reduction achievable from use of gaseous and liquid biofuels is set out in the report www.bioenergy.org.nz/resource/is33-ghg-reduction-from-transport-biofuels

6) Reducing carbon dioxide emissions by use of wood fuel for space and water heating.

While not a large area for reduction of greenhouse gas emissions compared to process heat the use of wood fuel for space and water heating in the residential and commercial

markets is a low hanging fruit which can be expanded immediately and with minimal government assistance. It is estimated that in Christchurch alone that around 150,000m³ of firewood is combusted and an unknown amount of wood pellets.

Wood fuel still remains a popular and effective form of heating. Because of the high energy output and radiant heat generated from a fireplace or pellet heater, there are benefits over electricity and heat pump heating, particularly in older homes with high air changes per hour (ACPH). Clever industry campaigning and historical fireplace issues has resulted in some public perception of heat pumps being a cleaner alternative to wood fuel. While approximately 80% of electricity in NZ is renewable, space heating commonly occurs at peak electricity times as it is generally proportional to the temperature and weather. Electricity during peak consumption times is often met through non-renewable generation sources such as natural gas due to the ease of increasing output quickly meaning additional electricity generation for the use in heat pumps and electric heaters can be disproportionately high in fossil fuel use relative to the NZ average. Wood fuel use through regulation of firewood quality, and use of fireplaces installed since the low emission burner era plus use of controllable wood pellet heaters is a viable intermediate solution to greenhouse gas emissions. Due to the ubiquity of fireplaces in New Zealand, continued support of electricity based heating over support of the existing and future wood fuel adopters, will only increase the demand for electricity requiring more renewable generators to be established.

Because wood pellet heating is a controlled heat source it has many attributes where it overcomes inefficiencies of electricity heat pump heating. Heater equipment is readily available and there is adequate pellet fuel available. The current low uptake is because there has been a lack of encouragement to communities to consider all low carbon options.

Question 2:

In your areas of expertise or experience, what actions or interventions may be required by 2035 to prepare for meeting the 2050 target set out in the Bill? Please provide evidence and/or data to support your assessment.

Answer:

1) Replacing combustion of fossil fuels by solid, gaseous and liquid biofuels to produce heat

The suggested actions are set out in the report www.bioenergy.org.nz/resource/is46-actions-to-reduce-use-of-fossil-fuels-for-process-heat

In summary the suggested actions are to address:

- 1) Providing confidence to the market that there are adequate quantities of biomass fuel available into the future.

Evidence is the number of times potential investors make the comment that they are not considering biomass fuel because they do not have adequate confidence that there will be enough biofuel available over the life of their plant. This is despite the reality that there are more sources of biomass available than for coal or gas.

The Scion study shows that currently there is enough biomass available to replace 60% of coal used for process heat. www.usewoodfuel.org.nz/resource/residual-biomass-fuel-projections-for-nz The other 40% is estimated as being available from farms moving to a circular economy approach to farming.

- 2) Assisting business who are capital constrained to make additional capital investment.

Evidence is that there are many business who would like to transition to using biofuel but this would require new capital expenditure. In other countries there have been financial mechanisms provided by government which have addressed this barrier. This could be in the form of suspensory loans or accelerated depreciation. There are also operational opportunities such as cofiring biomass into existing coal plant which continues to make use of still serviceable equipment and allows the biomass fuel supply market to grow in an orderly manner.

- 3) Establishing best practice and dissemination of experience and knowledge to investors and their advisers.

Evidence is in the number of people from business who seek guidance from the Bioenergy Association and attend webinars and workshops. Bioenergy Association now has 2300 followers. This is an unfunded activity which is ad hoc and “best we can do” considering the lack of resources. A proper resourced activity would be able to meet the demand.

- 4) Removing the barriers to consenting new or modified heat plant by establishing consistent air quality rules across all consenting authorities and providing guidance to consenting authorities.

