Submission by FARM (Facts About Ruminant Methane) on Climate Commission's draft report.

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About FARM

FARM is an organization of farmers, scientists and other interested people concerned about the way the impact of ruminant methane is being misrepresented in Government climate policy.

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The Climate Commission's draft report is a missed opportunity to address the unresolved issue of to what extent New Zealand emissions of ruminant methane contribute to global warming and what policy options for livestock emissions are optimal. FARM recommends the Commission take a more thorough look at the issue from a first principles approach.

The report makes a positive change from previous reports by taking a split gas approach with methane targets stated in Mt of methane rather than CO2 equivalents, but FARM feels that many of the mistakes that were created by the adoption of the CO2 equivalent system to quantity methane emissions are still prevalent in this report.

It must be acknowledged that there have been numerous significant mistakes by Government since climate policy was first introduced in respect to its treatment of ruminant methane emissions, not least being the adoption of the CO2 equivalent system to quantify ruminant methane emissions in terms carbon emissions based on CO2 equivalence using GWP 100. This system attempts to equate long loved cumulative emissions (CO2) with short lived flow gas emissions (CH4), which is a scientific absurdity. The system lacks scientific integrity as it overstates the impact of ruminant methane emissions. The most egregious error the CO2 equivalent system makes in regard to ruminant methane is that it treats every emission of ruminant methane as if it increases the atmospheric concentration of methane and thereby causes temperatures to increase, whereas in fact in our New Zealand context it does not.

The Climate Commission by taking a split gas approach in its report prevents the mistakes being perpetuated in some aspects of the report but not all. Also with climate policy and emission reduction targets up to now being based on the discredited CO2 equivalent system the Climate Commission should have reviewed these and taken a first principle approach to the issue instead of just accepting the targets the Government has set without question or comment.

Our submission responds to the questions asked in the consultation document and makes relevant comments and makes general comments in the second section.

Question I

Do you support the principles we have used to guide our analysis? Is there anything we should change, and why?

Principle 1: The Commission should be more independent and not simply align with legislated targets. By doing so it serves little purpose.

Principle 5 The Commission should not be concerned with existing inequities, as these exist due to political influence over society. The Commission has no mandate to provide advice on this. The Commission should limit itself to ensure that its advice does not create more inequity nor inflict harm on New Zealanders.

Principle 6 No official climate records record any increase in drought, flooding, forest fires and storms and in fact they record a decrease, so the Commission should not be focused on increasing climate resilience because it appears that a warmer world is more benign in terms of climate. Climate related deaths worldwide have declined by 99% over the last 100 years which indicates the climate is more benign and human resilience has increased with progress in any case, and will continue to do so. If global temperatures are kept below 2 degrees there is not expected to be any catastrophic global warming so it seems pointless to try and reduce emissions as well as increase resilience. Increasing resilience without reducing emissions would seem the most efficient least cost and certain response, but alas our Government has chosen the other path.

Principle 7 should include the wider benefits but with all perceived wider costs analyzed against them so a trade off can be decided. The cost of any action or policy should be set aside any benefit to judge its merits.

Question 2

Do you support budget recommendation1? Is there anything we should change and why?

The second and third budgets should be increased substantially to allow more emissions. The decrease is far too rapid to avoid causing immense personal hardship to New Zealand families. These budgets should be conditional on similar international reductions at least. The impact of Covid 19 must be recognized too and it must be acknowledged that New Zealand families are not as financially resilient as they were to withstand the costs of these carbon budgets.

Question 3

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

We do not support the proposed breakdown. The reduction in methane emissions is not justified in any way. Methane emissions from livestock in particular when stable, as they are in New Zealand, do not cause any increase in atmospheric methane. It is only activities that cause an increase in atmospheric greenhouse gas that can be blamed for causing further temperature increases.

The Commission does not base its recommendations on the science of methane emissions and simply bases its recommendations on the targets set by the Government in the Carbon Zero legislation to reduce methane emissions by 10% by 2030 and between 24 and 47% by 2050, and by referring to and adopting without analysis an IPCC pathway scenario. This is a completely inadequate way to assess what emission reductions are needed. The IPCC itself states that the pathways scenarios should not be used to set national targets and that the scenarios are not based on atmospheric science but a number of other factors as well. The Climate Commission cannot just deny the science of ruminant methane as it appears to do with its proposed reduction targets.

