emission: Impossible

Memorandum

From:	Louise Wickham
Date:	4 July 2013
То:	Council of Australian Governments Standing Council on Environment and Water
via email:	scew.secretariat@environment.gov.au

Please find attached my personal submission. It includes hyperlinks – if you have any problem with these let me know and I will provide full references.

I have endeavoured to be constructive in my comments based on my experience regulating wood burners in New Zealand. I welcome the opportunity to discuss this submission in more detail – please do not hesitate to contact me if you have any questions. My contact details are below.

Regards,

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1.0 Background

1. This submission was prepared by:

Name:	Louise Wickham
Area of expertise:	Air Quality
Experience:	20 years
Qualifications:	Bachelor of Chemical and Materials Engineering, University of Auckland

Masters of Environmental Law, University of Sydney

2. Louise has the following relevant work experience.

Louise was the New Zealand Ministry for the Environment's senior adviser on air quality between 2004 and 2011. During this time, Louise assisted the Ministry with the introduction and implementation of the *Resource Management (National Environmental Standards for Air Quality) Regulations 2004*. In 2009, Louise assisted the Ministry with a review of the regulations that culminated in the *Resource Management (National Environmental Standards for Air Quality) Amendment Regulations 2011*. Prior to that Louise led the 2006-08 national audit of wood burners in New Zealand.

Prior to joining the Ministry for the Environment, Louise managed the review of the *Clean Air* (*Plant and Equipment*) *Regulation 1997* for the New South Wales Environment Protection Authority in Sydney, Australia. Prior to this Louise was an air pollution engineer for several consultancies in New Zealand, the United Kingdom and Australia.

Since April 2011, Louise has been a senior air quality specialist for Emission Impossible Limited in Auckland.

3. This submission was peer reviewed and is supported by:

Name:	Dr Gerda Kuschel
Area of expertise:	Air Quality
Experience:	28 years
Qualifications:	Bachelor Chemical and Materials Engineering (Hons I) University of Auckland
	PhD Chemical & Materials Engineering University of Auckland

Fellow and Life Member, Clean Air Society of Australia & New Zealand

4. Gerda has the following relevant work experience.

Gerda is a chemical engineer with 28 years' experience working for a broad range of industries including oil & gas processing, metal smelting, research & development, government agencies, and environmental consulting in Australasia. In 2008, she set up **Emission Impossible Ltd** with Jayne Metcalfe to provide specialist advice to a range of clients on the improved management of air quality and vehicle emissions. Recent career highlights include:

- Lead author and project leader on the <u>Updated Health and Air Pollution in New Zealand</u> <u>Study</u> (2012) for the Health Research Council of New Zealand;
- Lead author on the <u>National Air Quality Compliance Strategy to meet the PM₁₀ Standard</u> for the Ministry for the Environment; and
- Co-author on the <u>2011 Users' Guide to the revised national environmental standards for</u> <u>air quality</u> for the Ministry for the Environment.

Gerda was employed by NIWA for nine years as an air quality researcher and as the Principal Scientist/Group Manager for the Urban Air Quality & Climate team. In 2004, Gerda moved to the Auckland Regional Council where she worked as a senior technical specialist in Air Quality Policy developing the council's implementation plan for the Air Quality National Environmental Standards. She was later appointed to set up the Environmental Sustainability team to coordinate Auckland's response to climate change and energy issues.

Gerda is a past President of the Clean Air Society of Australia and New Zealand and has published more 300 technical papers and general articles on air quality and environmental sustainability.

5. This submission is also supported by:

Name:	Jayne Metcalfe
Area of expertise:	Air Quality
Experience:	19 years
Qualifications:	Bachelor of Chemical and Process Engineering (Hons II) University of Canterbury
	Masters of Chemical and Process Engineering University of Canterbury

6. Jayne has the following relevant work experience.

Jayne is a chemical engineer with 19 years' experience in air quality management. In 2008, she set up Emission Impossible Ltd with Gerda Kuschel.

Jayne has been involved in the development of a range of air quality guidance documents and tools including:

- Development of an air quality screening tool for NZTA
- Co-author of the MfE Good Practice Guides on Assessing Discharges to Air from Industry and from Motor Vehicles.
- Primary author of the draft Auckland Council Guidance for the Use of Background Air Quality Data in Resource Consent Applications.

Jayne is also the primary author of a number of domestic fire and motor vehicle models and reports, which provide technical support for the development of policy in Auckland.