Evidence is that the consenting process for any wood energy based system is invariably slow, costly, and uncertain, to the extent that wood energy solutions are almost always rejected by developers and others. The air quality rules differ across regions and the National Air Quality Standard is outdated and not fit for purpose. In addition consent authorities have no guidelines for consenting heat plant and as a result a number of conditions are either unnecessary or add lots of unnecessary costs to a project.

2) Reducing methane and carbon dioxide emissions by processing of residual food waste to produce biogas and biofertiliser and avoid disposal to landfill.

The suggested actions are set out in the report www.bioenergy.org.nz/resource/is45-actions-to-maximise-reduction-of-methane-emissions-from-waste

In summary the suggestions are to address:

- 1) The lack of leadership and strong policy from Government that zero waste to landfill is to be achieved by 2035.

Evidence is that some communities such as Auckland and New Plymouth have adopted policies for zero waste to landfill by 2040. With Government issuing a strong directive as in a National Policy Statement that all communities are to implement such policies this would encourage other communities to also establish this as a goal.

- 2) Changing the focus of the Waste Strategy from its current bias on minimisation to incorporate all the levels of the waste hierarchy with a strengthening of government support so that utilisation of waste is considered as important as minimisation.
Evidence of the focus being on waste minimisation is obvious in that we have a Waste Minimisation Fund. By its title it biases towards minimisation and excludes utilisation.
- 3) Improving the incentives for minimisation and utilisation of waste such as increasing the waste levy.
Evidence is that if the waste levy increased to \$50/tonne that a number of waste-to-biogas projects using food waste as feedstock would be financially viable.
- 4) Establishing best practice and dissemination of experience and knowledge to investors and their advisers on how circular economy principles can improve business resilience.
Evidence is in the number of people from business who seek guidance from the Bioenergy Association and attend webinars and workshops. Bioenergy Association now has 2300 followers. This is an unfunded activity which is ad hoc and “best we can do” considering the lack of resources. A proper resourced activity would be able to meet the demand.
- 5) Lack of demonstration projects and detailed information on the financial viability, operating requirements, and technical design guidance
Evidence is that a number of business and communities would like to consider installing anaerobic digestion facilities to process food waste but have few examples
- Potential for energy generation from expanding industrial WWT facilities
www.bioenergy.org.nz/resource/industrial-wwt-potential
- Anaerobic treatment of cream cheese whey www.biogas.org.nz/resource/presentation-anaerobic-treatment-of-cream-cheese-whey
- 3) Reducing methane and carbon dioxide emissions by best practice anaerobic digestion at waste water treatment facilities.**
- In summary the suggested actions are to address:
- 1) Provide owners of waste water treatment plant (WWTP) with incentives and assistance to upgrade or replace old or inefficient facilities so that they can process local liquid trade waste and produce biogas for electricity generation and supply to other higher value uses.
Evidence shows (refer references) that around 20 WWTP could be upgraded over time with 6 immediately thus reducing greenhouse gas emissions as shown in the reference. The reason why these upgrades are not being done appears to be because of capital finance constraints by the facility owners.
 - 2) Establish regional greenhouse gas emission inventories with mandatory annual reporting on opportunities for emissions reduction and actual reductions.

Evidence is that regions are not measuring their greenhouse gas emissions and establishing plans for reduction. Those regions attempting to report annually are struggling because of the lack of data.

4) Assisting agriculture and horticulture farms adoption of circular economy principles and practices to reduce net farm greenhouse gas emissions

In summary the suggested actions are to address:

- 1) The lack of awareness by farmers of the wide range of opportunities available to assist them achieve a situation on each farm of zero net emissions.

Evidence is that farmers are seeking solutions to offset their but there is currently no mechanism for assisting them with information and demonstration. There has been no New Zealand studies on this aspect since the 1980's.

- 2) Provide demonstration of how farms can adopt zero net emissions.

Evidence is that there is no data or information from research or demonstration of the full range of opportunities farms have available. This would need to be cross sectoral as the solutions are generally not yet available in the agricultural and horticultural sectors.