The Commission states on page 171 of its report that the methane reductions of the scale it proposes are only necessary to offset CO2 emissions which cannot be reduced quickly enough (to net zero by 2030). In other words it proposes farmers reduce methane emissions to subsidize CO2 emitters. This is an outrageous position for the Commission to take and there are three main problems with this approach by the Commission;

- Firstly it's not fair especially if farmers are going to be penalized financially to force them to subsidize CO2 emitters. If there is a legitimate scientific case to offset CO2 emissions with methane reductions, and this is highly questionable, then farmers should be paid to reduce emissions, not fined with taxes for not doing so. It is deeply concerning that the Commission advocates penalizing farmers if they do not reduce methane emissions so that CO2 emitters can continue to emit at a rate that is too high.
- Secondly, requiring farmers to reduce emissions to offset CO2 emissions gives the impression that the emissions farmers produce are the problem which can lead to unfair vilification of farmers and their products and to product resistance. The Commission acknowledges that stable methane emissions, as we have in New Zealand, do not cause an increase in atmospheric greenhouse gas. This acknowledgment is not reflected however in its emission reduction proposals.
- Thirdly, the Commission and the Government state that methane emissions cannot be offset by forestry removals because of its split gas approach. However if emissions of methane cannot be offset by removals of CO2, then emissions of CO2 should not be offset by reductions in methane. The Commission and the Government are contradicting themselves here and need to either change their stance on methane offsets with forestry or CO2 offsets with methane.

FARM asks the Commission to revisit the Government's decision to not allow forestry offsets for methane as the Government's position is based on a misunderstanding of the science.

Taking the split gas approach to global warming policy is intended to prevent the mistaken assumption being made that is inherent in the CO2 equivalent system calculated using GWP 100, that all methane emissions are causing an increase in atmospheric methane and thus contributing to global warming and therefore need to be reduced or offset. There is no advantage in using the split gas approach unless it is recognized that when emissions of methane are stable, as they are now in New Zealand, they are not causing any increase in atmospheric greenhouse gas.

The Commission throughout the report attempts to address the question of how much methane emissions need to be reduced in order to hold global temperatures or to meet international targets but the fundamental issue it should address is what impact methane emissions are having on global

temperatures. Once it can be determined to what extent any emission of methane increases global temperatures then that impact can be offset by planting enough trees to offset that increase. If it cannot be determined what impact an emission of ruminant methane is having on global temperatures, which appears to be the case with ruminant methane, then there should be no requirement to reduce it in the first place until the scientific knowledge is able to verify the need.

Pine trees are a bit of a fraud in any case when it comes to climate mitigation because the formulas used to determine its impact on global temperatures do not take in to account fully the loss of soil carbon that occurs under forestry, nor the impact of albedo change and nor the global warming pine forests cause by emitting gases which prevent atmospheric methane removal from the atmosphere. But if this fraud is available to CO2 emitters it should be available to methane emitters and pine trees can be used to offset methane emissions when the impact on global temperatures of a particular methane emission can be determined. If this impact cannot be determined, as it appears the Commission is unable to do, there should be no methane reduction targets set.

As stated previously the only reason the Commission gives for reducing methane emissions is because we can't reduce CO2 quickly enough and so methane reductions are needed to offset CO2 emissions, so it can't then argue that methane emissions and CO2 are not fungible and that CO2 sequestration by pine trees, no matter how dodgy, cannot offset methane.

Question 5

Do you support enabling recommendation 1? Is there anything we should change and why?

Yes, there should be no methane reduction targets set without cross party support especially as the emission reduction targets are not backed by science. Methane is an important issue for New Zealand, it has been dealt with appallingly by our Government since climate policy began. Forcing the Government to get cross party support is some protection for farmers from the sort of incompetence by politicians, government agencies and officials they have had to suffer so far.

Questions 10 and 11

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

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?

Offsetting emissions with native forestry could lead to productive food producing land being converted to forestry and this will have consequences and is in possible contravention of article 2 of the Paris Agreement, to reduce emissions in a way that does not threaten food production. The loss of soil carbon needs to be factored in more than it is now as well as changes in albedo.

Question 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?

There should be no policy initiatives which encourage land use change from livestock to exotic forestry.

