Consultation regulation impact statement (CRIS) for reducing emissions from wood heaters

No safe level of PM2.5 pollution

PM2.5 (tiny particles less than 2.5 microns) are so small they behave like gases and infiltrate homes even when all doors and windows are shut. They penetrate the deepest recesses of our lungs and are considered the most health-hazardous air pollutant, responsible for 10 to 20 times as many premature deaths as the next worst pollutant, ozone. There is no safe level of PM2.5 pollution. The World Health Organisation notes that "In the absence of a threshold ... health benefits will result from any reduction of PM2.5 concentrations, whether or not the current levels are above or below the limit values."[1]

Woodsmoke is the major source of PM2.5, even in Sydney's mild climate where only 5% of households use wood as the main heating



Monthly PM2.5 emissions in the Sydney region

The NSW EPA graph (<u>www.epa.nsw.gov.au/images/air/SydneyPM25Woodsmoke.jpg</u>) clearly show that, even in Sydney's mild climate, where only about 5% of households use wood as the main form of heating in 2011[2], residential wood heaters are responsible for the lion's share of emissions of the most health-hazardous air pollutant, PM2.5. The NSW's Economic analysis concluded that woodsmoke is an **\$8 billion** health problem.[3]

Sydney's particulate pollution responsible for up to 1,400 premature deaths per year

In 2006, press reports of a study into the health effects of particulate pollution noted that that Sydney's polluted air contributes to the deaths of up to 1,400 people a year: http://www.smh.com.au/news/National/Sydneys-polluted-air-killing-hundreds/2006/09/11/1157826879240.html One report from this study confirmed that "both particulates and deaths are higher in winter"[4]. Because of the serious effects on health, CRIS proposals to reduce woodsmoke PM2.5 emissions by only about 10% over 20 years are totally inadequate. New proposals are therefore needed to meet the Government's duty and responsibility to use all cost-effective measures to protect the public from this major, unnecessary health-hazard created by a small proportion of households.

NSW Woodsmoke control report: top 3 measures better than any CRIS options

The NSW Woodsmoke Control Report (NSWWCR) shows that 3 simple measures could save \$6 billion of the estimated \$8 billion health costs in NSW.[3] These 3 measures are supported by the UN Environment Program & World Meteorological Association (UNEP/WMO) recommendations to phase out wood log-burning heaters in developed countries to reduce global warming as well as improve health.[5] Although the Federal wood heater CRIS did not consider the NSWWCR and UNEP/WMO analyses, the NSW cost-benefit study can almost certainly be scaled up to the rest of Australia. The 3 most cost-effective measures in the NSW (Table 1, below) should reduce health costs Australia-wide by nearly \$20 billion. These effective measures should be adopted instead of the totally inadequate options in the CRIS, which, at best, will reduce health costs by an insignificant \$0.75 to \$1.8 billion. The reality may be even worse. Measures similar to the CRIS proposals have been tried in Armidale, NSW. Despite public

expenditure of hundreds of thousands of dollars and emissions limits for wood heaters of 2.5 g/kg in new houses and 3.0 g/kg in existing households, Armidale's woodsmoke measurements in 2012 were worse than 1999 – see graphs on page 7. The 3 most cost-effective measures in the NSWWCR are much more likely to be successful because they build on the successful approach in Launceston, which achieved major health benefits by replacing wood heaters with alternatives.

Major health benefits from reducing woodsmoke

Woodsmoke is a very a serious health problem. When the number of households using wood-burning stoves in Launceston fell from 66% to 30%, wintertime particulate pollution fell by 40%. Deaths from cardiovascular diseases in winter fell by 20% and respiratory deaths by 28%. On a year-round basis, male mortality fell by 11.4 per cent, with reductions of 17.9% in total cardiovascular deaths and 22.8% in respiratory deaths[6, 7]. These benefits are so large and significant that very few people would consider wood heaters worth the large increase in early deaths from heart and lung diseases.

The toxic PAH pollution in woodsmoke has also been linked to genetic damage in babies, reduced IQ as well as behavioural problems such as anxiety and attention problems when children start school – <u>http://woodsmoke.3sc.net/pah</u>.