5) Reducing carbon dioxide emissions by replacement of fossil fuels by gaseous and liquid biofuels for transport

Specific actions are set out in the report www.bioenergy.org.nz/resource/is33-ghg-reduction-from-transport-biofuels

In summary the suggested actions are to address:

- 1) Developing a transport strategy which is agnostic to fuel and includes aviation, rail, marine and heavy road vehicles.

Evidence is that current government bias for transport is towards electricity and hydrogen yet there are many applications where gaseous and liquid biofuels would be a better solution.

- 2) Transport is said by Government to be one of its two target areas for reducing greenhouse gas emissions yet there is no strategy or programme for reducing greenhouse gas emissions from transport.

Evidence is that there is not yet a strategy or programme available although the Ministry of Transport is endeavouring to fill these gaps.

- 3) Import of liquid biofuels would allow an immediate reduction in greenhouse gas emissions so access to fuel is not a barrier but central and local government actions and lack of engagement with the sector set up barriers to vehicle operators transitioning from fossil fuels to use of renewable fuels.

Evidence is that biofuel has and is being imported and with a small incentive greater volumes could be imported at short notice.

Drop-in biofuels for international marine and aviation markets

www.liquidbiofuels.org.nz/resource/biofuels-international-marine-aviation-markets

NZ Biofuels roadmap

www.liquidbiofuels.org.nz/resource/nz-biofuels-roadmap

6) Reducing carbon dioxide emissions by use of wood fuel for space and water heating.

Actions which would result in increased greenhouse gas emissions are:

- 1) Removing government agency bias towards the use of electricity as if it were the only solution for space and water heating

Evidence is that current government support programmes for space and water heating have a strong bias towards using electricity with heat pump technology.

This is despite the reality that heat pump operating efficiency is poor in a number of applications. There is a lack of balance across government agencies in providing information and assistance to all low carbon technologies.

- 2) Providing standards and best practice for equipment and its installation.

Evidence is that Air Quality Rules across regions are inconsistent and some plainly wrong. Consenting of installation is variable and in some regions not to best practice.

Question 3:

In your areas of expertise or experience, what potential is there for changes in consumer, individual or household behaviour to deliver emissions reductions to 2035? Please provide evidence and/or data to support your assessment.

Answer:

The is significant potential for all members of the community and business to change behaviour and adopt many of the wide range of bioenergy and biofuels solutions.

Government has already shown with the successful passing of the Zero Carbon legislation that the community wants action but that requires leadership from the top. The lack of progress over the last decade is essentially because there was no leadership from the top. The obvious leadership that has occurred over the last 2 years shows how keen communities are to change behaviour.

1) Replacing combustion of fossil fuels by solid, gaseous and liquid biofuels to produce heat

Business who have already made the transition from fossil fuels to use of biomass fuel have shown the degree of interest in “doing the right thing” despite often challenging economics. A more neutral encouragement from government and government agencies will assist others make the transition.

Evidence of the bias within government agencies towards electricity and hydrogen and against biomass energy has provided unfortunate messages to potential investors against the use of biomass fuel.

2) Reducing methane and carbon dioxide emissions by processing of residual food waste to produce biogas and biofertilizer and avoid disposal to landfill.

A focus on adopting circular economy principles for communities and business has shown a deep interest in the concept. However it has failed to materialise because there has been no demonstration of the benefits of a circular economy.

Evidence is that the concept is still in early days and until information and demonstration of a circular economy in practice is made available the behaviour changes sought will not occur.

3) Reducing methane and carbon dioxide emissions by best practice anaerobic digestion at waste water treatment facilities.

Where waste water treatment facility owners have made investment they have continued to make other investments because of the success of the first investments.

Evidence is that while the behaviour of some facility owners has changed because of their early successes, those facility owners who are capital expenditure constrained may want to change but the lack of funding is often more constraining than the will to change.

4) Assisting agriculture and horticulture farms adoption of circular economy principles and practices to reduce net farm greenhouse gas emissions

The farming and horticultural sectors have not yet fully embraced the opportunities from adopting circular economy principles and aiming for zero net emissions from their farm but that may be because the concept has not yet been put to them with evidence.