Offsetting CO2 emissions with exotic forestry is an environmental and financial fraud because the formulas used to determine its impact on global temperatures do not take in to account fully the loss of soil carbon that occurs under forestry, nor the impact of albedo change and nor the global warming pine forests cause by emitting gases which prevent atmospheric methane removal from the atmosphere. It is also most likely in contravention of the Paris agreement that prohibits policies that threaten food production. The Commission proposes reducing methane emissions in a way that will prevent New Zealand farmers increasing food production at a time when global population growth requires it.

Question 16

Do you support the package of recommendations and actions for the agriculture sector? Is there anything we should change, and why?

There should be no pricing of agricultural livestock emissions. The Commission states that the methane reductions of the scale it proposes are only necessary to offset CO2 emissions which cannot be reduced quickly enough. In other words it proposes farmers reduce methane emissions to subsidize CO2 emitters.

If there is a legitimate scientific case to offset CO2 emissions with methane reductions, and this is questionable, then farmers should be paid to reduce emissions, not fined with taxes for not doing so. It is deeply concerning that the Commission advocates penalizing farmers if they do not reduce methane emissions so that CO2 emitters can continue to emit at a rate that is too high.

Reducing emissions by improving farm practices overlooks the fact that for improving farm practices and efficiencies to do more than reduce emission intensity (emissions per kg product), as they have to date, and also reduce absolute emissions, this will require a limit or cap on farm production, otherwise the efficiency gains farmers make will just go in to more production and absolute emissions will not reduce. Farm efficiency gains so far have been significant and will continue, but farmers will not be able to convert those gains in to increased output, as they have been doing up until now and will have to be as profitable in thirty years' time off the same production they do now. The advice the Commission is relying on from BERG is that these emission reductions are only possible for some farms if everything goes right. They are not possible for a good number of farmers and when good farmers are faced with less favourable conditions, so it is wrong to claim that on an industry wide basis these emission reductions are achievable and will do more than continue to reduce emissions per kg of output and result in a reduction in absolute emissions.

The Commission needs to relook at the science of methane emissions which it has not factored in to its recommendations.

Question 17

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

Offsetting CO2 emissions with exotic forestry is an environmental and financial fraud because the formulas used to determine its impact on global temperatures do not take in to account fully the loss of

soil carbon that occurs under forestry, nor the impact of albedo change and nor the global warming pine forests cause by emitting gases which prevent atmospheric methane removal from the atmosphere. It is also most likely in contravention of the Paris agreement that prohibits policies that threaten food production.

Question 20

Do you agree with Budget recommendation 5? Is there anything we should change, any why?

FARM supports point five

To Encourage the Government to develop methods for tracking emissions and removals by sources and sinks not yet included in the country's domestic or international target accounting, such as organic soils and biomass (including small lots of trees and regenerating vegetation), with a view to allowing them to be included in future target accounting.

Question 21

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

Do you support our NDC recommendation?

FARM does not agree with the Commission.

The Commission recommends increasing New Zealand's Paris agreement 2030 emission reduction target which was to maintain net emissions of CO2 equivalents (carbon) at a level that is 30% below our gross emissions of 2005. They want to increase this to 35%. They argue that because nearly half our emissions of CO2 equivalents are biological emissions from agriculture and these don't have the same impact on temperatures that CO2 does and don't need to be reduced to the extent CO2 emissions do, in order to hold temperature increases to 1.5 degrees, then our NDC is doing less to hold temperatures than other countries with the same reduction target.

A given reduction in emissions from an industrial country which produces mostly CO2 emissions will have a greater impact on global temperatures than the same reduction from a country like New Zealand which produces a lot less CO2 in its mix of emissions. This is because it is the CO2 emissions that are the main driver of temperature, not biological emissions.

What the Commission fails to recognize is that the mistake the CO2 equivalent system made was to equate methane emissions and CO2 emissions and treat them all as if they are causing the same global warming. The system did not recognize that a country with mostly CO2 emissions in its emission profile is causing way more global warming than a country like New Zealand with the same total emissions but with less CO2 emissions in its emission profile.

Instead of increasing our NDC, the Commission should recommend that New Zealand lowers its NDC to reflect that the CO2 equivalent system had overstated our impact on global temperatures because of our high level of methane emissions. In fact all legislated emission reduction targets should be revised downward to reflect this.

