

Appendix 5: Climate Implications of Policy Assessment: Disclosure Sheet

This disclosure sheet provides the responsible department's best estimate of the greenhouse gas emissions impacts for New Zealand that would arise from the implementation of the proposal or option described below. It has been prepared to help inform Cabinet decisions about this proposal. It is broken down by periods that align with New Zealand's future emissions budgets.

Section 1: General information

General information	
Name/title of proposal:	Agricultural emissions pricing
Agency responsible for the proposal:	Ministry for the Environment Ministry for Primary Industries
Date CIPA finalised:	
Short description of the policy proposal:	Implementing a farm-level levy on agricultural greenhouse gases by 2025, to achieve emissions reductions from agriculture in line with our legislated targets More information can be found in the following SAR: Agricultural Emissions Pricing (September 2023)

Section 2: Greenhouse gas emission impacts

Table 1 below shows the estimated impact of different agricultural pricing systems on overall agricultural greenhouse gas emissions, based on modelling conducted by Manaaki Whenua Landcare Research. Carbon dioxide emissions from agriculture were not reported as it is not a significant source of agricultural emissions.

Note this Manaaki Whenua Landcare Research modelling took account of the Emissions Trading Scheme driving afforestation, but did not incorporate the impact of other environmental policies (such as the Essential Freshwater reforms), which will also impact agricultural emissions.

Table 1 – overall impact of agricultural pricing systems on agricultural greenhouse gases¹

Option	Annual emissions impact by 2030	
	Change in GHG emissions in 2030 (Mt CO ₂ -e) <i>Relative to baseline projected emissions by 2030</i>	% Change in GHG emissions in 2030 <i>Relative to emissions in 2020 as a proxy for 2017 reference year in CCRA targets</i>
Option 1 – NZ ETS at processor-level:	8.0	-16%

¹ The modelling commissioned by officials included the impact of agricultural emissions pricing and the NZ ETS driving afforestation. It did not include the impact of the Essential Freshwater reforms and other environmental policies, which are expected to drive significant changes in farm practices and land use by 2030 (and therefore, agricultural emissions).

Option	Annual emissions impact by 2030	
	Change in GHG emissions in 2030 (Mt CO ₂ -e) <i>Relative to baseline projected emissions by 2030</i>	% Change in GHG emissions in 2030 <i>Relative to emissions in 2020 as a proxy for 2017 reference year in CCRA targets</i>
Option 2 – Levy at processor-level:	4.6	-9%
Option 3 – Levy at farm-level with sequestration incentive		
CH ₄ Price A (\$1.79/tCO ₂ -e) and a N ₂ O price of \$10.86/tCO ₂ -e:	3.1	-7%
CH ₄ Price B (\$2.86/tCO ₂ -e) and a N ₂ O price of \$10.86/tCO ₂ -e:	5.1	-10%
CH ₄ Price C (\$3.93/tCO ₂ -e) and a N ₂ O price of \$10.86/tCO ₂ -e:	5.7	-11%
CH ₄ Price D (\$5.00/tCO ₂ -e) and a N ₂ O price of \$10.86/tCO ₂ -e:	6.3	-12%

Table 2 shows the estimated impact split by the major agricultural greenhouse gases (methane and nitrous oxide) based on the Manaaki Whenua Landcare Research modelling.

Table 2 – estimated percentage emissions reductions in 2030 relative to 2020, by gas

Gas	Processor NZ ETS	Processor Levy	Farm-level levy (all options have a N ₂ O price of \$10.86/tCO ₂ -e)			
			CH ₄ Price A (\$1.79/t CO ₂ -e)	CH ₄ Price B (\$2.86/t CO ₂ -e)	CH ₄ Price C (\$3.93/t CO ₂ -e)	CH ₄ Price D (\$5.00/t CO ₂ -e)
All gases	-16%	-9%	-7%	-10%	-11%	-12%
Methane	-18%	-10%	-8%	-12%	-13%	-15%
Nitrous oxide	-10%	-5%	-3%	-3%	-5%	-5%

Table 3 below shows, for the farm-level levy option, the estimated impact of the levy per kg of output, based on a nitrous oxide price of \$10.86/tCO₂-e and at different potential methane prices. Note this is just an estimated average impact; different farms will have different relationships between emissions (and therefore, levy bill) and output.

Table 3 – impact of the farm-level levy option per kg of output

Methane Price	Impact of levy per kg of output (\$)			
	Sheep meat	Beef	Venison	Milk solids
Price A (\$1.79/tCO ₂ -e)	\$0.04	\$0.07	\$0.09	\$0.03
Price B (\$2.86/tCO ₂ -e)	\$0.05	\$0.09	\$0.12	\$0.04
Price C (\$3.93/tCO ₂ -e)	\$0.07	\$0.12	\$0.15	\$0.05
Price D (\$5.00/tCO ₂ -e)	\$0.08	\$0.14	\$0.17	\$0.06

* Results are based on the following emissions factors:

