

## Response ID ANON-NZPP-DFN3-K

Submitted to **Climate action for Aotearoa**

Submitted on **2021-03-27 17:25:41**

### Introduction

**What is your name? What is your organisation (if applicable)?**

**Name (enter in text box):**

Engineers for Social Responsibility Inc.

**What is your email address?**

**Email (write into text box):**

brendan.donnell@gmail.com

**In what capacity are you responding to this survey?**

**In what capacity are you responding to this survey? Select from the dropdown list.:**

NGO

**Add other/more than one capacity if applicable:**

**(Optional) Specify iwi/hapū affiliation, or if a mandated representative specify iwi/hapū/pan-iwi organisation, Māori-collective\* or Māori organisation you represent.:**

**What part of Aotearoa are you from?**

**What part of Aotearoa are you from? Select from the dropdown list.:**

Auckland (Tāmaki-makau-rau)

**Please specify if you are from outside Aotearoa:**

**What is your age group?**

35-44

**Confidentiality and disclosure**

Yes

**How this consultation works**

**Do you want to continue with the consultation questions or do you want to submit a pre-prepared response?**

I want to continue with the consultation questions

**File upload:**

No file uploaded

**Are you here to tell us your one big thing?**

**Your one big thing:**

**Your one big thing::**

@ Extremely urgent and effective action needed

Although the need for action to limit climate change has been well understood since at least 1990, global CO<sub>2</sub>e emissions have continued to increase strongly over the past 30 years and only now is the rate of increase showing some signs of deceleration.

It has become very clear that, in order to avoid potentially disastrous consequences, we need to limit global warming to 1.5°C above pre-industrial levels. The Paris Agreement, which came into force on 4 November 2016, was a step forward in addressing this very major challenge, but the Nationally Determined Contributions (NDCs) submitted so far are not nearly adequate to meet the target.

The publication of the IPCC Special Report on Global Warming of 1.5°C, in October 2018, was a further step forward in showing how we need to proceed, but its findings are widely held by scientists to be quite conservative. For example, the report says that by 2100 we can expect a sea level rise of up to 0.77 m at 1.5 °C warming, or 0.93 m at 2 °C warming, but a peer reviewed article by James Hansen and 18 other scientists concludes that sea levels could rise “several metres”

by the end of this century (Hansen et al, Atmospheric Chemistry and Physics, 2016).

The IPCC report stated that, to limit the temperature increase to 1.5°C above pre-industrial levels, global net human-caused emissions of CO<sub>2</sub> need to fall by about 45% from 2010 levels by 2030, with coal emissions falling by around 67% over the same period, and with all these emissions reaching net zero by around 2050. However, some scientists are saying that emissions reductions need to be achieved significantly faster than this to meet the 1.5°C target, while others are saying we have already left it too late to come anywhere close to meeting this target, and human civilisation and the future of many other living species is now in serious danger.

To have some hope of maintaining a reasonably habitable planet for ourselves and for many other living species, we need to take urgent and decisive action. This will mean the government needs to jettison its usual preference for “middle of the road”, incremental improvements to business as usual. The CCC’s draft recommendations to the NZ Government, if implemented, would be a major step forward from our grossly inadequate response to climate change so far, but the latest scientific advice from the IPCC clearly indicates that they are not nearly strong enough.

As the draft report says, to the extent that is possible, we need to address this problem in a way that is fair to people and protects their living conditions and livelihoods. But we do not need to follow the advice of the draft report that economic growth must be allowed to continue. If economic growth is to continue, it must be completely decoupled from fossil fuel consumption, and this will require a period of investment to regenerate the economy so that it can meet human needs while using significantly less energy. We will need to start using more accurate ways of defining prosperity and wellbeing than growth in GDP.

Climate change is probably the greatest challenge and the greatest danger that mankind has faced over at least the last 100,000 years. To protect ourselves and our planet, we must take very urgent and effective action.

### **Do you want to continue with the consultation questions or would you like to end your submission here?**

I want to continue with the consultation questions

## **Our six big issues - intro**

### **Our six big issues - the pace of change**

#### **1 Do you agree that the emissions budgets we have proposed would put Aotearoa on course to meet the 2050 emissions targets?**

Disagree

#### **Please explain your answer (1000 word limit):**

The Climate Change Response (Zero Carbon) Amendment Act has the stated purpose to “contribute to the global effort under the Paris Agreement to limit the global average temperature increase to 1.5° Celsius above pre-industrial level”, and creates a mandate for the CCC to “review the 2050 target and, if necessary, recommend changes to the target”. In our view, the purpose of the Act must be prioritised over the specific emissions targets, which are subject to review. We disagree that the purpose of the Act will be met based on the current proposals:

@ Budgets not ambitious enough:

The IPCC, in its 2018 Global Warming of 1.5°C report, says that, to hold global warming within the 1.5°C threshold, overall global emissions need to fall by around 45% below 2010 levels by 2030. From the graph for all gases (net) on page 35 of the CCC draft advice report, the New Zealand 2010 emissions figure was approx. 63 Mt CO<sub>2</sub>e per annum. A 45% reduction from this figure would give annual emissions of approx. 35 Mt CO<sub>2</sub>e by 2030, which is what the IPCC says is required. This is way below the CCC draft budget figure for the emissions reduction to 57.3 Mt CO<sub>2</sub>e by 2030, and is also well below the CCC draft budget figure for emissions reductions to 44.6 Mt CO<sub>2</sub>e by 2035. To play our proper part in holding global temperatures to under 1.5°C, the emissions reductions on which these budgets are based need to be very significantly increased, so that they are at least in keeping with what the IPCC says is needed.

@ Concern that embodied emissions have not been accounted for in the budgets:

The purpose of the Act is to limit global temperature increases. This global purpose will not be achieved if domestic emissions are reduced without any consideration of embodied emissions incurred offshore. The CCC’s emissions budgets and proposed emissions reduction pathways need to be more transparent about how embodied carbon is accounted for in order to demonstrate whether they will put us on track to meet our goals. EV’s provide an example of this issue:

@ The CCC’s proposed emissions reductions between now and 2035 appear to rely significantly on electrification of road transport (Section 3.7), and CCC draft advice Section 3.5.1 suggests that by “switching to electric vehicles, road transport, including heavy vehicles, can be almost decarbonised by 2050”. However, this appears to ignore the impact of embodied emissions.

@ EVs are a successful, road-tested technology that will form a valuable component of our transport future; lifecycle studies indicate they can emit 70% less CO<sub>2</sub> than combustion-fuelled vehicles in countries with clean electricity generation. However, even this significant reduction in emissions would not achieve the necessary targets on its own. Furthermore, constraints in materials supply, manufacturing, and finances mean it is not feasible to replace all of our vehicle fleet fast enough to meet our emissions reduction targets, and doing this would create unsustainable waste streams. EVs need to be supplemented by major investments in public transport, urban re-form, and low-powered vehicles such as e-bikes to achieve a significant reduction in vehicle kilometres travelled. If these fundamentals are in place, EVs can play a valuable role to fill in the gaps of the wider public transport system (e.g. as car sharing services used for non-routine travel, last mile transport etc). This multi-pronged approach to transport is mentioned in the CCC report, but needs further development so that it features at least as prominently as the discussion of EVs.

@ Emissions budget not ambitious enough in agriculture sector:

This sector is the largest source of emissions in New Zealand. It is also the source of a very substantial section of the New Zealand economy. Most New Zealanders, including most farmers, understand and agree that emissions from agriculture must be significantly reduced. The draft advice to government does not

aim to achieve the necessary level of action, within the necessary timelines, for significant emissions reductions from this sector.

## **Our six big issues - future generations**

### **2 Do you agree we have struck a fair balance between requiring the current generation to take action, and leaving future generations to do more work to meet the 2050 target and beyond?**

Disagree

#### **Please explain your answer (1000 word limit):**

While we strongly support the role of the CCC and applaud its work in developing its plans, we do not believe that they go far enough to strike a fair balance with future generations. Based on the IPCC's 2018 Global Warming of 1.5°C report, emissions reductions need to be greater and faster than those proposed in order to achieve the objectives of the Act. A 45% reduction below 2010 emissions levels by 2030, and 80% reduction by 2040 would strike a fairer balance of actions left to future generations.