FARM submits that all climate policy, targets, and agreements should be based on a split gas approach. There is no defence for using the CO2 equivalent system which has led to perverse outcomes with the most problematic one being that the temperature impact of producing animal products has been overstated. This has resulted in New Zealand's per capita carbon emissions reflecting a higher temperature impact than we cause. It also leads people to conclude they can reduce their impact on temperatures by cutting back on animal products instead of reducing CO2 emissions. This leads to product resistance and increases in global warming as people continue to emit CO2 at higher levels than they might.

Question 22

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

FARM does not support the Commission's recommendation. There should be no use of CO2 equivalents based on GWP100. The science is clear that short lived flow gases cannot be equated to long lived stock gases. It is not scientifically possible to equate a gas which accumulates in the atmosphere with one that does not. There is no justification for the use of this discredited system and there is no defence for it still being used now that the science has been acknowledged. The adoption of the CO2 equivalent system was a mistake that has had huge ramifications for farmers and for New Zealand. All reference and use of it in Government policy, domestic and international targets and agreements must be expunged. Farmers should not have to suffer because of the incompetence of those who made the mistake and adopted this system.

Question 24

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

FARM does not support this assessment because what the Commission overlooks is that for improving farm practices and efficiencies to do more than reduce emission intensity (emissions per kg product), as they have to date, and also reduce absolute emissions, this will require a limit or cap on farm production, otherwise the efficiency gains farmers make will just go in to more production and absolute emissions will not reduce. Farm efficiency gains so far have been significant and will continue, but farmers will not be able to convert those gains in to increased output, as they have been doing up until now and will have to be as profitable in thirty years' time off the same production they do now. This is not feasible.

The emission reduction target is not possible on an industry wide based and is not based on science. The advice from BERG that the Government and the Commission rely on has been cherry picked in order to justify the target.

FARM was formed because of the misinformation about ruminant methane and the lack of understanding by policy makers about the facts of ruminant methane. The Minister asked the Commission to provide;

"advice on the potential reductions in biogenic methane emissions which might eventually be required by New Zealand as part of a global effort under the Paris Agreement to limit the global average temperature increase to 1.5^{o} Celsius above preindustrial levels.

Notwithstanding there is no such global effort, the Commission was unable to answer the question saying that ***the global reductions in biogenic methane required to stay below 1.5°C will depend on the level of carbon dioxide and nitrous oxide emissions over the next century. Therefore, it is not currently possible to know for certain what reductions in biogenic methane will be required.***

Either it was a stupid question from a Mininster because he does not understand the science of methane or it is a stupid answer from the Commission for the same reason.

The question and the answer would have been less stupid if it had been conditional on New Zealand meeting its domestic targets of reducing CO2 to zero by 2050, and both the Minister and the Commission could have introduced that condition. Had this been done the answer to the question of how much methane will need to reduce will be zero reductions because the stabilised methane emissions will not be contributing to any global temperature increase and wont have been for decades.

The Ministers question and the Commission's answer demonstrate a lack of understanding about the science of methane emissions. The Commission appears to demonstrate understanding when it admits on page 73 that

"As methane breaks down at a faster rate, a constant rate of emissions will stabilise within about 50 years."

This is poorly written as it does not say what the Commission believes will be stabilized within about 50 years. One can only presume it is either the atmospheric concentration of methane or its temperature impact will be to do no more than maintain global temperatures. FARM maintains that the science supports the position that stabilized ruminant methane emissions cause no increase in atmospheric methane because the emissions are doing no more than replenishing constantly oxidizing stock. Unless an activity is causing an increase in atmospheric greenhouse gas, it cannot be causing an increase in the greenhouse effect and consequently increasing global temperatures.

If the Commission cannot explain what the likely temperature change that an individual methane emission is capable of causing, then there is a knowledge gap that needs filling so that the Climate Commission can advise how to meet the 1.5 degree C target. At the moment the Commission is either reluctant to admit that the methane reductions required would be zero, or it lacks the expertise to do its job.

Further points on the Commissions proposed emission reductions for ruminant methane

FARM strongly opposes these target reductions.

The Commission does not base its recommendations on the science of methane emissions and simply bases its recommendations on the targets set by the Government in the Carbon Zero legislation to reduce methane emissions by 10% by 2030 and between 24 and 47% by 2050, and on IPCC pathways.