Two Canadian studies reported serious health effects of woodsmoke at 10 ug/m³ PM2.5[8, 9] – less than half the current Australian advisory standard of 25 ug/m³. Another Canadian study with median PM2.5 concentrations of 7.3 ug/m³ showed an increase of 3 ug/m³ was associated with a 9% increase in deaths from ischemic heart disease and 3-4.5% increases in all deaths.[10] In Quebec, woodsmoke accounts for 61% of fine particle emissions.[11]

In Armidale, NSW, woodsmoke concentrations were noted to increase 4-fold within 40 metres, indicating that even individual wood heaters can cause serious health problems for neighbours.[12]

There is no safe level of PM2.5 pollution. The CRIS estimates that health costs of PM pollution range from \$113 per kg of emissions in smaller regional centres such as Wagga and Armidale to \$263 in capital cities. CSIRO research showed that real-life emissions of new heaters average 10 grams PM2.5 per kg firewood. With estimated firewood consumption of about 4 tonnes per year in colder regional areas and at least 2 tonnes per year in capital cities, *the annual health costs of a new wood heater average about \$4,520 per year in regional areas and overt \$5,250 in capital cities.*

How could it possibly be in the public interest to continue to allow the installation of new heaters with such extraordinary health costs?

Importance of preventing the problem from getting worse

People who understand the impact of such major health problems are unlikely to choose wood heating just to save a few dollars per year and will not want to live downwind of a another household's wood heater, especially one installed without permission or consultation.

An immediate moratorium on installing new heaters in urban areas should therefore be introduced until a new health-based standard has been developed for wood heaters.

Anecdotal evidence suggests that wood heater use is increasing, because of increasing gas and electricity prices. *Immediate action is therefore required* to prevent the pollution problem from getting even worse by continuing to permit installation of wood heaters that have estimated health costs of \$4,000 or more per year. A moratorium on the installation of new heaters is the only viable option while the RIS is being revised to discuss the estimated health costs of new heaters in urban areas, and what level of health costs might be considered acceptable.

Other options, such as public education programs on correct operation of wood heaters, and limiting the emissions rating of new wood heaters (e.g in Armidale to 2.5 g/kg for new houses and 3.0 for older houses) seem to have very limited success. Despite considerable time, effort and expense, the graphs on page 7 show that measured pollution levels in Armidale were higher in 2008-12 than in 1999, the year of a University of New England research project showed a significant relationship between woodsmoke pollution and visits to Armidale GPs for respiratory problems.

A new independent health-based standard

The current wood heater standard was set with the involvement of the wood heating industry, not independent health experts. Governments don't consult the tobacco industry about regulating cigarette smoke, so why should the wood heating industry be consulted about regulating wood heater emissions, which were found to cause 12 to 30 times as many mutations and tumours in bacteria and mice as the same amount of cigarette smoke? A new health-based standard, set by independent health authorities, should therefore be developed as soon as possible.

With health costs of \$263 per kg PM2.5 in capital cities, standards for new diesel cars (required to emit less than 0.005 g/km, i.e. 0.1 kg per year if travelling 20,000 km) were justified on health grounds, despite the additional \$980 cost per vehicle[13]. If the same principles applied to wood heaters, the health costs of heaters emitting substantially more PM2.5 per year than the average new diesel car would probably be considered unacceptable.

Standard can be set using health cost vs benefits of 1 wood heater

As noted above, there is no safe level of PM2.5 emissions, so every additional kilogram of emissions has additional health costs. Table 2 (below) uses estimated health costs of emissions to conclude that even heaters rated 1.5 g/kg by the current AS4013 test

have estimated health costs of over more than \$3,000 in Wagga and \$6,000 per year in Sydney and Melbourne. This information can be used to set an appropriate health-based standard, and should be used by the CRIS to determine the most appropriate policy options. If the above health costs are considered acceptable, the CRIS should explain why. If not acceptable, the CRIS should report what level of health costs per heater would be considered acceptable, and provide revised options that would be acceptable to all parties, including people living near to wood heaters, or ones that might be installed nearby in future.

Once the new standard has been set, the moratorium would be lifted to allow the installation of new heaters satisfying the healthbased standard.

Heaters not meeting the desired standard should be removed before houses are offered for sale, or (for houses not offered for sale) 10 years after installation.