The energy transition is clearly a project that needs to proceed faster than any political leaders are anticipating.

The 2018 IPCC report also makes it clear that the decade from 2020-2030 is crucial. If 40-50% emissions reductions are not made during this period, it will place an unfair burden on those who are responsible for rectifying this after 2030. The challenges from delayed actions to reduce greenhouse gas emissions include the risk of cost escalation, lock-in of carbon-emitting infrastructure, stranded assets, and reduced flexibility in future response options. To create a margin of safety against this scenario, some social disruption should be anticipated and accepted in the short term.

The question of fairness is also influenced by perceptions of what it is possible for the current generation to achieve. To identify steeper emissions reduction pathways that are both technically and economically feasible, we recommend consideration is given to the field of Transition Engineering.

The CCC have followed international practice by setting budgets that have a 50-66% chance of meeting the targets for global temperature rise. If future generations were to be consulted on this, we suggest they would be uncomfortable with this level of risk.

## **Our six big issues - our contribution**

### **3 Do you agree with the changes we have suggested to make the NDC compatible with the 1.5°C goal?**

Disagree – our changes are not ambitious enough

#### **Please explain your answer (1000 word limit):**

@ Support Commission's assessment of country's NDC:

The NDC our Government submitted under the Paris Agreement in October 2015, to reduce our greenhouse gas emissions to 30% below 2005 levels by 2030 was appallingly weak. What was not made clear was that it compared gross emissions in the base year with net emissions in the target year. On a consistent net-net basis (based on 2015 data – the most recent data available when the NDC issue became clear), this was actually an undertaking to increase net emissions by around 7% over 2005 levels by 2030.

If the government had been deliberately setting out to disguise how appallingly weak our NDC actually was, it seems that using this unexplained gross-net measurement technique would have been a good way of doing so. Years later, many people are still unaware of how weak our NDC actually is, though the Guardian paper, and others, have seen through this.

@ Form of NDC and other emissions targets needs to change.

In its draft advice report the CCC is still referring to NDCs defined on this gross-net basis (eg, p 151 and following). We need to immediately move away from defining our NDC, and other emissions reduction targets, on a highly confusing gross-net basis, and move to consistent net-net or gross-gross methods of defining these, which are clearly specified.

@ Do not support the Commission's stance on a revised NDC:

We urgently need to replace our current appallingly weak NDC with an NDC under which we are at least undertaking to meet the requirements laid out in the IPCC 2018 report to hold global warming to under 1.5°C, and preferably, as a developed country with the necessary expertise and resources, aiming significantly higher than this. We very strongly recommend that the Commission comes up with a proposed revised version of the NDC that meets the above requirements, and present it to the government and to the public.

## **Our six big issues - role and type of forests**

### **4 Do you agree with our approach to meet the 2050 target that prioritises growing new native forests to provide a long-term store of carbon?**

Strongly agree

#### **Please explain your answer (1000 word limit):**

We strongly agree with the proposed approach. However, we also suggest as follows:

@ As a high priority we should look after our existing native forests. Pests can reduce the mass of carbon stored. They can prevent the natural replacement of fallen trees by destroying young seedlings. Possums in particular can kill large trees of favourite species (such as rata) by intensive browsing.

@ Land that is already on the way to reverting to native forest could be given a high priority, as it can potentially give the fastest rate of locking up carbon. Landowners should be offered an incentive to allow the process to continue.

@ A suitable workforce to support the new native forests must be established, whether these forests are created by allowing land to revert to forest or by planting. The work to be done includes pest control, fencing for stock exclusion, and scientific overview and monitoring.

@ The native afforestation should be designed for multiple benefits: biodiversity and public amenity as well as sequestering carbon. For both public amenity and biodiversity, the new forest should be established on a range of land types. The result would be a wider range of forest types and therefore a wider range of habitat types, and better accessibility for the public. Including some better land in the mix for native afforestation is likely to increase the overall rate of carbon sequestration. Including a range of land types (and consequently forest types) is likely to make the new native forests overall more resilient to changes in the climate. In our view it would be a mistake to only establish the new native forest on steep marginal land.

## **Our six big issues - policy priorities to reduce emissions**

### **5 What are the most urgent policy interventions needed to help meet our emissions budgets? (Select all that apply)**

Investment to spur innovation and system transformation

**Please explain your answer (1000 word limit):**

All of these approaches will be needed. We have given comments below, listed in rough order of priority:

@ Investment to spur innovation and system transformation:

System transformation will be required as a prerequisite for meaningful behaviour change to reduce emissions.

We recommend introducing regulatory requirements for Local Governments to develop audited Transition Plans that identify specific projects that will allow their cities/regions to achieve government emissions reduction targets for urban transport, the built environment, and waste management. Plans must be audited for project cost estimates, and to demonstrate their ability to meet life-cycle emissions reduction targets. Provide investment to spur innovation and system transformation/regeneration.

@ Pricing to influence investments and choices:

We seem to be staying with the emissions trading scheme. In that case the price of emissions has to be raised to reflect the damage emissions are causing. We recommend going with the advice of the IPCC for the amount set.

This must include a pricing mechanism for imported embodied emissions. For example, if carbon charges were applied to steel manufactured in New Zealand, but not applied to imported steel, it would make the NZ industry uneconomic while achieving no reduction in global emissions. Conversely, applying emissions charges to both imported and domestically manufactured steel could encourage investment in steel recycling plant here in New Zealand (such plant has a strong track record of use in New Zealand, but was recently discontinued due to the cost of replacing plant that had reached the end of its working life). This investment would allow steel to be recycled again and again using an electric arc furnace, achieving a significant reduction in emissions and reducing the carbon footprint and waste stream of the wider NZ construction industry.

@ Action to address barriers:

To create a higher uptake of private investment in renewable energy generation we recommend a feed-in tariff of the same amount as the purchase price of electrical energy.

## **Our six big issues - technology and behaviour change**

### **6 Do you think our proposed emissions budgets and path to 2035 are both ambitious and achievable considering the potential for future behaviour and technology changes in the next 15 years?**

Disagree

**Please explain your answer (1000 word limit):**

1) The draft budgets are not nearly ambitious enough.

The IPCC, in its 2018 Global Warming of 1.5°C report, says that to have a 66% chance of holding global warming within the 1.5°C threshold, overall global emissions need to fall by around 45% below 2010 levels by 2030, with coal emissions falling by around 67% over the same period. The proposed budgets that the CCC has presented do not come anywhere close to achieving these reductions.

New Zealand needs to be aiming for considerably faster reductions in emissions than are given in the IPCC 2018 report, for four reasons.

(i) There is a reasonably strong possibility that the IPCC has underestimated what is required to limit global warming to 1.5°C.

(ii) As a developed country with the necessary expertise and resources, we need to contribute a lot more strongly to reducing emissions than just meeting the global average requirement.

(iii) Our per capita emissions of about 11.6 tonne CO<sub>2</sub>e per annum are around double the world average of 6.3 tonne CO<sub>2</sub>e per annum. We need to start rapidly reducing them.

(iv) In the period since the need to reduce emissions became clear, our response has so far been alarmingly poor. For example, compared to 1990, by 2018 our gross greenhouse gas emissions had risen by 24% and our net emissions by 57%. This needs to change, starting immediately.

## 2) The potential for future behaviour and technology changes

@ We note that the CCC have treated “technology change” and “behaviour change” as key variables in their modelling scenarios, and consider them to be sources of uncertainty in their modelling. Professor Susan Krumdieck (Transition Engineering, 2020) identifies these as factors which are commonly considered in emissions reduction scenarios, and suggests that reliance on these factors is doomed to failure.

(i) Technology change - only existing, viable technologies should be utilised for deployment in emissions reduction projects over the next 15 years – which allows the modeller to take control of this variable. Technology options need to be filtered through criteria such as Energy Return on Energy Invested (EROI) analysis, Technology Development Vector Analysis, Strategic Analysis of Complex Systems to identify the options with the greatest impact.