While Jayne was employed with the Auckland Regional Council, she was involved in all aspects air quality management including: policy development; processing and peer review of resource consents; management and reporting of the ambient air quality network and development of emissions inventory.

1.1 Declaration

- 7. I have significant experience in regulating wood burners in New Zealand. Through my participation on CS-62, the technical committee that oversees AS/NZS 4012 and 4013, I also have a good understanding of the commercial and regulatory environment for wood burners in Australia. I have regulatory experience with industrial air quality through my time with NSW EPA and technical expertise through numerous years of consultancy in Australia, New Zealand and the United Kingdom.
- 8. I have no commercial interest in this matter. I offer this submission on a personal basis, as an ex-regulator with an abiding desire to improve air quality.

2.0 Submission

9. Regulating domestic emissions to air is not easy. The most timorous of citizens can become a towering inferno of indignation when governments presume to intrude on their inner sanctum. Give me a bellicose cotton ginner from Queensland any day over an outraged homeowner from central Otago! My point is that nobody likes to being told what to do and this is especially true of rules that intrude into our private homes. This means that domestic regulation is always going to be extremely unpopular.

- 10. This also means that domestic regulation should only be undertaken where there is a clear and demonstrable need to do so. Unfortunately, in my view, this RIS does not demonstrate a clear need for national regulation;
 - Exceedances of the national standard for PM₁₀ due to wood smoke appear to be episodic and limited to Port Phillip and Canberra (Table 3.1, page 23).
 - The existing regulatory framework is not clearly defined which makes it hard to understand the base case. There is currently no national regulation of wood burners in Australia. This is not clear from repeated (incorrect) references to Australian/New Zealand 'standards' (please refer Appendix 1 of this submission). This also makes a proposed national regulation kind of a big deal.
 - The 2003 audit revealed existing, state-based, regulation to be largely ineffective (Appendix 5, page 106) due to non-compliance. This is a strong driver for introducing national regulation and deserves more space in the RIS.
 - Figure 4.1 (page 31) implies there would be greater gains from improving compliance with the existing regulations, than introducing a new national regulation.¹
- 11. I want to be very clear I am not saying that there is no need for national regulation of wood burner emissions. Rather, I am saying that *this RIS* does not demonstrate a clear need for national regulation of emissions from wood burners.
- 12. The RIS looks like it was prepared for a committee that kept changing its mind. There are far too many options under consideration. It is not possible to make any meaningful comparison between options because each option differs substantially.
- It is further unfortunate that there is such a long time lag between the date of report preparation (2010/2011) and its publication (2013). The RIS would benefit from more recent monitoring, and particularly more information on PM_{2.5}.
- 14. Key failures of the RIS:
 - There is no quantification of anticipated health benefits under any scenario (i.e. premature deaths avoided, reductions in hospital admissions, reduced restricted activity days, reduced doctors' visits, etc.)
 - There is no estimate of the impact the different options will have on compliance with the NEPM for PM_{10}

¹ This figure is misleading because it neglects the vast quantity of existing wood burners that actually impact on emissions (as opposed to new standards which only impact on new burners).

- There is no estimate of the impact the different options will have on compliance with the future NEPM and/or existing guidelines for PM_{2.5}
- There is no real consideration of only targeting areas in need as opposed to national regulation.
- 15. The RIS also fails to address an important legal requirement, the Trans-Tasman Mutual Recognition Arrangement (TTMRA) between Australian and New Zealand. The TRMRA specifically overrides product standards (such as a proposed national regulation for wood burners) and requires that:
 - A good that may legally be sold in Australia may be sold in New Zealand; and
 - A good that may legally be sold in New Zealand may be sold in Australia.

COAG wrote the Users Guide for the TTMRA, I would expect a RIS to address this.

16. Other, minor technical issues are discussed in Appendix 1.

2.1 Recommendations

Why

- 17. I recommend you come up with a clearer rationale for action. PM₁₀ and PM_{2.5} monitoring combined with comprehensive inventories and source apportionment will clearly define the extent of the wood smoke problem in urban areas of Australia.
- 18. I recommend greater honesty about the need for national regulation. The truth is that it will be better for industry. It is in industry's interests to have clear, (preferably easy to meet), rules that apply everywhere in Australia. So much so that even the Australian Home Heating Association (hardly a bastion of support for government intervention) supports national standards – hence their current proposals to Standards Australia to revise AS/NZS 4013.
- 19. Remember domestic regulation is extremely difficult and unpopular. There is no public health rationale for limiting emissions from wood burners installed in the outback. But a level playing field will benefit Australian manufacturers and this is a good rationale for national regulation.