A 'polluter-pays' tax should also be levied on heaters that do no meet the desired standard to discourage their use and fund woodsmoke-reduction programs and replacement of heaters that are affecting people's health.

Problem heaters that affect people's health or lifestyle

Currently, there are no effective measures to deal with problem heaters, especially those that have a major impact on people's health or lifestyle and were installed without permission of neighbours <u>http://woodsmoke.3sc.net/experien</u>

These problems remain unresolved because local councils have neither the expertise nor the resources to deal with them. The NSW EPA website says:"If you can see or smell smoke from your wood heater then you are causing a problem for yourself, your family and your neighbors" - http://epa.nsw.gov.au/woodsmoke/

In a civilised society, neighbours would not have to put up with ill health or reduced life expectancy because of a neighbour's pollution. Councils have no powers to take action unless they witness a 10 metre plume of smoke, as part of continuous visible emissions lasting at least 10 minutes. Nothing can be done about a 9 metre plume lasting all day, despite the obvious hazard to health. The equivalent rule for vehicles is visible emissions lasting for just 10 seconds. New provisions are required to ensure action is taken to solve woodsmoke problems if there is medical advice that a person's health has been affected, if continuous smoke is visible for more than 30 minutes (for which video evidence should be considered acceptable), or if PM2.5 measurements exceed 10 ug/m³ above background level on the neighbour's property. Because many of the problems occur at night, all residents should have access to a 24-hour hotline, funded by 'polluter-pays' levies on wood heater use. If the offending heater is less than a few years old, the retailer and installer should be required to remove it and refund the purchase price and installation cost. For older heaters, wood heater levy funds should be used repurchase all wood heater at the purchase price, less 10% for every year since its installation.

NSW Woodsmoke Control Options Report

The NSW Woodsmoke Control Options report considered 3 measures that together would reduce woodsmoke health costs by 75%. These were: removal of existing heaters that do not meet a health-based standard when houses are offered for sale, not allowing the installation of new heaters that do not meet a health-based standard and taxes and licencing fees to cover the cost of woodsmoke-reduction programs and assisting people whose health or lifestyle has been affected by woodsmoke.

	Health Benefit \$million	Cost \$million	Net Benefit \$million
4) Phase out at sale of house	\$4,015	-\$36	\$3,978
2) Ban on heater sales	\$2,206	-\$134	\$2,071
7) Licensing fees	\$1,267	\$11	\$1,278
6) Sales tax on new wood heaters	\$1,049	-\$1	\$1,048
9) Cash incentive phase out	\$879	-\$12	\$867
8) Levying an excise/tax on biomass fuels	\$419	\$36	\$455
5) Fuel moisture content regulations	\$399	-\$33	\$366
3) Emission standards (3g/kg, 60% efficiency)	\$301	-\$3	\$298

Table 1. Estimated health benefits and costs of woodsmoke control options in NSW

Source: Tables 26 and 28, AECOM Office of Environment & Heritage: Economic Appraisal of Wood Smoke Control Measures[3]

Woodsmoke NEPM (National Environment Protection Measure)

It seems likely that a woodsmoke NEPM will be needed to solve the problems of woodsmoke pollution. The NEPM should be set up with specific goals and targets, e.g. provision of the 24-hour hotline to deal with health-hazardous emissions from neighbours, a target of a 90% reduction in woodsmoke within 10 years, and no evidence of woodsmoke detrimentally affecting public health. Given the Canadian research of significant health impacts at exposure of 10 ug/m³, this level of pollution should be considered the absolute maximum acceptable level, with much lower levels to be achieved whenever possible. **...**

Additional Information/Recommendations & Answers to Questions Precautionary Principle

Regulations should be guided by the precautionary principle – if there are serious doubts about the safety of an activity, it should not be permitted unless there are clear benefits outweighing the safety considerations.

