Memorandum

To:	Oliver Hefford, Energy Efficiency and Conservation Authority (EECA)
Date:	16 December 2025
From:	Lou Wickham, Gerda Kuschel & Jayne Metcalfe (EIL) with Tim Denne (Resource Economics)
Re:	**Response from Authors to NZIER Peer Review of the Indoor Combustion Study**
cc:	Gareth Gretton (EECA), Andrew Neal (EECA)

The Energy Efficiency and Conservation Authority (EECA) commissioned Emission Impossible Ltd and Resource Economics to prepare a study into the health effects and costs of indoor combustion in New Zealand homes. Our report, published in September 2025 on EECA's website here, estimates the health-related costs of emissions from wood burners, gas stoves, and unflued gas heaters in New Zealand (Metcalfe et al., 2025).[1]

EECA commissioned NZIER to provide a peer review of the EIL/Resource Economics study on the impacts of indoor air pollution (Hensen et al., 2025).[2]

It appears that the matters identified by NZIER relate to version control:

- NZIER references an older version of Treasury's CBAx model; and
- NZIER has peer reviewed an earlier (June) version of the study to that published online in September.

The NZIER review states no technical errors had been identified in the study but goes on to make several **comments regarding the economic analyses.** These are summarised below, with our response in *italics*.

[1] Metcalfe J., Kuschel G., Wickham L., and Denne T., (2025). *Indoor Combustion: Health Effects and Costs*. Report prepared by Emission Impossible Ltd and Resource Economics for Energy Efficiency & Conservation Authority, June. 2025.

[2] Hensen M., Clough P., and Fitzpatrick M., (2025). *Indoor combustion health effects and costs. Peer review of estimated economic impacts.* Prepared for Energy Efficiency & Conservation Authority. Wellington. 28 November.

Comment: NZIER claim that the **value of statistical life (VoSL)** used in the study was a high value in CBAx rather than the central value. This is further repeated in the overall findings that "Policy makers should be explicitly made aware that the highest possible valuations of mortality costs are being presented."

Response: *This is incorrect. The latest CBAx model makes clear that the $12.5 million in 2021 $ values is the midpoint for Value of Statistical Life (VoSL).*

Comment: NZIER suggest that the central assumption should have included **cessation lag** assumptions to take account of marginal impacts, rather than unlagged effects. NZIER also questions the assumptions implicit in the US EPA lag formula.

Response: *As with HAPINZ 3.0, the primary task was to estimate the current cost associated with indoor air pollution rather than the marginal impacts of removing an appliance. Marginal impacts from reduced numbers of gas appliances should use the lagged impacts.*

Comment: NZIER questions the US EPA methodology for estimating cessation lag, the absence of any discussion of the age of those affected by indoor air pollution, which might affect the VoSL, and the absence of any review of literature that has assessed directly the **willingness to pay** for reduced air pollution.

Response: *These issues were discussed in some depth in the HAPINZ 3.0 report (by the same authors of this indoor air pollution study). NZIER is correct to note these uncertainties. Usefully they would be the subject of additional research but this study was not the right place to address these issues in any depth. The study employed the same approach as was used n HAPINZ 3.0, and other widely used assumptions (such as the US EPA cessation lag assumptions), to provide an estimate of costs.*

Comment: The lack of consideration of **VoLY consistency** with other CBAx life year measures such as QALY.

Response: *The VoLY calculation used the same approach as was used in HAPINZ 3.0, including low and high values.*

NZIER also identified some **minor discrepancies between calculations and reported figures** in the version of the report and model they reviewed (June 2025) but noted that "none of these errors substantively effect the overall analysis." For completeness, these are listed overleaf together with our response in *italics*.

Page no	Comment	Response
p26	**Table 6: VoLY values for sensitivity analysis** - The central VoLY 2025$ should be $914,487, rather than the presented $914,488.	*This is not an error. The difference is due to rounding*
p27	**Table 7: Morbidity values for sensitivity analyses** - HAPINZ 3.0 table 21 'Default values, plus their associated ranges, used in the HAPINZ 3.0 Health Effects Model (costs in 2019 NZ$)' has the unit of measure for asthma hospitalisations as per admission rather than the reported $ per case.	*The descriptor is "asthma hospitalisation" so a case is a hospitalisation.*
p29	**Table 9: Circumstances under which lagged or unlagged values are used** - A 2% discount rate as a percentage of unlagged effect to be 93.3% (rather than 93.4%). Similar across 5% and 8% discount rates.	*This is not an error. The difference is due to rounding*
p29	**Table 10: VoSL and VoLY values for policy analysis using the USEPA lag structure and a 2% discount rate** - Irrespective of the percentage of unlagged effect, lag rate used, Table 10 contained inconsistencies. These calculations are unable to be confirmed.	*The inconsistencies have not been identified by NZIER. We have not identified any. The comment may relate to the June rather than September version.*
p31	**Table 12: Annual indoor air pollution costs by appliance** - Gas stove total reported inconsistently between model and report	*The very small difference is due to rounding*
p32	**Table 15: New Zealand annual indoor air pollution impacts by appliance** - Asthma prevalence (<18 years) reported inconsistently between model and report	*There is no difference in the final report/model (dated Sept 2025). A correction was made to the earlier (June) version of the report*
p33	**Table 17: Effect of exposure increments on the total annual indoor air pollution costs by appliance** – Gas stove and gas unflued heater reported inconsistently between model and report	*The very small difference is due to rounding*
p34	**Table 18: Effect of household composition on the total annual indoor air pollution costs by appliance** - Gas stove reported inconsistently between model and report	*The very small difference is due to rounding*