The 10% reduction requirement by 2030 is not based on a scientific need to reduce these emissions but on a report by the **Biological Emission Reference Group** (BERG) that said that some farmers could reduce emissions by that much with present technology and knowledge. This is a completely inadequate and unjustifiable basis on which to impose an industry wide requirement and what is more advocate to penalize farmers with taxes if they don't meet it.

The justification for the Commission's targets are simply not there.

The Commission states on page 171

Simply maintaining the current level of warming from methane is not enough, as it would require the world to reach net zero carbon dioxde by 2030 to keep warming below 1.5^{o}C. We consider this to be infeasible and consequentially that the global warming contribution from methane must be reduced if the 1.5^{o}C temperture goal is to be achieved.

The term 'current level of warming' means not causing any further temperature increase, so what the Commission is proposing is to require farmers to reduce emissions to offset CO2 emissions which cannot be reduced quickly enough. In other words it proposes farmers reduce methane emissions, not because they are causing temperatures to increase, but to subsidize CO2 emitters.

The Government and the Commission base their 2050 target of -24 to -47 % on figures produced in IPCC pathways that show what combination of emission reductions are consistent with a temperature increase of 1.5 degrees C.

The pathways should not be used to determine a target for methane in the way the Government and the Commission do as according to the IPCC they 'do not indicate requirements'. They are not based on atmospheric science but on a number of things including trade offs that are possible between emissions. ie methane and CO2. They do not indicate that methane emissions need to reduce by that much because the science tells them they are causing global warming, but because they need to be reduced to that level because CO2 emissions cannot be reduced enough quickly enough.

The other main problem is that the Commission and the Government have adopted the IPCC pathway figure as their target for methane for 2050, but have ignored the same IPCC pathway figure for nitrous oxide which is +1 to -26 % and adopted instead a target of -100%. There is no justification for this discrepancy and the Commission needs to explain this inconsistency.

The Commission's reliance on these IPCC pathways is a mistake and a reflection of its own lack of knowledge of the science of methane emissions and their impact on temperatures.

Split gas approach taken by the Commission

Finally the Government has come to its senses and recognized what scientists have been saying for decades which is that short lived gases like methane can not be equated to long lived gases like CO2 and that the CO2 equivalent system of quantifying emissions of a short lived gas (methane) in terms of its equivalence to a long lived gas (CO2) based on GWP100 did not work. The point of using the split gas approach is to rectify the mistake and take in to account the science of methane emissions.

However while the Commission uses the split gas approach in its report it is unclear it fully understands why it is using it. Taking the split gas approach to global warming policy is intended to prevent the mistaken assumption being made, that is inherent in the CO2 equivalent system calculated using GWP 100, that all methane emissions are causing an increase in atmospheric methane and thus contributing to further global warming and therefore need to be reduced or offset. There is no advantage in using the split gas approach unless this is recognized. The Commission does acknowledge this but not in the way FARM would like and in fact it confuses the issue by referring to methane emissions as causing short term warming or causing warming by holding temperatures higher than they would be had the emission not occurred. They also refer to methane maintaining the current level of warming, which means holding temperatures at current levels not increasing them. These are misuses of the term 'warming' when it relates to global warming and the Commission needs to be clearer in its language to ensure there is no misinterpretation of what it means when it refers to 'warming'. Global 'warming' can only occur if the emission causes an increase in atmospheric greenhouse gas and consequently an increase in temperatures from current levels. Currently methane emissions from New Zealand agriculture are not causing any increase in atmospheric methane and so are not responsible for causing further temperature increases. The Commission appears reluctant to state this clearly and to be truthful about the impact of stable methane emissions from New Zealand agriculture. The Commission Chairman's view of agriculture as a sunset industry similar to whaling is possibly the reason for the Commission's apparent obfuscation.

The Commission throughout the report quantifies emissions of methane by taking the CO2 equivalent value and dividing it by the GWP metric (25), to get Mt of methane, but unless the methane emissions are separated out to differentiate between those which cause an increase in atmospheric greenhouse gas and those which do not, then this just perpetuates the mistaken assumption inherent in the GWP metric that all methane emissions are causing the atmospheric concentration of methane to increase, when in fact most are not.

The Commission states the impact of methane emissions are higher than CO2 but for a shorter time and published this graph.