Australian wood heaters are estimated to emit 40,000 tonnes of particulate air pollution – with total estimated health costs (\$8 billion in NSW) nearly 4 times greater than traffic pollution. The table below shows the alarming estimates in the Consultation Regulation Impact Statement (CRIS) of the health costs – *thousands of dollars* per wood heater per year – of new wood heaters in urban areas. The CRIS reports no offsetting benefits - buying firewood is very expensive – over \$1,000 per year in Melbourne, a city where Matthew Wright, chairman of 'Beyond Zero Emissions' recently replaced gas heating with electric heat pumps. Matthew's system delivers 10 units of heat for every unit of electricity, causing less than a sixth the global warming of a typical new wood heater in Melbourne, with running costs less than a tenth the cost of buying firewood.[14, 15]

cost of alternative heating (an efficient reverse cycle heat pump).							
Table 2. Estimated annual cost of heating per household (selected locations) and estimated health costs compared to t	ne						

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	Firewood Price	Wood use tonnes ^a	Annual wood heating cost ^a	Annual health costs New wood heater ^b		Annual cost: whole- house heating with
	(\$/tonne) ^a			А	В	efficient heat pump
Tasmania	\$150	10.28	\$1,540	NA	NA	\$500 - \$700
Sydney	\$380	3.43	\$1,300	\$7,938	\$6,044	\$150 - \$300
Wagga Wagga	\$180	4.08	\$730	\$4,057	\$3,089	\$300 - \$600
Melbourne	\$300	3.75	\$1,130	\$8,679	\$6,608	\$150 - \$300
Perth	\$270	3.09	\$830	\$7,151	\$5,445	\$150 - \$300

^aPrice, wood use and annual wood heating costs from Table 2.2 of the consultation RIS (CRIS) <u>http://www.scew.gov.au/strategic-priorities/clean-air-plan/woodheaters/index.html</u> ^bAnnual Health costs based on CRIS Table 3.2 – \$263,000 per tonne in capital cities and \$113,000 per tonne in Wagga. Real-life emissions calculated from Table 18, of the NSW OEH economic appraisal of wood heater control options. A: wood heaters rated < 3 g/kg have real life emissions = 8.8 g/kg; B: heaters rated < 1.5 g/kg have real life emissions = 6.7 g/kg).[3] ^cEfficient heat pumps in Sydney, Melbourne and Perth can deliver at 10 units of heat to a home for every unit of electricity used.[14]

With much better, cheaper ways of heating homes, the government's primary role should be protect public health. The current regulations clearly failed elderly residents in the Sydney suburb of Pittwater, when their "*next door neighbour installed a new and approved wood burning heater in 2010*" – see <u>http://woodsmoke.3sc.net/experien</u> *The smoke "immediately entered most rooms of our old, renovated house. My wife's asthma was triggered by the smoke and last winter she developed bronchitis and needed multiple treatments with antibiotics.* As well as suffering health problems, the couple was forced to seal all doors and windows and spend \$7,000 installing reverse cycle heating because they could no longer use their flued gas heater (which draws in outside air to replace that discharged up the flue). Although these measures helped, they would "*dearly love to again turn on our gas log fire, be able to open a bedroom window at night, enter through our front door and to tend our garden during the winter*".

The proposed CRIS provides no estimates of the cost of problems such as the above, and does nothing to prevent them from happening in future. There is no discussion of why heaters with estimated health costs of thousands of dollars per year should be allowed when there are much cheaper and better ways of heating homes. Nor does the CRIS say why Australians have to wait until 2018 for a limit 1.5 g/kg, when NZ was able to introduce it in 2005. What is the health cost of this delay compared to the benefit?

No safe level of PM2.5 pollution

There is no safe level of PM2.5 pollution – the costs in Table 1 apply irrespective of whether air quality standards are met or whether wood heaters are major contributors to poor air quality. Even relatively low levels of woodsmoke pollution (in areas that meet current air quality standards) cause major health problems. Recent research compared residential areas with wintertime woodsmoke averages of: A) less than 6.8 ug/m³, B) 6.8 to 10 ug/m³ C) more than 10 ug/m³. After adjusting for the effect of black carbon, NO₂ and other PM2.5 exposure, people living in areas with winter woodsmoke of more than 10 ug/m³ had a 15% higher risk of COPD (chronic obstructive pulmonary disease).[9]

. . ..

...

A national program to reduce the health damage from breathing woodsmoke is therefore required in all urban areas, whether or not wood heaters are demonstrably a major contributor to air quality problems. Estimated health costs of a single wood heater in an urban area surrounded by other houses do not depend on whether other houses use wood heating. In fact, the case for removing a single wood heater detrimentally affecting the health and lifestyle of several neighbours using non-polluting heating is arguably greater than the case for removing wood heaters elsewhere.