(ii) Virtuous behaviour change - should not be relied upon as a primary driver of emissions reductions. Instead, recognise that people will readily change their habits if the infrastructure for a practical and cost-effective alternative system is made available to them. The rapid adoption of cellphone technology can be cited as an example of people embracing rapid behaviour change when a useful, cost-effective system is made available. For example, if everyone lived within 400m of a regularly serviced electric train, tram or bus stop, and within 200m of an EV that was made available through a ride sharing service (at a fraction of the annual cost of a privately owned vehicle), most people would not be resistant to giving up private ownership of an ICE vehicle. Behaviour will only change at the pace required if the right systems and infrastructure are made available to support this.

## 3) Identify pathways to match energy demands to hydro generation capacity by 2050:

In her book Transition Engineering (2020), Susan Krumdieck explains the abundant energy-return-on-energy invested (EROI) that makes fossil fuels such an appealing energy source, and identifies EROI as a key requirement for prosperity in a post-fossil-fuel economy. She also points out that hydroelectricity has the highest EROI of any renewable energy source, it achieves an EROI ratio of 40-100 (depending on dam size, available head and flow), which is even greater than current fossil fuels sources. Other renewable resources have lesser utilisation factors and EROI, and these diminishing returns are predicted to eventually drive the economy into what she describes as “green decline”. Her conclusion is that the hydro power that countries already have will need to be the foundation for their energy prosperity - and this is good news for New Zealand. The level of existing hydro generation potential therefore sets an approximate target limit for the energy that will be available for economic activity/production in a post-fossil fuel economy (supplemented by a smaller proportion of geothermal and wind in the NZ context).

We recommend that the CCC explore this idea in further detail, and specifically investigate ways that NZ could downshift its 2050 energy demands to approximately match our current hydroelectric generation capacity. The CCC should recommend that the government develop a very robust plan for future strategic management of the country's hydro resources, since they form a likely cornerstone for our prosperity.

Beyond 2050, tidal power generation technology may become feasible and provide an opportunity for improved reliability and sustainable growth in NZ's generation capacity (although there may be opportunities to fast-track this, refer to discussion in our response to Question 15).

## Would you like to end your submission here, or move on to the detailed section of our consultation?

I want to continue with the consultation questions

## Detailed questions on our advice

### 1. How we developed our advice

#### 1 Do you support the principles we have used to guide our analysis?

Partially support

#### Please explain your answer (400 word limit):

The principles sound reasonable, up to a point, but they do not seem to reflect the extreme urgency we face in reducing our emissions. For example, under Principle 4 it talks about “planning ahead so that technologies, assets and infrastructure can be replaced with low emissions choices on as natural a cycle as possible. This will help avoid scrapping assets before the end of their useful lives or being left with stranded assets.”

To achieve the above we would have needed to start our planning in 1990 or soon after, rather than in 2021. For example, the IPCC 2018 report says that, in order to hold global warming within the 1.5°C threshold, coal emissions need to fall around 67% below 2010 levels by 2030. This means that we need to make an extremely rapid exit from coal use, starting immediately, but coal-fired boilers typically have a life of 15-25 years, and it can be longer than this.

Because we did not start planning ahead when the need for action became reasonably well known and understood, about 30 years ago, we are going to need to take steps that are not always in accordance with the Principles, as currently presented.

## 2. Emissions budgets numbers

### 2 Do you support budget recommendation 1? Is there anything we should change and why?

## **Q2 Emission budget levels - Emissions budget 1 (2022 – 2025):**

Not ambitious enough

## **Q2 Emission budget levels - Emissions budget 2 (2026-2030):**

Not ambitious enough

## **Q2 Emission budget levels - Emissions budget 3 (2031-2035):**

Not ambitious enough

### **Please explain your answer (1000 word limit):**

@ Budgets not ambitious enough:

The IPCC, in its 2018 Global Warming of 1.5°C report, says that to have a 66% chance of holding global warming within the 1.5°C threshold, overall global emissions need to fall by around 45% below 2010 levels by 2030, with coal emissions falling by around 67% over the same period. Since New Zealand is a developed country with strong expertise and resources, it would be appropriate for us to aim higher than this.

From the graph for all gases (net) on p 35 of the CCC draft advice report, the New Zealand emissions figure was approx. 63 Mt CO<sub>2</sub>e per annum in 2010. A 45% reduction from this figure would give annual emissions of approx. 35 Mt CO<sub>2</sub>e by 2030, which is what the IPCC says is required. This is way below the CCC draft budget figure for the emissions reduction to 57.3 Mt CO<sub>2</sub>e by 2030, and is also well below the CCC draft budget figure for emissions reductions to 44.6 Mt CO<sub>2</sub>e by 2035

To play our proper part in holding global temperatures to under 1.5°C, the emissions reductions on which these budgets are based need to be very significantly increased, so that they are at least in keeping with what the IPCC says is needed. Our suggestions under various sections of this report outline how these reductions can be achieved.

@ Budget lay-out does not give adequate data:

We do not consider giving just figures for total emissions budgeted over each multi-year budget period, and average emissions budgeted per year over each budget period is adequate. Also needed is the target emissions reduction by the end of each year, as were presumably used to plot the charts on p 35 of the draft advice report, but do not seem to be given in the report. Having these annual figures will allow it to be made clear, on an annual basis, whether we are on target to meet our budgets.

@ Budgets need to give data for reductions in both long-lived gas and biogenic methane emissions. Since we are breaking down our emissions in this way, which makes sense, we need to separate out the data to make it clear what we are aiming for in each case

@ Clear pricing of emissions units can drive change effectively: The Commission may be primarily focussed on setting and monitoring emissions targets, but it is actually the carbon charges under our ETS that can be used to give a clear signal to businesses and to others about making changes to reduce emissions. If indicative carbon charges were laid out over several future years, this would provide good clear information to businesses on what actions they should take and when. It would all be easier to achieve if the ETS reverted to a simple system using fixed price emission units over set time periods.

In its 2018 report, the IPCC projected that to stay on the 1.5°C path, by 2030 carbon prices will need to be in the range of US\$135-\$5,500 / tonne CO<sub>2</sub>e (around NZ\$185-\$7,500 based on current conversion rates). New Zealand needs to aim considerably higher than the global average, which implies that our carbon price by 2030 may need to be well over \$185 / tonne. We need to rapidly ramp up to this level.

Sweden introduced a carbon tax, which is primarily levied on fossil fuels used for heating purposes and motor fuels, in 1991. The tax rate currently sits at SEK 1200 / tonne CO<sub>2</sub> emitted – approx. NZ\$196 / tonne CO<sub>2</sub> emitted at current exchange rates. While the tax has been in place, Sweden's emissions have been declining, while its economy has continued to grow. This is an excellent example showing that much higher emissions charges than our current level of around \$35 / tonne are both workable and effective.

@ Subsidising the damage caused by emissions is counter-productive:

The New Zealand Productivity Commission in its 2018 report on a Low Emissions Economy recommended that emissions should be priced at a level that reflects their harm, which the 2018 IPCC report (Special report on Global Warming of 1.5°C, Ch 2, p 151) says is above US\$100 / tonne CO<sub>2</sub>e (above approx. NZ\$137 / tonne CO<sub>2</sub>-e at current exchange rates). When the next IPCC report is published, because emissions have kept increasing, any damage cost figures given are likely to be significantly higher than this.

Subsidising emitters for the damage their emissions are creating, which is what we are currently doing, is a completely counter-productive way of proceeding. There is therefore a very strong argument that the Commission should take the necessary steps to raise emissions charges to a price that reflects the IPCC damage cost figure, or higher. This could perhaps be done by setting appropriate budgets, if the Commission is given no direct control over pricing.

@ Emissions charges need to be recycled to the general population: To be both workable and politically acceptable, the effect of significantly higher emissions charges on the prices of goods and services needs to be off-set by recycling a large part of the revenue back to the population, for example via a citizen's dividend. This would also have the effect of reducing the rising income inequality our country has suffered from over the past 40 years or so.

