

Submission: Senate Inquiry - The impacts on health of air quality in Australia New England Greens

The New England Greens has members in Northern NSW, including Armidale, Glen Innes and Tamworth. We welcome this inquiry – research shows there is no safe level of some air pollutants, especially PM2.5.

PM2.5 pollution is responsible for the premature deaths of *thousands* of Australians every year, many more than the next worst pollutant, ozone. PM2.5 is now considered the most health-hazardous air pollutant. It consists of particles so tiny they behave like gases and infiltrate houses even when all doors and windows are closed. They also infiltrate the deepest recesses of our lungs where they cause inflammation leading to heart and respiratory diseases. Woodsmoke is the major source of health-hazardous PM2.5 pollution in most urban areas, e.g. 50.6% of PM2.5 emissions Sydney. The substantial damage to public health from inadequate regulation of the asbestos industry was widely condemned. History appears to be repeating itself with PM2.5 pollution.

Wood heaters: 50.6% of Sydney's PM2.5 emissions. The latest NSW EPA emissions inventory (published Oct 2012) shows that, even in Sydney's mild climate, more than 50% of man-made PM2.5 emissions are from a tiny proportion of houses using domestic wood heating. Other sources of PM2.5 are declining, but woodsmoke is increasing in Sydney and is a major health hazard in colder regional areas. A NSW Government report estimated the health costs of the average new wood heater installed in Sydney at \$4436 per year – many times higher than the benefit of allowing such heaters to be installed.

Governments have known for nearly a decade that new woodheaters installed in urban areas have estimated health costs of thousands of dollars per heater per year. NZ tried to address the problem by substantially reducing the emissions limit for all new heaters in 2005. In areas where woodsmoke builds up, NZ also legislated sunset clauses for existing heaters in conjunction with subsidies to remove them, and bans on installing new wood heaters in houses that don't have them. Australia allowed the problem to get worse. While traffic PM2.5 in Sydney fell to 14.4% of man-made PM2.5 emissions, domestic wood heater PM2.5 increased from 34.3% (2003 inventory) to 50.6% of man-made PM2.5 emissions (2008 inventory)

Substantial health benefits from reducing woodsmoke. The substantial benefits of reducing woodsmoke in regional areas was demonstrated by the success of Launceston's woodsmoke-reduction program, funded by the Federal Government. A University of Tasmania Media Release states: *"In 2001, Launceston was the setting for a series of interventions to reduce wood-smoke pollution. Following the interventions wood heater prevalence fell from 66 per cent to 30 per cent of all households and the three month average particulate air pollution during winter was reduced by 40 per cent.*

"The difference between deaths in 1994-2001 and 2001-2007 were statistically significant in men: differences of 11.4 per cent for all-cause mortality; 17.9 per cent for cardiovascular and 22.8 per cent for respiratory. "Results taken during the winter months (June – August) for males and females combined showed even higher reductions: cardiovascular 20 per cent; respiratory 28 per cent."

<http://www.media.utas.edu.au/general-news/all-news/reduction-in-air-pollution-from-wood-heaters-associated-with-reduced-risk-of-death>

NSW Greens Policy - polluter-pays, stricter standards, regular monitoring and reducing fine particulates. The NSW Greens air quality policy (revised Nov 2010) enshrines polluter-pays principles, stricter standards, regular monitoring and reducing fine particulates. The policy notes that principles of environmental democracy require governments to carry out regular monitoring of major air pollutants and air toxins, publish the results, and estimate the cost to society of exposure to air pollution.

Launceston's success needs to be repeated. Now the considerable benefits and cost effectiveness of Launceston's \$2.05 million woodsmoke reduction program have been demonstrated, similar action is needed to protect the health of the many other Australians at risk of ill-health from PM2.5 pollution. This will require government-funding, some of which could perhaps be recouped by "polluter pays" taxes.