How

- 20. The NEPC has a <u>well-documented methodology for cost benefit analysis</u> that does not appear to have been followed in this RIS. Why?
- 21. I recommend you quantify emissions and their health impacts in a transparent and robust manner. I recommend employing the NEPC cost benefit methodology.

What

- 22. I recommend a clearer, simpler set of options for consideration. National rules are blunt instruments and their limitations needs to be recognised. What works well in New Zealand (and I suspect what would work well in Australia) is a set of bottom line, easy to meet, national rules that focus (only) on the big-ticket items.
- 23. Whatever standards are set, it is important to include efficiency as well as emissions.
- 24. If you don't limit emissions **and** efficiency then there is a risk of perversely incentivising a wood burner that meets the emission limit (grams per kilogram of wood burnt) but still has high emissions (grams per hour) because it has very low efficiency (i.e. lots of wood being burnt per hour).
- 25. I recommend adopting a NEPM, as opposed to other alternatives. This provides the clearest legal link between the rationale of improved public health and a level playing field for industry through the desired outcome of better air quality.
- 26. I recommend regular national audits of wood burners against the (new) national standards. After all, there is no point in having national regulation if you are not going to enforce it.
- 27. Make sure you gain agreement with industry on the protocols for the audit *before* you carry out the audit. <u>Done well</u>, national audits will also address subsidiary issues such as controls on modification, installation and second hand burners.
- 28. I recommend independent testing and national certification. In my view, self-certification has not worked in Australia. Regulators don't even have access to test drawings on which to conduct audits. This is a real waste because *good* regulation is good for business.²
- 29. Alternatively, in New Zealand representative local government (two regional agencies on behalf of all 16 regional agencies) undertakes certification of wood burners.³ The results are publicised nationally by the Ministry for the Environment on a <u>national list</u>. The regional agencies recover costs directly from industry. The compliance assessment follows a <u>national protocol</u> published by the Ministry for the Environment, in partnership with the two regional agencies.
- 30. The costs for the New Zealand certification system are relatively low. I imagine industry in Australia would look favourably on a similarly lean approach.

² Please note the qualifier in that sentence – I define good regulation as being clear, simple and enforceable.

³ Nelson City Council and Environment Canterbury.

Where

- 31. We have national design standards for wood burners in New Zealand that work pretty well as a minimum baseline. Importantly, however, they only apply to urban areas because these are the only areas that experience problems with air quality due to wood burners.
- 32. I recommend COAG either:
 - regulates nationally for the lowest common denominator. i.e. Adopt the Australian Home Heating Association reform proposal to Standards Australia as a national rule (all new wood burners must meet a maximum emission limit of 2.5 grams of particulate for every kilogram of wood burned as measured in accordance with AS/NZS 4013:1999); OR
 - regulates more stringently but only in urban areas that do not comply with the Australian standards and guidelines for PM₁₀ and PM_{2.5} ('polluted areas'). i.e. Adopt the New Zealand design standards in polluted areas (all new wood burners must meet a maximum emission limit of 1.5 grams of particulate for every kilogram of wood burned as measured in accordance with AS/NZS 4013:1999).
- 33. In both cases, I also recommend specifying a minimum efficiency of 65 per cent. This is not a particularly high threshold to meet.
- 34. This will support the intent of the TTMRA.

Details

- 35. I recommend careful consideration over the definition of a wood burner. For example, it makes no sense to impose stringent performance requirements for new wood burners installed in certain areas if new, solid-fuel open fires are still permitted.
- 36. Similarly, I query the inclusion/exclusion of coal and/or multi-fuel burners. These are not discussed anywhere in the RIS and, given the abundance of cheap coal in Australia, this could be a significant oversight. Coal and multi-fuel burners are disproportionate polluters and typically considered 'low-hanging fruit' from a regulatory perspective.
- 37. I also recommend careful consideration over the treatment of wetbacks when it comes to an efficiency standard. I spent a considerable amount of time defending the (arguably indefensible) 65 per cent requirement for **all** wood burners in New Zealand when we first introduced it in 2004.⁴ At this time, no wood burner with a wetback could meet the standard. However, all opposition melted away the minute the first wood burner with a wetback that could meet the standard hit the market place (in around 2009?). I found this most instructive for dealing with industry concerns.

⁴ AS/NZS 4012 only includes space heating efficiency, which specifically excludes heat given to a wetback.