In the short term, some of the revenue from carbon charges could also be used to assist businesses financially with making the necessary changes to how they operate, for example, moving away from coal use to more sustainable alternatives.

## **3. Breakdown of emissions budgets**

### **3 Do you support our proposed break down of emissions budgets between gross long-lived gases, biogenic methane and carbon removals from forestry? Is there anything we should change, and why?**

### **Q3 - Gross long-lived gases:**

Not ambitious enough

### **Q3 - Biogenic methane:**

Not ambitious enough

### **Q3 - Forestry:**

About right

#### **Please explain your answer (1000 word limit):**

@ Gross long lived gases: not ambitious enough.

As explained above in this submission, the targets are not in line with the actions the IPCC says would be necessary to limit warming to 1.5C. Even the IPCC targets may not be sufficient to achieve that aim, according to some scientific opinion.

@ Biogenic methane: Not ambitious enough.

The IPCC's 2018 (SR15\_SPM) report indicates that ~50% reduction in methane emissions is a mid-range target for 2050, not an upper range target as currently proposed by the CCC (refer to Figure SPM.3a).

Also, we believe that the method of assessing the effect of methane is misleading, and its validity is therefore open to question. It is currently reported that methane represents 48% of our greenhouse emissions in terms of CO<sub>2</sub>e. However, if the warming effects of methane were defined in terms of its impact on radiative forcing, it would give a more accurate reflection of the high impact of methane in our greenhouse gas profile. This fundamental change in the method of accounting for methane is necessary to give a realistic assessment of its importance.

It is the concentration of the gas in the atmosphere that causes the radiative forcing (see Fig 8.27 of the IPCC's AR5 Synthesis Report, 2014), and in the case of methane the concentration is due to a balance between the rate of emission and the rate of removal. The GWP 100 assessment method which has been adopted by the CCC underestimates the near term radiative forcing, and it is in the relatively near term that we need to make substantial reductions in radiative forcing. It would be clearer and more accurate in terms of our effect on the climate to consider our radiative forcing profile than to consider our emissions profile.

Here is an example of how this could be done:

(i) Determine the rate of decay/removal of methane in the atmosphere: the half life of methane in the atmosphere is about 12.4 years (AR5 p675). The concentration of methane in the atmosphere is the result of a balance between emission and removal of methane. A higher rate of emission leads to a higher concentration in the atmosphere. Figure 8.28 of AR5 shows the reduction over time of radiative forcing due to a pulse of gas with a lifetime of 13 years (much like methane). The decrease with time in radiative forcing due to the initial pulse of gas is a result of the removal of the gas. In the following it is assumed that the removal of methane from the atmosphere can be quite well approximated by an exponential decay function.

(ii) Use methane emissions data to determine the amount of methane in the atmosphere: The Greenhouse Gas Inventory for 2016 (MfE) estimates that 1291kt of methane were emitted from New Zealand sources in 1990. In 2016 the estimated methane emission was 1347kt. Assuming a linear variation of emission rate between those years, and extrapolating the trend linearly out to 2020, and assuming an initial (at 1990) mass of methane in the atmosphere due to our New Zealand emissions of 18750kt, time series modelling with an exponential decay function with the decay constant adjusted to produce a 12.4 year half life of methane, indicates that our New Zealand emissions maintain a mass of methane in the atmosphere of 23,000kt.

(iii) Determine the amount of radiative forcing caused by methane in the atmosphere, for comparison with the carbon equivalent: Figure 8.29 of AR5 shows that the radiative forcing per kilogram of methane in the atmosphere is of the order of 100 times that of carbon dioxide. So the radiative forcing due to the mass of methane that our New Zealand emissions keep in the atmosphere is 23Mt times 100, equals 2300 arbitrary units, compared with the radiative forcing due to our present annual emissions of the long lived greenhouse gases (45.5Mt CO<sub>2</sub>e) or 45.5 of the same arbitrary units. Thus the comparison that can usefully be made is that the mass of methane that our New Zealand emissions maintain in the atmosphere is equivalent to about 50 years accumulation of our current New Zealand annual emissions of the long lived gases.

This is not meant to give the definitive answer, rather to indicate how the calculation can be done.

There are two other reasons why we should pay more attention to methane:

1). Methane emissions have an amplification effect. Methane is removed from the atmosphere mainly by reaction with hydroxyl groups in the troposphere. Increasing the concentration of methane significantly reduces the amount of OH, by 0.32% for every 1% increase in methane (p674 of AR5), thus adding to the burden of methane. Conversely if we reduce the amount of methane in the atmosphere, we get a better rate of removal of methane, thereby amplifying the benefit.

2). Emissions of methane cause much greater radiative forcing than would be calculated from just the concentration of methane. The latter is estimated at 0.48W/m<sup>2</sup>, but because methane in the atmosphere leads to production of ozone and stratospheric water vapour, and affects its own lifetime as noted above, the radiative forcing due to methane emission is considered to be 0.97W/m<sup>2</sup> (AR5 p697-698).

@ Forestry: probably about right.

We support the position of the Commission that the main focus should be on reducing emissions of greenhouse gases. We would add that there should be better maintenance of our existing native forest asset, by increased pest control. Possums, deer, goats and pigs have the potential to cause collapse of forest ecosystems, if not managed. Some of our forests are teetering on the edge.

#### **4. Limit on offshore mitigation for emissions budgets and circumstances justifying its use**

#### **4 Do you support budget recommendation 4? Is there anything we should change, and why?**

Partially support

**Please explain your answer (1000 word limit):**

As a developed country with the necessary resources, New Zealand needs to play a strong role in reducing global emissions to net zero by 2050 and in holding global warming to 1.5°C. We can do this by setting and achieving strong domestic budgets ourselves. We can also do this by giving advice and assistance to others.

Given the above, and given that the acceptance by New Zealand of international emissions units in the past has been a disaster, our recommendation is that the door to this option remains closed. If in the future, events occur that could threaten our ability to meet our international commitments, after receiving the necessary advice the government could decide how this should be dealt with, and possibly move towards accepting a small amount of offshore mitigation as a way of meeting our domestic commitments, if this is still allowed.

#### **Enabling an enduring climate transition - intro**

#### **5. Cross-party support for emissions budget**

#### **5 Do you support enabling recommendation 1 on cross-party support for emissions budgets? Is there anything we should change and why?**

Fully support

**Please explain your answer (1000 word limit):**

We agree that cross-party support for the emissions budgets is desirable in order to achieve continuity in the longer term, providing confidence in investment decisions related to emissions reductions.

However, the need for narrowly defined consensus should not be accepted as a barrier to adoption of ambitious targets. It may be more pragmatic to achieve cross-party consensus on a range of budget values for each greenhouse gas, which can be adjusted somewhat (say +/-10%) by future governments to reflect factors such as updated scientific information.

#### **6. Coordinate efforts to address climate change across Government**

#### **6 Do you support enabling recommendation 6 on coordinating efforts to address climate change across Government? Is there anything we should change and why?**

Fully support

**Please explain your answer (1000 word limit):**

While we fully support the recommendation to coordinate efforts to address climate change across government, we would like to go a step further. We would like to see the climate change commission to be morphed into an entity that has greater powers, although limited in scope, similar to the way the Reserve Bank functions. For example, the CCC could be responsible for setting carbon pricing under the ETS. They might also become an appropriate body to provide independent audit/verification services for emissions reductions plans and budgets prepared by local & central government agencies.

#### **7. Genuine, active and enduring partnership with iwi/Māori**

#### **7 Do you support enabling recommendation 3 on creating a genuine, active and enduring partnership with iwi/Māori? Is there anything we should change and why?**

Fully support

**Please explain your answer (1000 word limit):**

We fully support the CCC's recommendations for the government to build a genuine, active, and enduring partnership with Māori. However, we note the following opportunities for improvement:

@ Māori Representation: the recommendations need to be strengthened by specifically noting the importance of Māori representation in advising government on climate change policy (e.g. by the inclusion of representative Maori voices on the CCC), and in regional implementation of emissions reduction pathways (e.g. by representation in local government). Such representation would be a useful indicator of progress towards genuine, active and enduring partnership.