Health costs of woodsmoke pollution not widely known. As reported in the SMH in Jan 2012: *"The smoky haze from wood fires is Sydney's biggest source of air pollution in winter, and wood smoke will add \$8 billion to the health budget by 2030, says an independent report commissioned by the state government and*

kept secret for six months.... The NSW Greens, who obtained the report under freedom-of-information laws, said the government should act quickly to minimise smoke.” <http://www.smh.com.au/environment/wood-smoke-adds-billions-to-health-bill-says-report-20120127-1qlin.html>

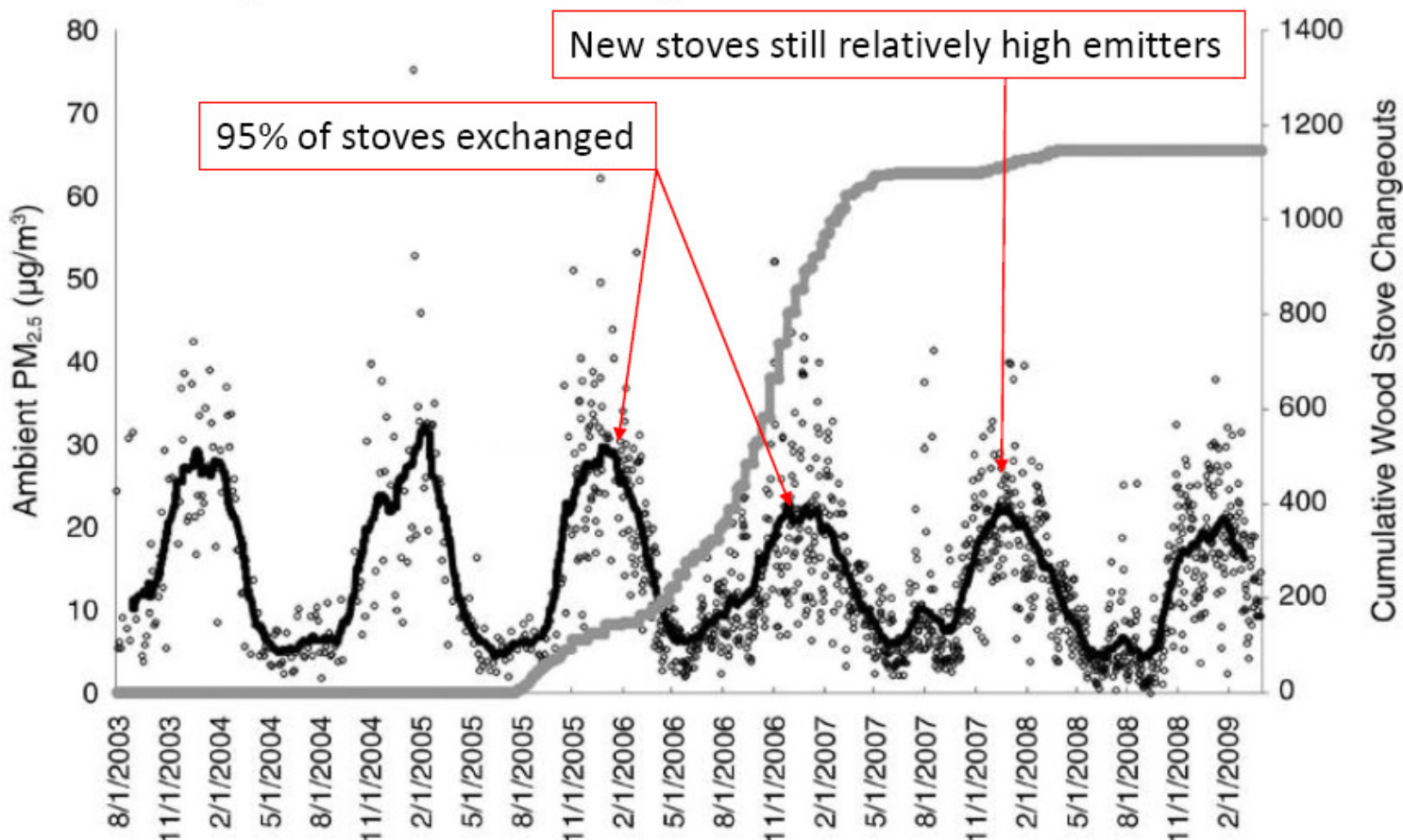
Despite the \$8 billion health costs – equivalent to more than \$22,000 for every wood heater in NSW – few people understand the scale of the problem. This is not surprising; the report was kept secret for 6 months and released only after a FIO application. Despite the exhortation in January 2012 to act quickly, no measures have yet been introduced to address the issue, which continues to worsen. From 2003-2008, traffic PM2.5 emissions in Sydney fell to 14.4% of man-made PM2.5 emissions, but domestic wood heater PM2.5 rose from 34.3% (2003) to 50.6% of man-made PM2.5 emissions (2008 inventory, published Oct 2012).

