

# Agricultural emissions for dairy farms: the cost

Following the release of the Productivity Commission’s *Low-Emissions Economy* final report, DairyNZ CEO Tim Mackle suggested that the report’s recommendations on pricing agricultural emissions would cost an average dairy farmer “in the vicinity of \$231 800” each year (NZ Herald, 2018). Andrew Hoggard, the vice president of Federated Farmers New Zealand, repeated this claim in a Newshub interview (Bateman, 2018).

The Commission is uncertain of the assumptions DairyNZ made in generating that number. However, we can replicate an estimate of around \$230 000 per year, only by making some fairly heroic (and misleading) assumptions – in particular, that no progress is made in reducing on-farm emissions between now and 2050.

**Table 1 Replicating the DairyNZ estimate**

	Assumption/value	Source (if relevant)
<b>Farm and emissions assumptions</b>		
Average herd size (head/farm)	414	LIC & DairyNZ (2017)
Annual methane emissions per animal (t CO <sub>2e</sub> per head per yr)	2.058	MfE (2018)
Percentage of total dairy GHG emissions from methane	74%	Motu LURNZ model
<b>Emissions price assumptions</b>		
Emissions price (\$ per t CO <sub>2e</sub> )	\$200	
Percentage of free allocation for methane	0%	
Percentage of free allocation for nitrous oxide	0%	
<b>Calculation of emissions costs for an average dairy farm</b>		
Methane (\$ per farm per year)	\$170 400	
Nitrous oxide (\$ per farm per year)	\$59 900	
<b>Total (\$ per farm per year)</b>	<b>\$230 300</b>	

As described below, some of the key assumptions that need to be made to generate this number are inconsistent with the report’s findings and recommendations.

- **An emissions price of \$200 is in place** – the Commission’s modelling, included in the report, indicates that to achieve a net-zero target, emissions prices would eventually rise to between \$150 and \$250 per tonne CO<sub>2e</sub> by 2050. For a 25 Mt target (similar to net-zero long-lived gases and roughly a 20% reduction in methane), prices could rise to between \$75 and \$150 by 2050.
- **No progress is made in reducing annual on-farm emissions between now and 2050** – the report notes that many farms have scope to achieve modest but material reductions in on-farm emissions through improvements in efficiency and adoption of low-emission practices (eg, reduced use of fertiliser). The possibility also exists of new technologies emerging that can achieve emissions reductions of up to 30% (eg, a methane inhibitor).
- **Both agricultural methane and nitrous oxide face the same emissions price** – the report recommends that methane is priced in a separate pricing scheme to nitrous oxide (recommended to be included in the NZ ETS). This is especially important since methane makes up about 74% of an average dairy farm’s emissions.
- **Agricultural emitters receive no free allocation** – the report does recommend that free allocations for nitrous oxide in the NZ ETS should be phased out over time towards zero. But with methane in a separate pricing system (either a dual cap ETS or a methane quota system), farms would still receive some permits for emitting methane even in 2050.

Using the information in Table 1, we can estimate the annual emissions cost for a dairy farmer at current emissions prices and likely policy settings. With the current NZU price of roughly \$25 per tonne and with 95% of emissions permits freely allocated (as proposed by the Government), an average farm would pay roughly \$1 400 per year (Scenario A in Table 2).

The table below estimates the annual emissions cost faced by an average dairy farm under several basic scenarios. The 2030 scenario and 2050 scenarios involve differential treatment of methane emissions and nitrous oxide emissions as the Commission has recommended (but note the Commission did not make recommendations on specific levels of free allocation). Under all scenarios, the cost for an average dairy farm is considerably lower than DairyNZ's estimate.

**Table 2 Estimating the emissions cost for an annual dairy farm under different scenarios**

Scenario	Key assumptions	Annual emissions cost for an average farm
<b>Today</b>		
Scenario A	<ul style="list-style-type: none"> <li>- Methane and nitrous oxide emissions receive 95% free allocation</li> <li>- Methane and nitrous oxide face an emissions price of \$25 per tonne</li> </ul>	\$1 400
<b>2030 scenario</b>		
Scenario B	<ul style="list-style-type: none"> <li>- Methane receive 90% free allocation; nitrous oxide receives 65% free allocation</li> <li>- Methane and nitrous oxide face an emissions price of \$50 per tonne</li> <li>- The average farm reduces emissions by 5%</li> </ul>	\$8 492
<b>2050 scenarios</b>		
Scenario C	<ul style="list-style-type: none"> <li>- Methane receives 75% free allocation; nitrous oxide receives no free allocation</li> <li>- Methane and nitrous oxide face an emissions price of \$200 per tonne</li> <li>- The average farm reduces all emissions by 20%</li> </ul>	\$82 000
Scenario E	<ul style="list-style-type: none"> <li>- Methane and nitrous oxide face an emissions price of \$120 per tonne</li> <li>- Free allocation same as Scenario B</li> <li>- Same emissions levels as Scenario C</li> </ul>	\$49 200

*Notes:*

1. Assumed emissions prices and rates of free allocation are indicative and are not recommendations.

## References

Bateman, S. (2018). New report says NZ must be bold on climate emissions. Retrieved from <https://www.newshub.co.nz/home/rural/2018/09/new-report-says-nz-must-be-bold-on-climate-emissions.html>

NZ Herald. (2018). Emissions recommendations 'would penalize farmers'. Retrieved from [https://www.nzherald.co.nz/the-country/news/article.cfm?c\\_id=16&objectid=12119066](https://www.nzherald.co.nz/the-country/news/article.cfm?c_id=16&objectid=12119066)

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