@ Provide support to enable more systematic engagement: as an NGO that runs on volunteer resources, we are keenly aware of the burden of engaging in consultation with government policies & initiatives. We believe that the CCC needs to significantly improve its performance in the area of engagement with Māori. Evidence Section 6.1.2 indicates that the CCC's current draft advice to government has been prepared on the basis of a desktop study of Māori perspectives (e.g. review of iwi management plans, literature review), zoom calls with 15 Māori people, and an unspecified quantity of correspondence received from Māori who have proactively contacted the CCC. Avoidance of "engagement fatigue" was stated as one reason for a lack of systematic, personal engagement. We would expect that a more systematic approach to obtaining widespread input from Māori is needed. Māori should provide advice on the form that this consultation &

engagement should take, and sufficient financial resources need to be made available to overcome the barrier of engagement fatigue.

@ Self-determination: we support the idea that Crown and local government provide Māori-collectives the option of receiving funding to determine their own emissions profile within their respective takiwā, as an important step in ensuring equity and partnership for Māori in future decision-making.

## 8. Central and local government working in partnership

### 8 Do you support enabling recommendation 4 on central and local government working in partnership? Is there anything we should change and why?

Fully support

**Please explain your answer (1000 word limit):**

We fully support the CCC's recommendation to align central and local government policies on emissions reduction, and to provide suitable funding mechanisms to ensure progress is made. Local government plays a crucial role in carbon transition, particularly in the areas of land use, transport, urban reform and waste. We want to highlight the following opportunities for improvement of the current recommendations:

@ Independently verified transition plans:

The recommendations need to be strengthened by proposing an enforceable audit mechanism for local government policies. For example, the Local Government Act 2002 requires councils to develop a long-term (10-year) plan, and this could be strengthened to require councils to address carbon transition for their region (refer to [https://www.youtube.com/watch?v=e0QYULMabK8&ab\\_channel=SusanKrumdieck](https://www.youtube.com/watch?v=e0QYULMabK8&ab_channel=SusanKrumdieck) for further explanation).

The 10-year Transition Plan would describe the council's plans to regenerate their existing land use, transport and waste management systems etc to meet or exceed central government emissions targets. These Transition Plans, along with Council's 10-year budgets, need to be independently audited and verified as being able to achieve central government emissions targets. Some councils are already starting to engage with this. Here is an example of the type of work that can be done, looking at Christchurch City: [https://www.youtube.com/watch?v=e0QYULMabK8&ab\\_channel=SusanKrumdieck](https://www.youtube.com/watch?v=e0QYULMabK8&ab_channel=SusanKrumdieck)

@ Accountability for outcomes, access to funding:

Even the best resourced Councils are struggling to meet the proposed emission reduction objectives. Auckland Council's "10 year budget 2021-2031" highlights the fact that the COVID-19 crisis has created huge challenges, reducing council income by \$450 million this year, and cumulative losses projected to reach around \$1 billion by 2024, significantly affecting debt levels over the next 5 years. It also appears doubtful that their Climate Plans are sufficient to achieve meaningful reductions in regional emissions. For example, their Climate Plan appears to take no account of the adverse effect of embodied emissions from electrification of their bus fleet, and makes no mention of urban reform opportunities (e.g. densification around transport hubs, or development of parking and electrical charging infrastructure to support roll-out of car sharing for EVs). Providing quantitative audit processes for Transition Plans would quickly focus councils on the investments needed to achieve meaningful emissions reductions, and also provide a basis for equitable access to funding mechanisms.

## 9. Ensuring inclusive and effective consultation, engagement and public participation

### 9 Do you support enabling recommendation 5 on establishing processes for incorporating the views of all New Zealanders? Is there anything we should change and why?

Fully support

**Please explain your answer (1000 word limit):**

We support the CCC's recommendation for the government to create opportunities for meaningful consultation with all New Zealanders.

However, we are concerned that government agencies are not accessing the best technical advice regarding emissions reduction technology and its deployment, and the CCC should recommend that government systems are strengthened in this area. In addition to consulting with industry groups, iwi, the labour force and the general public, it is important that the government consults and obtains advice from qualified experts in the field of emissions reduction technology and its practical roll-out. One example is the opportunity to consult with researchers and experts in the emerging interdisciplinary field of Transition Engineering, who can provide independent advice on subjects such as:

@ Energy Return on Energy Investment (EROI) – this will become an increasingly crucial factor in our economic performance as the abundant energy available from fossil fuels is phased out.

@ Development vector analysis – which investigates the hurdles that a new technology must overcome to move from an idea to a product that meets a need. Robust analysis can prevent over-investment in technological "solutions" that cannot deliver the necessary emissions reductions.

As an example, Transition Engineering experts could be added to the government's panel of science advisors. Alternatively, a Ministry of Sustainable Development could be established to accommodate a range of technical experts who have the ability to evaluate and support the implementation of effective emissions reduction technology, and provide appropriate advice to government ministers on technical & engineering requirements for meeting emissions budgets.

## 10-11. Locking in net zero

**10 Do you support our approach to focus on decarbonising sources of long-lived gas emissions where possible? Is there anything we should change and why?**

Partially support

**Please explain your answer (400 word limit):**

The approach you outline (CCC draft advice report, p 48) makes sense, but we consider the rate at which long-lived gas emissions will be decarbonised is too slow. To play our proper part in reducing emissions and global warming, as a developed nation with the necessary skills and resources we need to be reducing these emissions a lot more rapidly.

**11 Do you support our approach to focus on growing new native forests to create a long-lived source of carbon removals? Is there anything we should change and why?**

Fully support

**Please explain your answer (400 word limit):**

We strongly support the recommendation to grow new native forests. We would add that pest control should be ramped up in our existing native forests, to protect both their carbon stock and their biodiversity. Also a workforce should be established to manage the native reforestation, whether by planting or by allowing land to revert. In both those cases protection from stock and pest control will be required.

**12. Our path to 2035**

**12 Do you support the overall path that we have proposed to meet the first three budgets? Is there anything we should change and why?**

Partially support

**Please explain your answer (1000 word limit):**

@ Target for initial budgets:

As mentioned in our response to earlier consultation questions, the target does not aim at 45% emissions reductions by 2030 as recommended by the IPCC (2018 report). There are many existing technology options that would allow us to follow a faster emissions reduction pathway.

@ Emissions of long-lived gases can be cut much faster using existing technology. For example:

(1) Pathways for energy supply:

@ Solar hot water heating needs to be mentioned and recommended in the CCC's advice. While this technology has been tarnished by incompetent operators in the past in New Zealand, it is well used by the rest of the world. The draft advice mentions heat pumps for solar hot water, but ignores the even more efficient solar hot water heating. Hot water heating is a major contributor to the domestic power bill and solar hot water heating can have a big impact.

@ The use of coal and natural gas for electricity generation can be cut extremely rapidly by changing how the electricity market works. Renewably generated electricity needs to be given precedence in entering the market, regardless of price.

@ Phasing out the use of fossil fuels to provide a back-up supply of electricity when other generating sources cannot meet the load can also be achieved. For example, we could rapidly return to the use of ripple control to turn off domestic electric water heating systems when needed to lower peak demand. Bioenergy resources such as wood pellet burners for winter heating should be promoted. Steps to promote domestic solar generation with possible energy storage in hot water would also be useful. Other steps such as the development of pumped hydro and tidal generation, will take slightly longer.

@ We also need to make changes so that: (i) electricity prices are based on the average cost of generation by grid suppliers, and are no longer set by the highest priced electricity supplier feeding into the market; and (ii) so that approximate doubling of domestic prices since market changes were made starting in around 1987 can be reduced back to previous levels. Both these steps will lead to a fairer market and will encourage the use of electricity in place of fossil fuels.

(2) Pathways for industry:

@ The use of coal for process heat can and should be phased out reasonably rapidly. The use of natural gas for this purpose also needs to be phased out. One option is to move to wood chips or to other biomass. There is currently sufficient material generated from forestry operations to supply a lot of fuel, so this can start now. Another option is to move to electricity. This needs to start happening as soon as there is sufficient electricity generating capacity in place.