The CRIS argues that "removal of non-compliant heaters on the sale of a house and bans on installation in critical airsheds were not considered feasible as part of a national program" because such measures would be "blunt in terms of imposing unnecessary restrictions on households in areas not experiencing air quality impacts related to wood heaters". However, as noted above, this argument is incorrect – the CRIS paper shows that all existing wood heaters in all urban areas have *estimated health costs of thousands of dollars per heater per year*.

A National Program is therefore required to protect public health by developing a satisfactory standard for new heaters and requiring removal of all heaters (e.g. when houses are offered for sale) in urban areas that do not comply with the desired standard, and therefore have unacceptable health costs.

Recommendations

1) That the Federal Government commissions research to develop a real-life emissions test and standard for new wood heaters that ensures the estimated health costs are less than any benefits of using wood heaters.

2) A moratorium on the installation of new log-burning heaters in urban areas, until models have been developed that comply with the new standard.

3) Pellet heaters with emissions rating < 1.0 g/kg would continue to be permitted.

4) All log-burning heaters in urban areas that do not comply with the new standard to be removed before houses are offered for sale, or 10 years after installation.

5) An annual levy on woodheater use (with subsidies for low-income families) in urban areas, to be used to fund an education program and provide subsidies to upgrade insulation and replace wood heaters with high efficiency gas, electric, solar or wood pellet heaters. In Christchurch, NZ, replacing wood heaters with upgraded insulation and heat pumps had a minimal effect on electricity consumption (average 1% increase) so most families would save money by not having to burn firewood. However, the annual levy should also be used to provide assistance to any low income families who experience hardship as a result of switching to non-polluting heating.

6) A National Woodsmoke Education program to inform people about the health problems caused by breathing woodsmoke, the Australian Lung Foundation recommendation not to use wood heaters when non-polluting alternatives are available, and the recommendation of the UN Environment Program and World Meteorological Association that developed countries phase out log-burning heaters to reduce global warming as well as improve health. The woodsmoke education program should explain that the average new wood heater currently emits 190 to 400 times as much PM2.5 (believed to be the most health-hazardous air pollutant) as the average new car or diesel sports utility vehicle.

7) All cities and airsheds likely to have high woodsmoke levels to measure the most health-hazardous air pollutant (PM2.5) and issue 'Don't Light tonight' warnings on local TV, radio and the internet for all areas where breaches of the PM2.5 standard from woodsmoke are forecast.

8) A National Air Pollution hotline to allow people affected by woodsmoke to obtain assistance.

9) The inaccuracies, known since 2008, in the National Pollutant Inventory (NPI) which under-estimates particle emissions from woodheaters by about 50% should be fixed immediately. Other major inaccuracies in the NPI (e.g. the lack of accurate data for PM2.5 and for toxic chemicals such as ethylbenzene) should be fixed at the same time and new protocols developed to ensure that major errors in the NPI are fixed in a timely manner.

Australian Air Quality Group responses to QUESTIONS

3. Do you consider wood heater emissions to be a significant issue relative to other forms of air pollution?

Even in Sydney's mild climate, the latest NSW EPA emissions inventory shows that more than 50% of man-made PM2.5 emissions are due to a relatively small proportion of houses using wood heating, compared to 14.4% from on-road traffic. The estimated health costs of the average new wood heater installed in Sydney were \$4436 per year – many times higher than the benefit of allowing such heaters to be installed.[3] Rather than asking the public if this is a significant issue, the

5. Are there other variables that have not been considered or not been attributed sufficient weight in the discussion?

The discussion deals with population level health impacts. Wood heater use also affects the health and lifestyle of immediate neighbours, who may incur substantial medical costs, not be able to enjoy gardens or outdoor living areas, dry clothes outside, and may have to seal doors and windows overnight and not use flued gas heaters (which draw smoky outdoor air into the house to replace the air drawn up the flue). The adverse impacts on the health and lifestyle of immediate neighbours should also be noted, and remedied by providing a 24-hour hotline provided to deal with such problems, as well as amending planning regulations to ensure neighbours are consulted before wood heaters are installed.

6. Do you agree that the current policy measures for the abatement of wood heater emissions are not successful in realising the policy objectives? Can you provide other evidence to support this?