Many regional areas have much worse pollution than Sydney. Armidale Dumaresq Council’s valiant attempts to address the issue have had little effect. Measured PM2.5 pollution at Council Chambers (see Appendix) is worse than in 1999. In Launceston, attention focussed on replacing wood heaters with alternatives. The wisdom of this strategy was demonstrated when a study of real-life emissions from new wood heaters were shown to have similar emissions to older models –

<http://www.environment.gov.au/atmosphere/airquality/publications/emission-factor.html>

Armidale tried an alternative strategy of working with the wood heating industry, and held a ‘Change-out’ expo, which promoted wood heating, and led to new wood heaters being installed in houses that previously used other forms of heating. Change out-programs, which increase the profits of the wood heating industry, continue to be promoted the peak industry body, the AHHA. A good example of their tactics is the misrepresentation of pollution measurements in Libby, Montana, a town of 2,600 people, where virtually every wood heater was removed. Most were replaced by new wood heaters at a cost of over \$2.5 million (more than Launceston’s \$2.05 million, which reduced wintertime PM2.5 by 40% in a much larger city). Independent researchers estimate that in Libby the reduction was only 28% (see graph below), with many winter days with at totally unacceptable woodsmoke levels. The AHHA, however, tell people who are planning to buy new heaters that the change-out program reduced pollution by “more than 80%”!

Libby, Montana stove exchange



Public misunderstandings & lack of information hinder policy development. Purchasers are told that replacing old heaters with new ones reduces pollution by more than 80%. People rely on ‘truth in advertising’ laws, which appear to be ineffective. The AHHA also promotes heaters saying “*In addition to being the most cost effective form of domestic heating, later model wood heaters emit fewer particles and have the lowest greenhouse emissions when compared with heating alternatives. Today, you can choose a cleaner and greener wood heater that exceeds the most stringent Australian Standards.*”

The AHHA’s misleading information has been a highly effective counter to the recommendations of the Australian Lung Foundation (ALF) to: “*use alternative methods (instead of wood heaters) for climate control, including insulating and improving the energy efficiency of homes, flued gas and electric heaters and energy efficient house design*” <http://lungfoundation.com.au/wp-content/uploads/2012/06/Woodsmoke-The-Burning-Issue.pdf> Similarly, the American Lung Association “*strongly recommends using cleaner, less toxic sources of heat. Converting a wood-burning fireplace or stove to use either natural gas or propane will eliminate exposure to the dangerous toxins wood burning generates including dioxin, arsenic and formaldehyde*” <http://www.lungusa.org/press-room/press-releases/cleaner-alternatives-for-winter-heat.html> 50 scientific experts from the UN Environment Program and the World Meteorological also recommended that developed countries should phase out log-burning heaters - <http://woodsmoke.3sc.net/greenhouse> Prof Piers Forster, Coordinating lead author of the IPCC report “Changes in Atmospheric Constituents and in Radiative Forcing”, which examines the scientific evidence on what changes in the atmosphere are causing global warming, stated that “*Reducing emissions from diesel engines and domestic wood and coal fires is a no-brainer as there are tandem health and climate benefit*”

The AHHA’s claim about “most stringent Australian Standards” lulls purchasers into a totally false sense of security. A Federal Government Scoping Paper states: “*Governments have been unable to achieve improvements to national wood heater emission standards due to industry veto in Standards Australia processes. The emissions standard was last revised in 1999 and the current level of 4 grams of particles per kilogram of wood burnt is well above levels achievable by latest technologies and the emissions standard set in New Zealand (ie. 1.5 g/kg) -* http://woodsmoke.3sc.net/files/EHPC_NationalApproach_Reducing_WoodheaterEmissions_ScopingPaper.pdf

The NSW Government’s Discussion Paper on Woodsmoke Control Options notes the success of this misinformation campaign: “*According to data supplied by the Australian Home Heating Association, sales of wood heaters across Australia grew 33% in 2011.*” With estimated health costs of the average new wood heater installed in Sydney at \$4436 per year – many times higher than the benefit of allowing such heaters to be installed – Australians will end up paying a very high price for the continued failure to address this issue.