@ We consider the CCC target of eliminating coal use for food processing by 2037 is way too slow. This could potentially be achieved within around two-three years of a reliable alternative energy source being available, which means that a significant part of this industry could already have moved away from fossil fuels by 2025. We strongly recommend that 2025 be set as a target date for having moved away from using fossil fuels for process heat, provided sufficient electricity generating capacity is available for those that want to move to this energy source.

(3) Pathways for the built environment:

@ There is no mention of materials used in the construction chapter. The chapter focuses on the emissions of buildings during their lifetime through heating and air conditioning, but forgets totally the embedded energy in the building materials. It will take some time for industry to adapt to change in construction materials and methods (including changes to supply chains, plant and equipment, workforce skills, updating of design standards), so this issue needs to be addressed

proactively in the short term future.

@ Timber as a renewable resource should be preferred for buildings ahead of steel and concrete. There is scope for the government to invest in development of technical building standards that will provide greater confidence and regulation for the adoption of timber by the construction industry.

@ Investment in the reinstatement of NZ's steel recycling industry needs to be appropriately incentivised in the short term future.

@ Urgent research should be commissioned to quantify the embodied carbon in construction materials used in New Zealand (including offshore & transport emissions), to support that the government's proposed 'Building for Climate Change' framework and ensure that materials selection decisions are based on accurate emissions data (reliance on overseas data could lead to perverse results).

(4) Pathways for transport:

@ We need to move to requiring imported vehicles to be meeting EU emissions standards by the end of 2022, not by 2028 as the CCC says, or by 2025 which is the latest Government move.

@ It is essential that we supplement EVs with electrified public transport, urban re-form, small electric vehicles, and vehicle sharing schemes - refer to comments in Big Issue Question 1 & Question 14.

(5) Pathways for agriculture:

There are also lots of known ways of reducing greenhouse gas emissions from agriculture. This is an area where we have less experience, but here are some examples:

@ Moving to more sustainable farming methods, such as regenerative farming, can reduce the need for artificial fertilisers, thus reducing the related emissions, and result in large amounts of carbon being stored in the soil.

@ Biogenic methane emissions can be reduced through use of feed supplements such as seaweed, by moving to once-a-day milking, and by moving to breeds of cattle with higher feed conversion efficiency and lower emissions.

@ Nitrous oxide emissions can be reduced by largely or completely moving away from the use of nitrate fertilisers to other options, such as regenerative farming. They can also be reduced by properly following fertiliser management guidelines regarding fertiliser type, application rate, timing of application, and placement.

### **13. An equitable, inclusive and well-planned climate transition**

#### **13 Do you support the package of recommendations and actions we have proposed above to ensure an equitable, inclusive and well-planned climate transition, and is there anything we should change?**

Support some of the actions

**Please explain your answer (1000 word limit):**

We realise, we are commenting on the draft advice of the climate change commission. Nevertheless actions on the climate crisis have a different impact on different parts of society. The ETS and a carbon tax are raising money, which can be redistributed. We are proposing that any money raised be used to increase benefits. We are also suggesting to start a conversation on a universal basic income scheme.

In addition, since electricity will become the dominant energy in the future, as a first step to an equitable transition, we recommend to reduce the huge difference between domestic and commercial electricity prices.

#### **The direction of policy**

### **14. Transport**

#### **14 Do you support the package of recommendations and actions for the transport sector? Is there anything we should change and why?**

Support all the actions

**Please explain your answer (1000 word limit):**

The package of recommendations is supported. We are, however, concerned that there is too much reliance on a quick uptake of electric vehicles (EVs). Other measures are also required. Some of these are identified below.

@ Excessive Reliance on Early EV Uptake

Norway demonstrates how effective incentives to buy and use electric vehicles can be. The adoption and deployment of EVs has been actively supported since 1990. Norway has high taxes on imported vehicles which are waived for EVs. Also, by December 2019 there were 13,687 public charging points in Norway. In 2020 the EV share of new vehicles in Norway was 74.7%, up from 29.1% in 2016. The policy clearly has a high cost in terms of loss of revenues. Norway is, however, a very wealthy country.

The Norwegian example indicates that it is feasible to achieve a very high proportion of EVs in new car sales and that sharp increases can be achieved over a few years once momentum is gained. However, this requires consistent and effective Central Government policy support over many years. These policies should significantly reduce and ideally eliminate the purchase cost differential between EVs and equivalent conventional vehicles, and ensure a good supply of public charging points. It is likely that any New Zealand subsidy would only meet part of the price difference, at least until EV prices fall significantly. This suggests that achieving the Commission's EV market share recommendation may well take a several years longer than assumed. These should include pricing mechanisms favouring EV/low emission vehicles.

#### @ Government Policy

The Report should include other Government actions to achieve the targets. These include:

(1) Revising the Government Policy on Land Transport Funding to ensure that transport investment is directed towards achieving the Climate Change outcomes.

(2) Requiring the NZ Transport Agency to set specific guidelines for all strategic transport plans and investment programmes which enable their contribution to achieving emission targets to be measured. These should include:

(i) total greenhouse gas emissions;

(ii) mode shares (public transport, walking and cycling, peak period and all-day);

(iii) total vehicle kilometers travelled - a measure of the effectiveness in reducing total vehicular travel.

#### @ Intercity Rail

The electrification of the Tauranga-Hamilton rail line and the full length of the Wellington-Auckland rail line is supported. These lines should also be upgraded through double-tracking and improved signalisation to reduce travel times. An upgraded rail network with new stations at key locations could potentially offer a real alternative to inter-city road or air travel.

#### @ Urban Transport

The replacement of diesel buses by electric buses is strongly supported. In addition to CO2 reductions, electric buses are quieter and do not emit noxious fumes. They are much better suited to quality urban environments which support and prioritise walking, cycling and public transport over cars.

Fare policy needs revision. The Commission's report refers to reduced fares for target groups. Future fare increases for non-target groups should be linked to inflation and not driven by an arbitrary fare-box recovery policy (e.g. a 50% farebox recovery target).

High quality rapid transit with dedicated separate right-of-way in major urban areas should be given high priority. This could be electric bus or rail-based as appropriate. It is essential that rapid transit investments include urban re-form - such as mixed use, high density development around stations with the resulting development designed to encourage walking, cycling, and the use of low-powered vehicles such as e-bikes. Placing part of the rapid transit facility on viaduct could significantly reduce the land area required and avoid the very high cost of tunnel construction.

If these fundamentals are in place, EVs can play a valuable supplementary role to fill in the gaps of the wider public transport system (e.g. as a car sharing services used for non-routine travel, last mile transport etc). This multi-pronged approach to transport is mentioned in the CCC report, but needs further development so that it features at least as prominently as the discussion of EVs.

#### @ Freight

The movement of freight is essential to the economy but typically receives less attention than private transport. Electrification of heavy goods vehicles is not realistic at present. For the medium term at least biofuel production from sources such as wood waste or fast-growing grasses should be encouraged through funding of research and, where appropriate, facilities for testing new production techniques.

## 15. Heat, industry and power

### 15 Do you support the package of recommendations and actions for the heat, industry and power sectors? Is there anything we should change and why?

Support some of the actions

**Please explain your answer (1000 word limit):**

@1. The way our electricity market currently operates needs urgent attention.

It is absolutely critical that the way the electricity market currently functions be changed as rapidly as possible. The market currently operates by paying all electricity providers in a region, who are feeding into the grid, with the same price as the highest bidding provider whose power is accepted into the grid over a given half hour period. In the North Island, this provider is often the Huntly Power Station.

The outcome is that, by keeping Huntly Power Station as a grid provider, electricity prices paid by consumers are pushed up, other electricity providers make increased profits, and fossil fuel-powered generation is incentivised, while renewable generation is disincentivised. As a consequence, around 10 consented windfarms remain undeveloped, including the mothballed Hauauru Ma Raki wind farm in the hills behind Huntly, that could alone generate up to half the electricity that Huntly Power Station does, and provide many local jobs.