5) Reducing carbon dioxide emissions by replacement of fossil fuels by gaseous and liquid biofuels for transport

The degree of interest to the Bioenergy Association from media and the public on transport biofuels is very high but is not utilised because there is little interest from government on adopting biofuel solutions for transport.

Evidence is provided from the EECA managed Low Emission Vehicles Contestable Fund where only electric vehicles are included. There has been no interest from EECA or government to including alternative fuelled vehicles in the programme. It is essentially an electric vehicle only programme.

6) Reducing carbon dioxide emissions by use of wood pellet fuel for space and water heating.

Bioenergy Association finds that there is a high public interest in the continued use of wood fuel/use of wood pellets for space and water heating but the lack of interest from EECA and government to the use of wood fuel is a major constraint on changing public behaviour.

Anecdotal evidence is that wood fuel suppliers (sold wood fuel and wood pellets) are often having people telling them that they will never get a heat pump, and they will always use fires etc. Christchurch suppliers advise that they have grown 50% in firewood volume in the last 3 years, and every year are selling thousands of cubic metres to homes with new fireplaces.

Question 4:

When advising on the first three emissions budgets and how to achieve the 2050 target, what do you think the proposed Commission should take into account when considering the balance between reducing greenhouse gas emissions and removing carbon dioxide from the atmosphere (including via forestry)?

Answer:

Reducing greenhouse gas emissions should always be the top priority because there are so many options available. If it is not the top priority then many of the opportunities will be forgone as happens at present. Use of forestry for removing carbon dioxide should only be considered if emissions reduction is not effective enough. Forestry should be the exception and not the norm.

Question 5:

What circumstances and/or reasons do you think would justify permitting the use of offshore mitigation for meeting each of the first three emissions budgets? And if so, how could the proposed Commission determine an appropriate limit on their use?

Answer:

The Bioenergy Association does not under any circumstances support the use of offshore mitigation because with proactive planning and management each of the emission budgets can be met from domestic initiatives. Because the Commission has the opportunity to set appropriate budgets and the long lead times if these are not achieved then this is an indictment on the effectiveness of implementation.

When setting the budgets if there is a likely shortfall during any period so that the 2050 target may not be met then there is adequate lead time prior to that period for investigation of how the possible gap can be filled, and action taken to ensure the gap does not occur.

Analysis has shown that collectively there are adequate possible initiatives that can be taken to meet the 2050 targets so if the targets are not met this will be due to a failure of governance.

Section B Emissions reduction policies and interventions

The proposed Commission will also need to consider the types of policies required to achieve the budgets it proposes. This consideration should include:

- sector-specific policies (for example in transport or industrial heat) to reduce emissions and increase removals, and
- the interactions between sectors and the capability of those sectors to adapt to the effects of climate change.

Question 6:

What sector-specific policies do you think the proposed Commission should consider to help meet the first emissions budgets from 2022-35? What evidence is there to suggest they would be effective?

Answer:

There are some generic policies which would assist achieve emissions budgets across each of the five specific bioenergy and biofuels budget areas:

- a) The Bioenergy Association provides unfunded services to the bioenergy and biofuels sector to ensure there is adequate provider capability, appropriate standards, dissemination of knowledge and experience, accreditation of providers, and best practice performance. Funding of the significant public good component of the Association's activities would allow these services to be provided adequately to ensure emission budgets are met. *The evidence is that there is no other provider of these public good services, there is a high turn out at webinars, and the association currently has 2300 followers many of whom contact the association when they require independent neutral advice.*
- b) There is a wealth of international knowledge and experience which could be applied to New Zealand which currently is only accessed in an unfunded ad hoc manner and disseminated by the Bioenergy Association. In particular is the involvement in IEA bioenergy Task Groups. Adequate funding for involvement in the IEA Task Groups would assist the transfer of international knowledge and experience thus avoiding the need for duplicate research rediscovering what is already known. NZ is not a fast follower as minimal effort is put into the applied research area. *The evidence is that there is no other provider of these services and the association is able to identify each month a significant body of information from the IEA Task Groups which is relevant to NZ.*
- c) The Bioenergy Association provides unfunded independent advice on bioenergy and biofuels matters to regulators, potential investors and specialist advisers which is not available elsewhere. With 2300 followers but only 120 members there is a big gap between those who want knowledge and information infrequently and the small pool of specialists who have a level of activity which can support being a member. This means that there is a significant free rider problem where a few are funding services provided to the majority. The Association estimates that 52% of its activities are public good services but these are unfunded. Adequate funding of independent advisory services would allow current and extended services to be provided. *The evidence is that the 2300 followers remain as followers and don't ask to unsubscribe from the dissemination of information which they receive and that they contact the association when seeking independent neutral advice.*
- d) The opportunities for reduction of greenhouse gas emissions by use of bioenergy and biofuels solutions cover multiple sectors of the NZ economy and involve a wide range of parties. By focusing on the economic benefits from new business;