38. Nelson City Council is the best air quality regulator in New Zealand – as demonstrated by Figure 1 below.

Figure 1 Maximum daily (red) and annual (blue) PM₁₀ in Nelson, 2001 - 2012

Source: Nelson City Council, 2012

39. The key source of air pollution in Nelson, is domestic wood burners. I highly recommend the Nelson City Council <u>home heating tips</u> webpage. The page includes a number of resources including clean home heating methods and better burning tips. This is an easy to use resource for the public. It also outlines the <u>Good Wood scheme</u> – an innovative and business friendly approach to improving the quality of wood being burnt.

Appendix 1 Minor technical details

AS/NZS 4013 'standards'

- There is a misconception over the role of AS/NZS 4013 that I feel compelled to correct. The purpose of AS/NZS 4013 is **not** to improve the performance of wood burners (Section 2.4, page 18). Rather, the purpose of AS/NZS 4013 is to **standardise** testing of particulate emissions so that:
 - The test is repeatable (within specified limits);
 - The test is reliable (within specified limits); and therefore,
 - The test provides an indication of particulate emissions performance so that we can compare different wood burners with one another in a meaningful way.
- 2. For a batch-fed appliance such as a wood burner that comes in a variety of shapes and sizes, this is actually quite hard to do. This is why AS/NZS 4013 controls (to such a high degree of specificity), the size and moisture content of wood, the quantity of wood, the way it is loaded in relation to the (multi-sized and shaped) combustion chamber and how the burner itself is operated.
- 3. The upshot of which is that, in my view, AS/NZS 4013 is an extremely good method. It rigorously and robustly defines particulate emissions performance for batch-fed wood burners in the laboratory. We will always have to provide adjustment factors to translate laboratory performance into real-world emissions. This is because defining real-world performance is not the purpose of the laboratory test method.
- 4. I consider AS/NZS 4013 superior to European and American test methods which often only measure combustion efficiency (e.g. carbon monoxide) and do not measure the full gamut of operational behaviour (i.e. low, medium **and** high fire).
- 5. In any case, the RIS assumes a direct correlation between laboratory and real-world performance and uses adjustment factors to establish the relative performance of various options. This is a reasonable assumption considering the wide population of burners over which emissions factors are then applied. However, in doing so it contradicts its own criticisms regarding real-life performance versus test performance.
- 6. The point of all this is that it is important not to be distracted by differences between reallife performance of wood burners compared with tested performance in the laboratory. Yes, it is possible to have poor performance from a "clean" wood burner (simply by using wet, green wood). Equally it is possible to have good performance from a "dirty" wood burner (by providing lots of air and burning dry, seasoned wood). The important thing to remember is that:

- Particulate emissions from wood burners only cause air pollution when there are, at a minimum, hundreds of wood burners.
- When there are hundreds of wood burners, individual performance is smoothed into overall, general performance; and
- Laboratory test performance is a good indicator of overall, general performance which is why we use this test method (i.e. to meaningfully compare different burners with each other).
- 7. None of the above abrogates the need for future improvements to AS/NZS 4013 to better reflect real-life performance. It simply underlines the importance of retaining repeatability and reliability in the laboratory test method. It also underlines the importance of using adjustment factors to translate emissions inventories into real-life measured ambient particulate levels.
- 8. Appendix 4 (page 96) states that AS/NZS 4013 measures particles greater than 0.3 μ m in diameter. Please provide a reference for this statement.
- 9. Appendix 4 states that the Australian/New Zealand standards are industry performance standards that simulate 'correct' wood burner operations. In fact, as described above, the standards simulate 'repeatable' wood burner operation.

Costs

Economic impacts of policy options (section 7.3, page 56)

10. Please state the year for which net present value has been calculated.

Costs of testing (Table A7.8, page 144)

11. COAG may wish to consider using New Zealand laboratories for testing to AS/NZS 4013:1999 and AS/NZS 4012:1999. There are two IANZ accredited laboratories in New Zealand that only charge NZD\$ 6,000 per model compared with AUD\$ 10,000 in Australia. This is significantly cheaper - even allowing for additional freight costs.

Costs of labelling (page 149)

 The RIS estimates the administrative cost of developing a labelling standard at AUD\$100,000. This is not needed. AS/NZS 4012:1999 already specifies label requirements for wood burners.

Presentation

 The use of <u>pie charts is inappropriate</u> (page 55) for the reduction in emissions by location. This information would be much more accessible on a bar chart.