Yes. The photos of smoke emissions in Armidale (below) do not represent an acceptable level of pollution.



Real-life emissions from a brand new wood heater installed in a new house in Armidale (AS4013 test rating < 2.5 g/kg).



7. Which policy delivery method do you believe should be adopted by government and why?

With the health costs of a year's delay in introducing effective regulations costing close to half a billion dollars, the most important thing is to protect public health as quickly as possible from the current unacceptable situation. Whatever measures can be introduced quickly and effectively should be used to solve this problem. Commonwealth legislation, a NEPM or referral of powers could all be effective. Interim measures should be introduced by whatever delivery method is quickest, with other delivery methods used if they provide better long-term public-health protection.

8. Do you agree that the policy measures listed for the abatement of wood heater emissions will be successful in realising the objectives? If not, please provide your reasons including supporting evidence.

All the proposed measures have been tried in Armidale over the past decade. Despite costing many thousands of dollars, woodsmoke levels are worse that in 1999 – see graphs below. The only effective measures are those used in Launceston, and Montreal, where the focus was on removing wood heaters. In Launceston, "From 2001 to 2004, the number of households that used wood-burning stoves fell from 66 to 30%. Wintertime particulate pollution fell by 40%."

The stove exchange in Libby, Montana, is a good example of the failure of the measures proposed in this CRIS. In Libby, a large proportion of old wood heaters were replaced with new ones. As shown in the graph overleaf, despite the small number







AAQG woodheater CRIS submission

of wood heaters (about 1,200) and the removal of all uncertified wood stoves, there are many days with much higher PM2.5 pollution than the Australian advisory standard of 25 ug/m³, a level associated with significant damage to public health.

The Australian Home Heating Association is on record, in an article about outdoor air pollution in the ACT, as describing the 28% reduction in pollution in Libby as an improvement of "more than 80%". It appears that the AHHA are basing their claimed reduction on the emissions ratings of the stoves (which, as in Australia, don't represent real-life emissions) instead of outdoor PM2.5 measurements, which they admit fell by only 28%. In a paragraph headed "Change out programs can improve air quality", most people would interpret the claimed "more than 80% reduction" as a reduction in outdoor air pollution. 'Truth in advertising' legislation is required to prevent consumers from being misled in this way – being told in an article about outdoor pollution that pollution was reduced by more than 80%, when the AHHA knows perfectly well the reduction in PM2.5 measurements was only 28%. There is evidence that many people who buy new wood heaters have been led to believe that they are clean and environmentally friendly. People who understand the truth – that the average new wood heater emits as much health-hazardous PM2.5 pollution as 190 to 400 new diesel cars or 4WD are unlikely to choose this form of heating.



9. Do you believe that the "nudge" programs will be helpful in reducing wood heater emissions?

"Nudge" programs resemble the 'social marketing' that has been tried on Armidale and many other places. Most people think that governments would have banned woodheaters many years ago (just as they did lead in petrol and asbestos sheeting) if the research showing that woodsmoke caused 12 times as many cancers as the same amount of cigarette smoke were true. People will not change their behaviour until they understand the true health effects of woodsmoke and then most will not want to use wood heating.

The most "nudged" wood heater users in Launceston were those who volunteered for the CISRO study to measure real-life emissions. Despite doing everything they could to operate their AS4103-compliant heaters correctly – including getting up in the middle of the night to re-fuel heaters (instead of leaving them to on low burn) – emissions averaged 9.4 grams per kg of fuel. This is the absolute best that can be expected for current wood heater models on sale in Australia.

"Nudging' wood heater users to switch to alternatives in Launceston was much more successful, although the remaining 15% of households using wood heaters still cause the breaches of the PM2.5 standard, which is 5 times higher than substantially

higher than the levels of 5 u/m3 at which woodsmoke has been shown in a Canadian study to have detrimental effects on public health.[9]

In the rest of Australia, "nudge" programs to discourage wood heater use will compete with "nudge" programs by the wood heating industry to further their profits by selling more heaters. Government-funded "nudge" programs have no chance against industry advertising claiming that new heaters are clean and environmentally friendly and describing the 28% reduction in outdoor air pollution resulting from the change-out in Libby, Montana as a reduction of "more than 80%" Government-funded "nudge" programs citing the UN Environment Program/World Meteorological Organisation recommendation to phase out wood heaters in developed countries to improve health and reduce global warming have no chance against contradictory claims by the wood heating industry.