The Senate should recommend urgent measures to address this problem

Rather than allow the current situation to continue, the Senate Committee should recommend immediate efforts to start addressing the problem, while seeking agreement on longer-term solutions. The NSW Greens Air Quality Policy (revised Nov 2010) contains many useful policy suggestions.

21. Measure and report PM2.5 in all areas that may exceed the PM 2.5 standard.
22. Update air particle monitoring as a matter of urgency so that PM2.5 is measured according to the NEPC reference method
23. Introduce policies to reduce urban and rural air emissions from point sources (large emitters) and diffuse sources (small emitters) to achieve the NEPM PM2.5 standard in all locations as soon as possible;
24. Adopt further measures to significantly reduce PM2.5 pollution below the current NEPM standards
25. To reduce the concentration of PM2.5 regarding wood heaters the NSW Greens support:
 1. reducing wood heater emissions by at least 90% on current levels;
 2. a new health-based standard for wood heaters;
 3. prohibition on new heaters that do not meet this standard;
 4. a moratorium on installation of new wood heaters until the new health based standard has been developed;
 5. the gradual phasing out from urban areas of all wood heaters that do not comply with the new health based standard;
 6. research and development of affordable non polluting domestic heaters.

National Monitoring and Reporting System. The Final Impact statement of the 1998 Air Quality NEPM (National Environment Protection Measure) expressed the ultimate aim of “*providing equivalent protection for all Australians, wherever they live*”. But with PM2.5 generally considered the most health-hazardous pollutant (estimated health costs of \$235 per kg of emissions in capital cities and \$56 in rural areas - DITRDLG, 2010) and most locations that exceed the PM2.5 standard lacking NEPM monitors, the current NEPM cannot achieve this aim. The lack of NEPM monitors in areas with high PM2.5 pollution is illustrated by the 2010 NSW NEPM report which states that breaches of the PM2.5 24-hour reporting standard were recorded on one day at one PM2.5 monitoring site in NSW. Yet in Armidale (which lacks a NEPM monitor, but the local council measures PM2.5 with a DusTrak calibrated by EPA TAS) had 37 breaches of the 24-hr PM2.5 standard in 2010. In Tasmania, Geeveston, a small town with 277 houses, exposed to smoke from domestic wood heaters had 99 exceedences of the PM2.5 standard, the vast majority due to emissions from domestic wood heaters.

Tasmania’s BLANKET system (Base Line Air Network EPA Tasmania, epa.tas.gov.au/epa/blanket-reports) demonstrates that PM2.5 monitoring need not be expensive. BLANKET uses a series of DusTrak monitors calibrated for woodsmoke. The results are available in real-time. The accuracy of the system is verified by the co-location of NEPM accredited monitors at some sites. With DusTrak monitors costing less than \$10,000, and real-time connections to the internet readily available, there is no longer a financial barrier to measuring and reporting PM2.5 in most locations where the PM2.5 standard is likely to be exceeded.

Although NEPM monitoring is normally carried out by the States, it would be expedient for the Federal Government to set up the PM2.5 monitoring for areas that have fallen through the cracks in the NEPM. Once the system has been established, the States could take over, or simply delegate PM2.5 measurements at new sites to the Federal Government. The \$8 billion health costs of woodsmoke in NSW (and no doubt similar per capita costs in other States) is a compelling reason for co-ordinated national action, rather than the likely additional expense and delays if individual states have to research the issue and reinvent the wheel several times over.

National Woodsmoke Campaign. To help people understand the need to reduce woodsmoke pollution, as well as counter misleading information from the AHHA, a National Woodsmoke Education Campaign is needed. It is important to increase awareness nationally, so that all Australians understand that the average new wood heater emits more PM2.5 pollution in 10 hours than the average new car, or new diesel 4WD or sports utility vehicle does in a year. It is also important for people to understand:

- Which areas have high pollution. In previous years, air pollution was included in weather reports. Sydney also issued voluntary ‘Don’t light tonight!’ requests on days when high particulate pollution was forecast. By investing a small amount of money measuring PM2.5 in areas where it is expected to be high, voluntary ‘Don’t light tonight!’ information requests could be issued in conjunction with weather reports for all areas with high PM2.5 pollution. This would increase understanding of the issues.
- People should also be informed that there is no safe level of PM2.5 pollution, and that wood smoke contains the same and similar chemicals to tobacco smoke; in fact it appears to cause about 12 times as many mutations and tumours as the same amount of tobacco smoke
- There are no “stringent Australian standards” because the wood heating industry rejected changes recommended 15 votes to 4 by the majority of the Australian Standards Committee.
- The Australian Lung Foundation, the American Lung Association both recommend that, where possible, households use alternatives to wood heating – see woodsmoke.3sc.net
- Good neighbours don’t smoke - wood heater emissions have been found to affect the health of neighbours. Neighbours should therefore be consulted before wood heaters are installed and simple criteria developed (e.g. medical evidence of adverse health effects, or a chimney lower than the top of the windows of neighbouring houses) to identify cases where currently-installed wood heaters pose a risk to an unacceptable risk to a neighbour’s health and should therefore be removed. In a survey in Armidale, nearly 60% of respondents without woodheaters had experienced problems from wood heater smoke from other houses.
- As well as heart and lung diseases, people need to understand that wood smoke and PM2.5 pollution have been associated with many other problems including low birthweight and genetic damage in babies, reduced IQ on starting school, middle ear infections, and reduced cognitive function in the elderly. In developing countries, children whose mothers cook with wood (as opposed to kerosene) stoves have reduced

IQ, memory and poorer social skills. Concerns have also been expressed in developed countries such as the US. In Utah, where PM2.5 pollution tends to be higher during winter months for various reasons, such as more frequent and severe temperature inversions, more space heating, including wood burning, a group of Utah doctors are advising prospective parents to wait until the inversion season is over before trying to conceive - <http://www.sltrib.com/sltrib/news/55825755-78/pollution-utah-birth-studies.html.csp>

The Senate Committee should also recommend an investigation into the failure of ‘truth in advertising legislation’ to correct the mis-information from the wood heating industry (discussed above and at <http://woodsmoke.3sc.net/ahha-tactics>) to determine if such mis-information is in the public interest, and if not what needs to be done to ensure that it never happens again, either in relation to wood heaters or any other consumer products.

The Senate Committee should recommend adoption, as a matter of urgency, of the most cost effective measures evaluated in the NSW Government’s Woodsmoke Control Options Report. The table below summarises the costs and benefits of various ways of reducing 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

Source: Tables 26 and 28, AECOM Office of Environment & Heritage: Economic Appraisal of Wood Smoke Control Measures - Final Report, 29 June 2011

Four of the first 5 measures – phasing out wood heaters (except pellet stoves with emissions rating of less than 1 g/kg) when houses are sold, a ban on sales of new log-burning heaters, licensing fees, and cash incentives to remove wood heaters are all highly cost effective, with estimated benefits 20 to 100 times greater than the costs. In NZ, restrictions on wood heaters have led to a flourishing pellet heating industry and the development of cleaner-burning wood heaters. As in Christchurch, NZ, one possible exception to a ban on new log-burning heaters could be for models with emissions rating less than 1.0 g/kg installed as replacement for existing wood heaters. This would allow people who don’t want to use alternatives to upgrade to a cleaner model and also raise some sales tax money, which could be used to fund the cash incentive to phase out other wood heaters. Some of the above measures would probably require implementation by individual states, but if Federal funds were made available to cover the cost, and targets set for speed of implementation, there would be substantial benefits at both state and Federal level. The public interest would therefore be best served if agreement could be reached on swift implementation of these cost-effective measures.

The measures described above are necessary because efforts to develop a health-based standard for Australian wood heaters were abandoned after the wood heating industry vetoed the recommendations of the Australian Standards Committee. The extent to which the Australian wood heating industry has been allowed to regulate itself was explained in an article in by Prof John Todd in “Clean Air and Environmental Quality” *“through a series of circumstances, largely unplanned by government authorities, a situation has developed where the industry association, which represents some, but not all, Australian wood heater manufacturers, has a veto on the emission test method, a veto on the emission and efficiency limit (unless individual states choose to set their own limits in legislation), runs the certification process covering all manufacturers and both test laboratories, and participates in the auditing of the whole process.”*

Self-regulation, by an organisation that misrepresents a 28% in Libby, Montana as a “more than 80% reduction” is not in the public interest. Over the past 20-30 years, new standards have led to a 99% reduction in emissions from diesel cars and 4WD. The Government had no qualms about mandating the new Euro 5/6 standards, despite adding about \$980, or 2.5 per cent to the cost of a \$40,000 diesel vehicle <http://www.news.com.au/national/car-pollution-crackdown-to-save-lives/story-e6frfkvr-1226073347555> The new PM2.5 limit is .005 g/km, i.e. about 0.1 kg for a vehicle travelling 20,000 km per year. In 2008,

cars, trucks and buses emitted 14.4% of man-made PM2.5 emissions in Sydney. Wood heaters emitted 50.6%. In order to redress the balance and protect public health, the Senate Committee should make immediate recommendations about appropriate measures to address this situation as a matter of urgency.