The way the market operates needs to be rapidly changed so that:

- (i) electricity generated from renewable resources gets precedence in entering the market, regardless of price, and
- (ii) electricity providers are required to make bids which reflect their generating costs, and the grid price is based on the average price providers are charging, not on the highest price.

With these market changes, the use of the Huntly power station would then immediately fall towards backup status, power prices to consumers would fall, and there would be a strong incentive to develop further renewably powered generating options.

@2. Domestic pricing of electricity needs to be reduced relative to business pricing:

Further to the above, since electricity market “reforms” were introduced around 34 years ago, while electricity prices paid by businesses have not changed greatly, electricity prices paid by consumers have approximately doubled. To make electricity a stronger choice for domestic consumers we need to change both how the electricity market works and how the pricing in the distribution system works, so that domestic prices fall back to a more equitable level.

@3. Obstructions to local electricity generation needs to be removed:

Increasing numbers of people, businesses and communities are investing in solar panels and in other ways of generating electricity renewably. There have also been some moves to install small local grids so as to use the electricity more effectively. This is excellent because it is increasing the proportion of our overall electricity coming from renewable resources. But when they generate surplus power, if they are able to sell it back at all, they may get only a very small fraction of what the supplier is charging domestic users. This problem also needs to be addressed so as to give generating entities the ability to sell surplus power back into the grid at a reasonable price. In the medium to long term, NZ’s hydroelectric generation capacity is likely to provide a better energy return on energy invested than small scale local generation equipment, but local generation has an important part to play during the initial transition away from the carbon footprint and inequity of the current electricity market. Carbon pricing should be applied to the carbon that is embodied in electricity generation equipment, as for all other goods.

@4. Reliability of electricity supply needs to be addressed:

With increasing reliance on electricity to provide power and heat, we need to have a reliable supply. The CCC draft advice report does not seem to mention tidal energy in this context, which is a more reliable energy source than solar, wind or hydro. A consent was granted in 2008 for a 200 MW plant in the Kaipara Harbour but the project was later abandoned because of uncertainties around the electricity market. Tidal currents in Cook Strait reportedly have the potential to meet all of New Zealand’s electricity needs. A consent was granted in 2008 to install a trial turbine in Cook Strait, but again the project was dropped, perhaps also because of uncertainties about the electricity market. Steps to encourage the development of tidal power would be useful in helping to provide a reliable electricity system.

@5. Much faster reduction needed on emissions from process heat:

The CCC draft advice report, p114-115 says one of the steps to reduce emissions from process heat will be to introduce measures to help reduce emissions from boilers, which it says were around 4 Mt CO<sub>2</sub>e in 2018, by 1.4 Mt CO<sub>2</sub>e over 2018 levels by 2030 – a 35% reduction, and by 2 Mt CO<sub>2</sub>e by 2035 – a 50% reduction”. Both these proposed reductions are way below the reduction in coal emissions of around 67% below 2010 levels by 2030, which the IPCC said in its 2018 report was necessary to hold global warming within the 1.5°C threshold.

The move away from coal has so far been extremely slow because for many entities it remains the cheapest energy source. For example, dairy processing company Fonterra, New Zealand’s second largest coal user, has taken some small steps to investigate the use of wood-based fuels, and says it is electrifying its small Stirling plant in South Otago, which it says will take 3-5 years to complete. These steps have so far had very little effect on its total emissions. If carbon prices were rising rapidly towards the cost of the damage caused by the emissions, which the IPCC says is at least NZ \$137 / tonne CO<sub>2</sub>e (see elsewhere in submission for more information), and were expected to keep rising well beyond that, we would be seeing much faster action.

In some cases, process heat from fossil fuels can be replaced with energy from wood pellets, other biomass, or in a few cases geothermal heat. The remaining cases will presumably need to move to the use of electricity.

We recommend that steps be taken immediately to increase the generating capacity of our electricity network so that by 2025 there is sufficient capacity to support process heat users who need to move to electricity, as well as the increasing number of electrically powered cars and other vehicles. We further recommend that there be strong incentives or regulatory requirements for process heat users to make the transition by the end of the 2025 year, if the required electricity generating capacity is in place by that time.

## 16. Agriculture

### 16 Do you support the package of recommendations and actions for the agriculture sector, and is there anything we should change?

Support some of the actions

**Please explain your answer (1000 word limit):**

Agriculture is New Zealand’s largest source of emissions. The proposals and actions by this sector need to be more ambitious and have a faster timeline. Business as usual must not be allowed to continue. The primary sources of agricultural emissions are the number of cows and sheep, and the use of synthetic nitrogen fertiliser.

Actions needed in this sector:

@ We need to impose a sinking lid policy to reduce the number of cows and sheep.

@ The use of nitrate fertilisers needs to be phased out in favour of other options, such as regenerative farming. During the phase-out period, greenhouse

emissions can also be reduced by improved education and tighter regulation around fertiliser management practices regarding fertiliser type, application rate, timing of application, and placement.

@ We need to stop production and application of synthetic nitrogen fertilisers.

@ We need to encourage the development of Organic and Regenerative Agriculture. More sustainable agricultural methods can reduce the need for artificial fertilisers, thus reducing the related emissions, and result in large amounts of carbon being stored in the soil.

@ Biogenic methane emissions can be reduced through use of feed supplements such as seaweed, by moving to once-a-day milking, and by moving to breeds of cattle with higher feed conversion efficiency and lower emissions.

@ We need to strongly encourage land use for agriculture that is in balance with the soil type and natural climate. We must protect our best soils from destructive land uses, including housing and industrial development.

@ Irrigation schemes must be restricted to locations and areas that will help deal with climatic variation on crops suited to the soil and ambient climate.

@ We need to encourage farm generated compost as fertiliser

@ We must limit agriculture pollution to improve local water quality.

## 17. Forestry

### 17 Do you support the package of recommendations and actions for the forestry sector? Is there anything we should change and why?

Support all the actions

**Please explain your answer (1000 word limit):**

There should also be consideration of wilding conifers. At present a lot of effort and chemicals are devoted to limiting their spread. They might be a useful addition to mitigation of our greenhouse gas emissions. Are there any places where that could be acceptable?

## 18. Waste

### 18 Do you support the package of recommendations and actions for the waste sector? Is there anything we should change and why?

Support some of the actions

**Please explain your answer (1000 word limit):**

The actions on waste are too much focused on the emissions of waste alone. While these emissions are important there should be an equal weight on the avoidance of waste in the first place. This has to consider whole supply chains, the design of products and their material selections as well as the design of services. Product stewardship is equally important as dealing with emissions from waste sites.

## 19. Multi-sector strategy

### 19 Do you support the package of recommendations and actions to create a multisector strategy, and is there anything we should change?

Support some of the actions

**Please explain your answer (1000 word limit):**

SUPPORT SOME OF THE ACTIONS BUT DO NOT CONSIDER THE APPROACH IS NEARLY STRONG ENOUGH:

@ As covered elsewhere, we very strongly recommend that the ETS revert from being an auction system to being a system where the emissions price is set for the coming period, and ideally indicative prices are also given for future periods, going out several years. This will make the whole ETS operation a lot simpler and more transparent, reduce administration and compliance costs, and make it much clearer to businesses and other entities what steps they need to take to reduce emissions, and when it will make sense to take them for financial reasons.

@ Also, as covered elsewhere, we very strongly recommend that the major part of the revenue from emissions charges be recycled back to the public via a citizen's dividend. We consider this will be necessary to make the higher emissions charges we urgently need both workable and politically acceptable. In the short term, some of this revenue can also be used to assist businesses and other entities in moving away from fossil fuel use.

@ Industrial allocations need to be rapidly removed, particularly in the case of products being sold domestically. Instead, to allow local suppliers to compete on the domestic market, we recommend that a carbon tax be imposed on imported products from other countries, to reflect the extent that their emission charges are lower than ours.

@ Allowing "banked" ETS units to be held, and then used later when unit prices are higher, undermines the whole purpose of the ETS. We recommend moving to a system under which ETS unit prices are set for the coming period, and units purchased back in time at lower prices cannot be used to meet current emissions

requirements, but can be sold back at the price originally paid for them. (Units supplied to forestry operations for carbon capture and storage in trees would probably need to be treated differently from the above.)