Unless the measured real life-emissions of 9.4 g/kg (health costs of many thousands of dollars per heater per year), which are the best than can be achieved provided after a \$2.05 million woodsmoke reduction program in a the city are considered acceptable, "nudge" programs have no chance of protecting public health.

10. Are there other measures that are not listed in the document that should be considered? Table 3. Estimated health benefits and costs of woodsmoke control options in NSW

	Health Benefit \$million	Cost \$million	Net Benefit \$million
4) Phase out at sale of house	\$4,015	-\$36	\$3,978
2) Ban on heater sales	\$2,206	-\$134	\$2,071
7) Licensing fees	\$1,267	\$11	\$1,278
6) Sales tax on new wood heaters	\$1,049	-\$1	\$1,048
9) Cash incentive phase out	\$879	-\$12	\$867
8) Levying an excise/tax on biomass fuels	\$419	\$36	\$455
5) Fuel moisture content regulations	\$399	-\$33	\$366
3) Emission standards (3g/kg, 60% efficiency)	\$301	-\$3	\$298

Source: Tables 26 and 28, AECOM Office of Environment & Heritage: Economic Appraisal of Wood Smoke Control Measures[3] The three most cost effective measures in Table 3 above should not only be considered, but, unless there are compelling arguments to the contrary, **should be implemented before the end of 2013.**

11. Which of the listed policy combinations do you favour in addressing a reduction in wood heater emissions? Why do you favour these measures?

The policy combinations proposed in the CRIS can be likened, instead of banning asbestos sheeting (which now has universal support) to introducing regulations to reduce the maximum allowable amount of asbestos in sheeting by 33% (policy combinations 6 to 8) by 2016 to 2018, or by 67% by 2020 (policy combination 9).

Government's first priority should be to protect public health. The first step should therefore be to introduce the 3 most cost effective measures in Table 2 as soon as possible, while more permanent regulations are being developed. The permanent regulations should deliver similar or better health benefits than the 3 most cost effective measures listed in Table 3.

12. Are there policy combinations that you would not support? Please provide reasons.

Allowing the installation of any new heaters with estimated health costs of more than \$500 per year, except as replacements for more polluting heaters.

13. Do you believe the base case has been correctly identified, or are there other variables that need to be considered?

In order to identify the base case, it is necessary to report the cost of woodsmoke pollution. Po-rating the estimate of \$8 billion for NSW suggests that the cost of the base case is about \$20 to \$24 billion for Australia as a whole. Under the precautionary principle, the true base case would then be the cost of acting responsibly, i.e. *not allowing* new heaters to be

14. Have all health, environmental, economic and social impacts been identified? If not, please suggest others that need to be included. Has sufficient weight been given to these impacts within their relationship to the policy options being proposed?

The health, medical costs and effect on lifestyle of neighbours has not been considered, nor their rights in being consulted about the installation of any devices that can seriously affect health and lifestyle. Consideration also needs to be given to the impact of people moving out of town to avoid unhealthy pollution levels, the need to seal houses to prevent the ingress of pollution, and the need for alternatives to replace flued gas heaters that draw outdoor air (and woodsmoke pollution) into houses.

15. Have all key assumptions been correctly identified and included in the analysis? If not, please suggest others that need to be included.

The key assumptions depend on the base case. An incorrect base case implies that all key assumption need to be revised once the fundamental flaw of an incorrect base case has been remedied.

What assumption, for example, is behind the need to delay the implementation of a limit of 1.5 g/kg (introduced in 2005 for all urban areas in NZ) to 2020? The NZ industry quickly responded by developing dozens of models to satisfy this limit – so there appears to be no possibly justification for assuming that such a delay would be necessary in Australia.

16. Do you agree with the conclusions? If not, please provide reasons.

There is no doubt that a National Regulatory Approach to wood heater emissions is required. However, all the policies outlined in this CRIS and many more have been tried in NZ. NZ has an effective audit system. Otago councils also required all heaters rated more than 1.5 g/kg or efficiencies less than 65% to be removed by 1 Jan 2012. There has, however, been little improvement in air quality, with Cromwell (pop 4896), Alexandra (pop 4824), Arrowtown (pop 2400) and Clyde (pop 900) – all small towns will little or no traffic or industry – having respectively 29, 42, 24, and 7 excedences of the PM10 standard in 2012, compared to 33, 41, 25 and 29 in 2011 http://cleanairnz.com/2013/04/07/hey-central-otago-whats-plan-b/

1. What is your view of the wood heater industry in Australia? Are there specific aspects of the industry that require attention? Please provide details.