Assist people who experience problems with other people's woodsmoke. A survey in Armidale, NSW found that nearly 60% of people without woodheaters had experienced problems with wood heater smoke from other houses. As well as providing subsidies to replace wood heaters with alternatives, any 'polluter pays' taxes on woodheater use could provide funds to help resolve problems experienced by people who do not use wood heating.

One form of assistance could be to provide subsidies for HEPA filters in areas where woodsmoke levels are detrimental to public health. For healthy adults *living in areas with average PM2.5 levels of 10 ug/m³ (less than average woodsmoke levels in Armidale)*, HEPA filters were described as an inexpensive way to reduce cardiovascular disease risks. In the study, use of two HEPA filters (costing about \$125 each) in the living and bed rooms reduced average concentrations of fine particulates inside homes by 60% and woodsmoke by 75%, and their use was associated with improved endothelial (inner lining of the blood vessels) function (a 9.4% increase in reactive hyperemia index) and decreased inflammation (a 32.6% decrease in C-reactive protein), both predictors of cardiovascular morbidity. Ryan Allen, PhD, assistant professor, Simon Fraser University, said: "*Reducing air pollution appears to provide health benefits even if the pollution levels are already relatively low.*"

Research and development of affordable non-polluting domestic heating.

If the wood heating industry is to flourish in the long-term, without compromising health or air quality, new non-polluting heaters must be developed. New technology, including gas boosting when the firebox is below the temperature required for optimum combustion (as well as for initial lighting of the fire) suggests that this might be feasible. The huge improvement in PM2.5 emissions from diesel vehicles suggests that, when governments are prepared use regulations to set health-based standards, improvements soon follow to meet the required standards.

In coastal cities, efficient heat pumps are perhaps the most affordable way of heating homes. Christchurch, NZ, offered incentives to replace wood heaters with efficient heat pumps – household electricity consumption increased by just 1%. Compared to the cost of buying firewood, this represents a substantial saving for the average family. The report describing the results of the Clean Heat Program explains: "*Additionally, in order to receive subsidies from ECan, households were retrofitted to meet NZ Building Code standards for ceiling and underfloor insulation, potentially reducing the use of other forms of electrical heating, such as the bedroom heater.*"

Big improvements in efficiency for modern heat pumps were also noted by Matthew Wright, executive director of Beyond Zero Emissions. In 2010, he used the equivalent of 3000 kWh of gas to heat his home in Melbourne. The following year, he installed air conditioners. His home was warmer, yet measured electricity consumption for the heat pumps of only 328 kWh, a tiny fraction of what can be generated from the average PV system, leading to tiny running costs compared to the previous gas heating system. - <http://www.climatespectator.com.au/commentary/why-i-have-six-air-conditioners>

Consider additional infrastructure funding. Governments currently accept responsibility for helping to fund replacement infrastructure such as roads and libraries. With measured PAH pollution at substantially less than half Armidale's wintertime pollution associated with genetic damage in babies, a 5 point reduction in IQ when starting school and increased risk of behavioural problems such as ADHD, upgrading home heating 'infrastructure' would appear to be far more important for public health and welfare than providing fast internet to households (when current speeds are adequate for most uses except downloading movies), or new library facilities.

Need for swift and comprehensive action. Given all the above evidence, we hope that the Senate Inquiry will recommend swift and comprehensive action such as outlined in Recommendations 1 to 5 above to reduce the public health damage from the large proportion of PM2.5 emissions from domestic wood heaters. More importantly, if these measures can't be implemented immediately, immediate temporary measures such as the introduction of a moratorium on the installations of new wood heaters should be initiated (ideally before the start of the 2013 winter) to prevent further worsening of the problem while long-term solutions are under development.