@ The ETS emissions charges given in the CCC draft advice report are not nearly high enough. For example, on p131 it talks about “a trajectory that allows for prices of at least \$140 in 2030”. But first, the IPCC 2018 report says that the damage cost from emissions is more than US\$100 / tonne CO<sub>2</sub>e – approx. NZ\$135 / tonne CO<sub>2</sub>e at current exchange rates. It is totally counter-productive to subsidise emitters by charging them less than this amount. Emissions charges need to be rapidly raised to this level. And second, the IPCC 2018 report also says that by 2030 carbon prices will need to be in the range of US\$135-\$5,500 / tonne CO<sub>2</sub>e – around NZ\$185-\$7,500 based on current exchange rates. Based on this information, we need to be aiming for prices well above \$185 by 2030.

## 20. Rules for measuring progress

### 20 Do you agree with Budget recommendation 5 on the rules for measuring progress? Is there anything we should change any why?

Support all the actions

**Please explain your answer:**

We have no significant objections to the proposed rules for measuring progress.

## 21-23. Our Nationally Determined Contribution (NDC)

### 21 Do you support our assessment of the country's NDC? Do you support our NDC recommendation?

Partially support

**Please explain your answer (1000 word limit):**

@1. Fully support assessment of country's NDC:

It is totally appropriate that the Commission decided that the Nationally Determined Contribution our Government submitted under the Paris Agreement in relation to our 2030 emissions was not compatible with global efforts (p 19). The commitment was presented as reducing our greenhouse gas emissions by 30% below 2005 levels by 2030. What never seemed to be made clear when the NDC was presented, is that it was based on comparing gross emissions in the base year with net emissions in the target year. On a consistent net-net basis (based on 2015 data – the most recent data available when the NDC issue became clear), this was actually an undertaking to increase net emissions by around 7% over 2005 levels by 2030 – an appallingly weak target.

@2. Do not support the Commission's NDC recommendation:

Rather than just leaving the state of our NDC up to political decision, our view is that the Commission should present to the government, and to the public, a revised version of our NDC that at least reflects the emissions reductions laid out in the 2018 IPCC report as necessary to hold global warming to 1.5 degrees C and ideally, because we are a developed nation with the necessary resources, goes somewhat beyond this.

@3. Change the way we define our NDC's and other emissions-related data:

On p 151 the CCC draft advice report refers to the gross-net accounting approach previously used for our NDC and for expressing some of the other targets that our government has set. This involves comparing gross emissions in the base year with net emissions in the target year. It gives some support to this, saying it is “a legitimate internationally agreed approach”.

This comparing apples with oranges approach, frequently presented in the past by our Government without it being made clear, is extremely misleading. This has been pointed out by the previous Commissioner for the Environment, Dr Jan Wright, in her final report published in 2018, and by others. It is also not a standard way for all countries to present this data, though some others may do so. To keep things clear and understandable, we need to immediately stop obfuscating important information by presenting emissions targets and reduction data on a gross versus net basis, and instead use net-net comparisons, or possibly in some specific cases gross-gross comparisons, where the derivation of the information is clearly specified.

To present important information in any way other than clearly and rationally is not compatible with good democratic process.

@4. South-West Pacific focus for any offshore mitigation:

Since offshore mitigation is being considered as a way to strengthen New Zealand's NDC, we would support the idea of investing in mitigation & adaptation in South-West Pacific countries. For example, we should consider supporting our Pacific neighbours to achieve similar milestones in renewable energy, transport etc that New Zealand is proposing domestically (albeit using different technologies as appropriate).

@5. Address “upstream” emissions of goods imported to NZ:

If New Zealand is investing in offshore mitigation as a way to strengthen our NDC, we should consider the embodied energy of products imported to NZ as a priority (including transport emissions), deciding if there is a way to mitigate these emissions offshore, or replace them with lower-emissions products from domestic sources. This approach maintains a clear link between NZ's domestic activities and our impact on the global climate.

### 22 Do you support our recommendations on the form of the NDC?

Somewhat support

**Please explain your answer (400 word limit):**

@ Support continuing to define our NDC on the basis of all greenhouse gases: While this is what other countries are doing, it makes sense for us to do the same. When our government submits a new NDC (which it very urgently needs to do) for clarity it also needs to provide additional information regarding the reduction it plans to achieve in long lived gases, and in biogenic methane, to achieve our NDC. We also recommend very strongly that the NDC be defined in a consistent basis – net-net is the most obvious choice – and that the definition from now on always be clearly stated.

@ Support contributions beyond meeting our NDC: given we are a developed country with lots of expertise, we should certainly be assisting other countries in reducing emissions. It also makes excellent sense for New Zealand to take an active part in pushing for mitigation measures for international aviation and shipping. For example, carbon charges for these activities need to rapidly rise to cover the damage cost of the emissions produced, and need to continue rising to meet the pricing the IPCC has concluded will be necessary by 2030 to control emissions and remain on track to meet the Paris target.

**23 Do you support our recommendations on reporting on and meeting the NDC? Is there anything we should change, and why?**

Somewhat support

**Please explain your answer (400 word limit):**

@ The use of international carbon markets to assist in meeting our NDC needs to be a last resort. We need to take responsibility for reducing our own emissions, and not rely on the international carbon market except in really exceptional circumstances.

@ The government also needs to report annually on our emissions versus budget and on emissions pricing. Annual reports on how the government plans to meet the NDC are important, but we also need to know how we have progressed so far. This requires having annual budget figures that can be compared with actual emissions. The government, or the CCC if it has the authority, also needs to indicate, or to prescribe, what emissions charges can be expected to be in effect over the coming several years. This is a key way of making it clear to businesses what actions they need to take to reduce their emissions, and allowing them to determine the timeframe in which these changes will become economically viable.

@ The government must clearly communicate any matters re: possible purchasing of off-shore mitigation. We regard this as a last resort option that we should only take in extremely exceptional circumstances. Should these arise, the government needs to make it totally clear why it is considering or taking this option, what level of off-share mitigation it proposes to accept, and how it will manage any related fiscal risks.

**24. Eventual reductions in biogenic methane**

**24 Do you support our assessment of the possible required reductions in biogenic methane emissions?**

Do not support our assessment

**Please explain your answer (1000 word limit):**

The proposed approach is not ambitious enough.

As noted in our response to Question 3, the method of assessing the significance of methane in our New Zealand radiative forcing profile is fundamentally flawed, and there are good reasons to take methane more seriously.

@ Recommend transition to more plant-based agriculture:

In recent decades, there has been an increase in the land used for dairy farming, as noted in the draft report of He Pou a Rangi. Some of that land is quite unsuitable from a water quality point of view. Light soils in Canterbury are an example. The best way to mitigate the groundwater quality issues would be to remove dairy farming from those soils. Reducing the dairy stock numbers would reduce the amount of biogenic methane emitted.

The draft report of He Pou a Rangi notes that in some countries there is a move to reduce consumption of red meat and dairy products, while in others the demand for those products is increasing. From a human nutrition point of view, the protein that feeds the great majority of humans comes from grains and pulses, and it is perfectly adequate protein. While a small amount of high grade (animal) protein is useful, there doesn't need to be much of it to make a person healthy. In a world with increasing population, there may be a move towards a greater proportion of plant based food in our diets.

Colin Tudge (So shall we reap, Penguin 2004) describes how traditional regional cuisines relied on plant based food with small amounts of animal protein (amongst other matters, in a major treatise on food and agricultural systems). The present level of meat eating in wealthy countries is historically anomalous.

We suggest that Aotearoa could take a lead in efficiently producing food for humanity. However efficient we may be at producing animal protein (compared with an American beef feedlot for example), it remains a very inefficient kind of food to produce. We suggest that some land could be better used in other ways than animal production.

Eric Toensmeier (The Carbon Farming Solution, Chelsea Green Publishing 2016) suggests a range of perennial crops that can enhance the carbon content of soils.