additional employment; regional growth; reduced business operating costs; and improved business resilience (particularly for farms) the environmental, societal and greenhouse gas emission reduction benefits come for free. As a consequence government policies and programmes related to greenhouse gas emission reduction need to be developed and managed on a cross agency basis. *The evidence is the large number of similar enquiries which come from different government agencies and the number of times when one agency doesn't know that another agency is doing something similar.*

- e) The value chain for bioenergy and biofuels solutions is complex with a number of different parties along the chain. There is generally also market failure in that investors are generally only able to secure a small component of the benefits and most benefits, such as greenhouse gas emissions, are public goods. A wide range of central and regional government agencies have regulatory and policy interests relevant to bioenergy and biofuels greenhouse gas emission reduction opportunities but there is no point of focus and the opportunities are often forgone because there is no specific interested parties. Private sector parties often have to shout very loud to get attention as government priority setting is often decided by who shouts loudest or has the best insider contacts. The benefits from bioenergy and biofuels are often co benefits with higher value coproducts so a bioeconomy coordinating approach within government would be of great assistance. Having a single responsible agency for developing the bioeconomy such as Te Uru Rakau is for forestry is recommended. Te Uru Rakau should not be that agency as the bioeconomy resources are wider than from forestry. Similarly EECA should not be that agency as the activities are much wider than energy efficiency. However either could be an appropriate model. *The evidence is from the large number of greenhouse gas emission reduction opportunities which are falling through the gaps yet they may have financial payback on investment of 2-3 years (eg methane and CO₂ reduction from efficiency of improvements of waste water treatment facilities.), and the difficulty which project proponents have with dealing with government agencies who are only half interested.*
- f) Implementing greenhouse gas emission reduction opportunities is way way below what could be achieved because there is no government agency with a mandate to identify and achieve reductions. The result is that most opportunities are falling in the gap between the agencies. Those in business who could take action to reduce greenhouse gas emissions struggle to find who in government agencies to talk to, and then the officials are often so busy trying to cover so many potential opportunities that they don't have the time to listen, let alone take action. This problem is enhanced by there being so little depth of experience in the staff of these government agencies to assist what are often very technical opportunities, for which they have inadequate understanding. Having a single government agency with a mandate for implementing greenhouse gas emission reduction opportunities would assist sound opportunities to navigate the morass of government agencies. A model could be the management of the Provincial Growth Fund *The evidence is the difficulty that the Bioenergy Association and*

others have encountered when trying to suggest very financially attractive greenhouse gas emission reduction opportunities.

- g) The consenting of projects to reduce greenhouse gas emissions is currently adding significant additional cost to many projects. The problem is not with the legislation but with the variable and inconsistent Regional Rules and the lack of experience of consenting officers when considering applications of technologies for which they have little experience. The preparation of guidelines for each of the six bioenergy technology areas would reduce applicants costs significantly. Where Bioenergy Association has provided such guidelines there have been less issues.

More specific actions have been covered in question 2.

Question 7:

What cross-sector policies do you think the proposed Commission should consider to help meet the first emissions budgets from 2022-35? What evidence is there to suggest they would be effective?