Sheep meat – 12.87kg NH₄/kg, 1.33kg N₂O/kg

Beef – 20.30kg NH₄/kg, 3.27kg N₂O/kg

Venison – 27.06kg NH₄/kg, 3.64kg N₂O/kg

Milk solids – 8.04kg NH₄/kg, 1.76kg N₂O/kg

Section 3: Additional information

Additional information

- As stated in the Supplementary Analysis Report attached to the Cabinet paper, the key finding from the modelling was that all options can meet the 2030 biogenic methane emissions reduction targets except for the lowest methane price (\$0.05/kg). We note that the He Waka Eke Noa Partnership, in their final recommendations report, indicated that a farm-level levy with a methane price of \$0.11/kg in 2025, rising to between \$0.17/kg and \$0.35/kg by 2030, should result in sufficient methane reductions to meet the 2030 biogenic methane target.
- The Manaaki Whenua Landcare Research modelling took account of the Emissions Trading Scheme driving afforestation, but did not incorporate the impact of other environmental policies (such as the Essential Freshwater reforms), which will also impact agricultural emissions.
- New Zealand also produces emissions projections as part of its reporting to the UNFCCC. These projections incorporate a range of policies that impact agricultural emissions, including the NZ ETS, the Essential Freshwater reforms, and the ETS backstop for agricultural emissions pricing. If the impact of the ETS backstop is excluded (so the projections are indicative of emissions in the absence of pricing), the latest published version of these projections (from December 2022) have agricultural methane falling by 6.2% in 2030 relative to 2017.
- Note that the baseline scenario used in the modelling is *no* pricing of agricultural emissions, which is projected out to 2030 as a business-as-usual scenario. This baseline is intended only to provide a consistent basis from which to assess the impacts of different options. The ‘true’ counterfactual is Option 1: Processor-level Pricing in the NZ ETS. This is the ‘backstop’ option that will come into effect if no other option is agreed. Note that implementing Option 1 would require further Government decisions about expenditure and development of regulations in order to operationalise.
- A key assumption is that the modelling represents well the changes that will unfold because of these policies. Also assumed are aspects such as on-farm compliance and implementation, farmer capability and willingness, that the policy is implemented well, and that the 5-year average of recent product prices represents average product prices in the study period. The modelling framework used assumes rational profit maximising behaviour and full information to make decisions. Input data from 23 sheep and beef farms and 24 dairy farms is assumed to represent these sectors in aggregate.
- The main drivers for gross agricultural emissions is feed intake which in turn is driven by the number of animals (cows, sheep, cattle etc), livestock weights, what they are fed, how they are managed, the use of fertilisers, and use of technology (e.g., inhibitors). The main driver of agricultural emission reduction

Additional information

is financial (e.g., price of levy), but also aspects such as other environment regulations, farmer capability and willingness, availability and uptake of technology.

- OECD analysis of emissions leakage from taxing agricultural emissions suggests emissions leakage rates can be expected to be higher when smaller groups of countries tax agricultural emissions and when mitigation is unavailable². For example, over 80% of domestic emissions reductions are “leaked” to offshore competitors increasing their production and emissions in one scenario where Australia and NZ tax emissions at \$100 USD per tonne CO₂e and mitigation technology is unavailable. MPI is currently doing more detailed modelling internally linked to the policy scenarios described in Section 2 above.
- Further to the assumptions listed above, uncertainty exists around the certainty provided by the science. For example, the accuracy of estimating nitrous oxide emissions is low, the impact on farm of the use of inhibitors in real situations is not well confined, the barriers to land use change may not be well understood. For example, quality input data is needed to model well the emissions. The economic modelling aims to maximise profit, where there may be other drivers limiting or controlling on farm actions.
- Peer review of the modelling indicated a range of areas in which the modelling assumptions and inputs could be improved. These were addressed where possible in the timeframes, including nuancing the application of mitigations and technologies across different farm systems (e.g. beef-only vs sheep and beef) and adjusting elasticities around the choice that farmers have between shifting land-uses versus the update of mitigations.
- Calculations and results are made at a single time point (2030) and are relative to a single base year (2020). This means the modelling is limited in accounting for and providing insights on gradual step changes in inputs and outputs over short time periods. The NZFARM modelled used, however, is as sophisticated as available in New Zealand for modelling changes to farm systems in the future, and no model was available at the farm-scale that can provide a time series.

Section 4: Summary and quality assurance

Quality assurance

- The Climate Implications of Policy Assessment (CIPA) requirement applies to this proposal as it is expected to have a significant emissions impact.
- All three pricing options are expected to support agriculture to meet its relative portion of the 2030 biogenic methane emissions reduction target to reduce methane emissions by 10% below 2017 levels, at sufficient price levels. Only the CH₄ Price A is insufficient to meet the 2030 target alone, but nevertheless achieves significant reductions that could be supported by other policies and measures. This is largely due to the land-use change that occurs at even a

² <https://www.oecd-ilibrary.org/docserver/fc304fad-en.pdf?expires=1660516464&id=id&accname=guest&checksum=05603E8528134D0AC7CBB9640BE25456>

Quality assurance

moderate price on agricultural emissions in combination with existing incentives for forestry through the NZ ETS.

- The processor-level NZ ETS option is estimated to result in the highest level of emissions reductions of the options modelled, at the highest impacts and cost to the sector. The farm-levy option is expected to result in less emissions reductions but is estimated to also meet the biogenic methane target under every price scenario that was modelled, with less impact and cost to the sector.
 - While the processor-level levy option is also expected to deliver significant emissions reductions, it is expected to fall slightly short of meeting the biogenic methane target when considered in isolation. However, in conjunction with other actions to reduce emissions from agriculture, it is likely that the biogenic methane target is met under this scenario.
 - Modelling of different options and scenarios has indicated that the emissions price is a very strong driving factor of the level of emissions reductions that are likely to be achieved through pricing agriculture emissions, regardless of which option is implemented. The actual emissions reductions achieved will also be dependent on effective implementation of the chosen option and farmer decision-making.
 - The CIPA team has reviewed the results and analysis at a high-level and considers them to be reasonable for providing indicative relative emissions impacts between the different options and scenarios modelled. Expected emissions impacts will continue to be assessed and disclosed where appropriate as proposals are advanced.
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