2. Can you provide evidence of new or different operational or marketing paradigms that would affect the stated view?

As noted above, the AHHA are on record as describing the change-out program in Libby, Montana as an improvement in air quality of "more than 80%". This implies that consumers wishing to buy new heaters are being misled about the level of emissions from those heaters. The claim about the benefits of the Libby change-out is one of a long line of false clams made by the AHHA, e.g. "Wood heating is the natural way to heat your home without harming our environment and emitting harmful gases" (press release, May 2012) despite the fact that chemicals considered so harmful they are covered by an Air toxics NEPM – benzene, formaldehyde, toluene, xylene and PAH – are all emitted by wood heaters, usually as gases, and in most cases in higher quantities that by the average vehicle. For example, the average wood heater in Sydney produces 39 times as much formaldehyde as the average vehicle, 10 times as many PAH and 6 times as much benzene – see

http://woodsmoke.3sc.net/woodheater-car-comparison.

The AHHA are also on record as claiming in 2010 that "Substantial technological advances in the past five years have led to modern wood heaters that produce only a small fraction of the smoke and particle emissions that earlier models did. In most cases up to 80% less." The estimates in Table 2.3 do not support this claim.

The results from Launceston suggest that the estimates in Table 2.3 of the CRIS are overly optimistic. Measurement of real-life emissions in Launceston took place after many years of education on how to operate heaters correctly. All households

volunteered for the testing and knew their emissions were being measured. There was no evidence that heaters were *"allowed to smoulder overnight; in contrast they appeared to be refuelled periodically throughout"*. Getting up in the middle of the night to refuel the heater cannot merely be considered "good" operation, but a superlative effort!

This, combined with the continued exceedences in NZ, despite what appears to be more stringent regulations than proposed by the CRIS suggests that the proposed measures will be a totally ineffective response to the very serious threat to health posed by woodsmoke exposure.

17. Can other conclusions be made based on the outcomes of this analysis?

That the National Regulatory Approach should be to implement, as quickly as possible, the 3 policy options deemed to be most cost effective in the comprehensive scoping study of wood heater emissions carried out in NSW. This needs to be carried out in conjunction with a comprehensive program to explain the health effects of wood smoke to all current and potential future wood heater users. Most people who truly understand the nature of woodsmoke, including the carcinogen and toxins it contains, the proven health problems caused by these carcinogens and toxins, as well as other health problems, will not want to use wood heating.

At the Newcastle Hearing of the Senate Inquiry into the Health Effects of Air Pollution, Prof. Higginbotham explained that breathing air at the PM2.5 standard of 20 micrograms per cubic metre (sic) was equivalent to smoking 3 cigarettes per day. The measurements for Libby, Montana (and Launceston, Tasmania, where the CRIS estimates than only 15% of households have wood heaters, nearly all compliant with AS4013) still result in many days with wintertime PM2.5 measurements above 25 ug/m³. Some people are concerned about allowing people to smoke cigarettes near outdoor playing fields. If they knew the truth, many more would be concerned about even a single wood heater nearby, because it emits as much PM2.5 per hour as in the smoke from 500 cigarettes, with carcinogenic potency of perhaps 6,000 cigarettes per hour.

Senator Di Natale commented at the Senate Inquiry hearing: "So what you are getting at really is that, while we might have the threshold (i.e. NEPM limit for PM2.5), there should be existing targets as well that go beyond just an arbitrary cut-off. In fact, there might be low-hanging fruit there whereby we might be able to make some good health gains by reducing particulate matter beneath the threshold." Most people who understand the woodheater-cigarette comparison are likely to support much strict measures to reduce woodsmoke, e.g. not allowing new heaters to be installed until a satisfactory health-based standard has been developed, annual licencing fees and, before houses are offered for sale, requirements to remove all woodheaters that do not comply with the new health-based standard.

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