Answer:

The opportunities for greenhouse gas emission reductions from bioenergy and biofuels solutions requires considerable cross sector policies. For example a successful plantation forestry sector providing a carbon sink, linked with an effective and efficient wood processing sector would result in large amounts of wood processing residues coming available for use as fuel for process heat. This would also link to land use policies with regard to sustainable land management so that soil erosion is avoided and land owners could farm with zero net emissions. Currently there is effectively enough biomass available for around 60% of coal used in process heat to be replaced by biomass www.usewoodfuel.org.nz/resource/residual-biomass-fuel-projections-for-nz but this could increase to 100% if agricultural and land use policies were integrated with regional economic development and environmental policies.

Similarly waste policies need to be integrated with urban development, energy and economic development policies from use of waste to create new businesses.

Cross government agencies working on implementation of greenhouse gas emission reduction policies and implementation is critical if reduction is to be achieved. Currently the ad hoc relationship between agencies results in everyone being responsible and therefore no one being responsible. The consequence is that large numbers of emission reduction opportunities are being missed or action is too slow. There is a need for a single Crown agency to be established with a mandate to identify and assist implementation of greenhouse gas emission reduction opportunities.

The evidence is that private sector investors seeking guidance and assistance from government agencies are being frustrated by not being able to find appropriate agencies and the staff in the agencies often having other priorities.

Question 8:

What policies (sector-specific or cross-sector) do you think are needed now to prepare for meeting budgets beyond 2035? What evidence supports your answer?

Answer:

The policies and programmes pre and post 2035 should be the same. The separate budget periods are simply a means of establishing priorities. Some emission reduction initiatives can have a quick effect and should be implemented immediately while other initiatives are longer term and will not produce emission reductions until later budget periods.

The evidence is that utilisation of waste and short rotation species or currently available biomass residues for production of biogas and process heat can be used immediately but new long rotation species plantings will not come available as a biomass source for a number of years. The bioenergy and biofuels markets will also take time to evolve and may require significant large scale capital investment, both of which take time so emission reductions from these will not occur until later budget periods.

Section C Impacts of emissions budgets

The proposed Commission will need to consider the potential social, cultural, economic and environmental impacts of emission budgets on New Zealanders, including how any impacts may fall across regions and communities, and from generation to generation. Potential impacts may be either positive or negative.

Question 9:

What evidence do you think the proposed Commission should draw upon to assess the impacts of emissions budgets?

Answer:

Much of the evidence to assess impacts does not currently exist as in many areas there has been no data collection, analysis or research. The Commission will have to take a zero based investigation of the required data and the relevant government agencies will need to collect the data. For example, currently there is no real data on how much biomass is being used as fuel for heat, and by who. Current data collected by MBIE is derived from estimates and not measurement and there is no annual data collection so that the level of emissions reduction can be identified. Similarly in the waste area the data on waste and its possible uses is largely unknown. There is no measurement of regional greenhouse gas emissions so regions can not be monitored as the emission reduction performance.

The evidence is that the Greenhouse gas emissions inventory is a good start at data collection and analysis but it needs to be based on real measured data and it needs to be disaggregated by region.

Question 10:

What policies do you think the proposed Commission should consider to manage any impacts of meeting emissions budgets? Please provide evidence and/or data to support your assessment.

Answer:

Treating the emissions budgets each as a project with good project management, targets, monitoring and proactive management and reporting would be adequate.

A key method of gaining success would be to include regular input and advice from relevant sector associations. The approach of seeking evidence and advice in a very open manner through this request should be continued through the operational activities of the Commission.

Section D Other considerations, evidence or experience**Question 11:**

Do you have any further evidence which you believe would support the future Commission's work on emissions budgets and emissions reduction policies and interventions?

Answer:

The Bioenergy Association has a wealth of evidence, experience and knowledge and would be very pleased to be able to assist the Commission.

Please email your completed form to feedback@ICCC.mfe.govt.nz by **12 noon, Friday 15 November 2019.**

If you have any questions about completing the call for evidence, please contact us via feedback@ICCC.mfe.govt.nz.