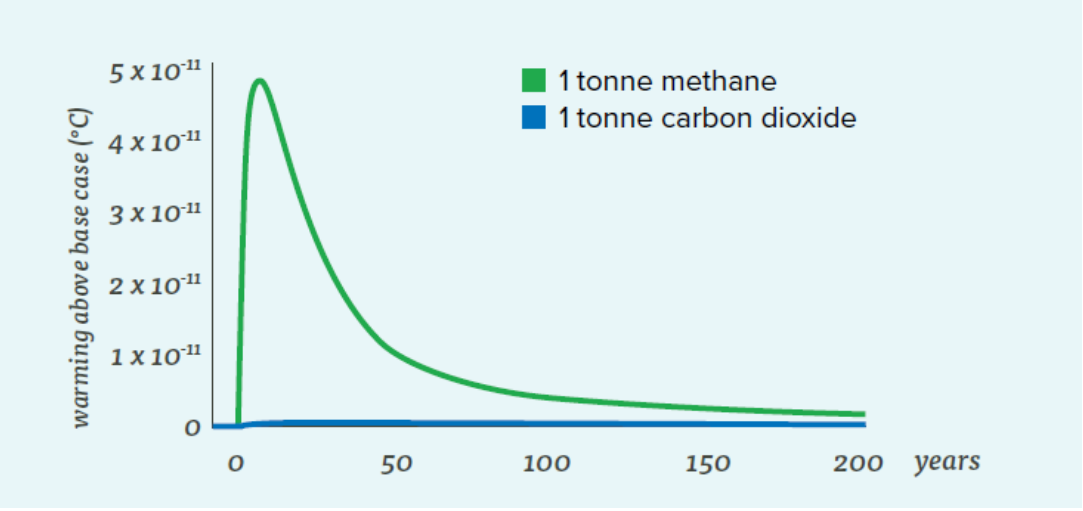

Figure 4.1: The warming effect of a tonne of methane and a tonne of carbon dioxide.

The big mistake made with this graph is that it assumes the methane emission is causing an increase in atmospheric methane when in fact it in most cases in New Zealand's context it is not. An emission of methane which is from a steady state of output that does not cause any increase in atmospheric greenhouse gas, cannot cause warming in the way the CO2 emission which is causing an increase in atmospheric greenhouse gas does. This graph only applies to emissions of methane which do cause an increase in atmospheric greenhouse gas, which New Zealand farm emissions do not do.

Market resistance to meat and dairy products.

The Commission suggests that market resistance to high emission products such as meat and dairy products could become a problem.

One point of using the split gas approach is to not overstate the impact of meat and dairy products on the atmosphere and unless our Government does more to address the misperceptions around the impact on global temperatures of our products, due to the discredited CO2 equivalence system, farmers are in trouble. New Zealand should be leading the global charge to get the science and facts about the impact of ruminant methane emissions recognized.

Other science

The Commission is required in law to *consider the available scientific evidence on the global biogenic methane emissions reductions likely to be required to limit global average temperature increase to 1.5^{o} Celsius above pre-industrial levels;*

FARM has been concerned for some time that the growing uncertainty in the assumptions about methane's role in global warming is not being considered properly. The Climate Commisison is working under legislation that clearly requires it to idre consider the science. Of particular concern to FARM are scientific papers that find that methane is irelevant as a greenhouse even if it does cause an increase in atmospheric greenhouse gas because the absorption band with which it works is overlayed by water vapour. These papers were submitted to the Climate Commission for its consideration and it has a legal responsibility to consider them. FARM seeks the Commission's considerations be included in this report.

The Commission's recommendation to increase our NDC (Nationally Determined Contributions) for the Paris agreement is an example of its failure to comprehend the problem of the CO2 equivalent system and the reason for a split gas approach.

Conclusion

The Climate Commission report in regards to methane is inadequate. It takes us no closer to settling on enduring science based policies and it perpetuates mistakes originating from the disastrous adoption of the CO2 equivalent system calculated using GWP 100. The Commission needs to rewrite the report to ensure these mistakes are removed. FARM also urges the Commission to see the

unfairness of its recommendation to make farmers pay if they do not reduce emissions that the Commission states are only required to offset CO2 emissions. FARM also urges the Commission to make clear that its methane reduction targets are not needed to address methane's impact on global warming, which in most cases is zero, but the inability of CO2 emitters to reduce their emissions.