



**PUBLIC COMMENT SUBMISSION
FROM
THE FIREWOOD ASSOCIATION OF AUSTRALIA INC.**

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

The Firewood Association of Australia Inc. (FAA) is the peak industry body representing commercial firewood cutters, wholesalers and retailers. Members of the FAA agree to comply with the Voluntary Code of Practice for Commercial Firewood Suppliers that was promulgated by the Australian Government.

The FAA strongly supports effective action to reduce wood smoke from domestic heaters. FAA programs concerning wood smoke reduction include active involvement in research and development of smoke monitoring and abatement systems, participation in and support for State government smoke reduction programs, as well as liaison and support with all levels of government.

The health effects of prolonged fine particle inhalation have been well documented and are uncontested.

According to the National Pollutant Inventory (NPI), smoke from domestic wood fires represents only 1.4% of total airborne fine particulate (PM₁₀). The FAA considers that there is an excessive focus on domestic wood smoke reduction when compared with other industrial and diffuse sources that make up the other 98.6% of PM₁₀ emissions. (The NPI figures show that the top five of the one hundred and ten sources listed are the cause of 90.5% of emissions.)

Nevertheless, the FAA supports the development of a national regulatory framework that will provide both appropriate guidance, and flexibility, for local governments to take effective action on high smoke emitting households – both education and enforcement.

Air Quality Measurement

Unlike the smoke from wildfires and from controlled forest and agricultural burns, domestic wood smoke is not a general atmospheric health hazard that is faced by all Australians. Instead, it tends to be a localised or neighbourhood problem. This is clearly demonstrated by the real time measurements of air particulates that are made by the NSW government's Air Quality Monitoring Network. Graphs of PM₁₀ and PM_{2.5} levels at the various monitoring stations throughout the network show that wildfires and fuel reduction burns are the dominant source of elevated fine particulate levels. The recorded data shows that there is no significant increase in measured smoke levels that can be attributed to domestic wood heaters. Some example graphs of data from the monitoring stations are provided in Appendix 1. Data from the monitoring network can be viewed at <http://www.environment.nsw.gov.au/AQMS/search.htm>.

Estimates of atmospheric PM₁₀ pollution used throughout the cRIS are not based on any real or factual measurements of air particulates. Instead, emission estimation techniques are relied on to establish an assumed exposure per head of population. This assumed exposure is then used to attribute a theoretical health cost to domestic wood smoke exposure. The FAA believes that these theoretical estimates of PM are founded on seriously flawed logic, inaccurate estimations and an inappropriate dispersion modelling methodology.

Wood Consumption Estimates

The quantity of wood that is thought to be burnt in domestic fires is estimated by an unreliable and unverified process. It is acknowledged that it is very difficult to accurately establish the quantity of wood burnt annually in any region. For example it is often assumed that one half of the wood burnt for domestic heating is self- collected and the other half is purchased, however this is an unproven assumption and will naturally vary considerably depending on the availability of wood in an area. Surveys that ask people to state their wood usage are not likely to be accurate. Few people would be able to accurately determine the weight of wood (at 20% m/c) that they burn annually, unless they purchase all of their wood from a reputable merchant who sells by weight and who provides a record of moisture content.

To obtain the consumption quantity used in various emission estimations two techniques are utilised. Nationally, a wood consumption quantity is estimated from a “formula” that was developed by ABARES and BREE. This “formula” is not based on real data or survey information but on intangibles which BREE says are “*use and prices of alternative energy sources, household incomes and the number of households*”. The NSW EPA periodically carries out a household survey to estimate GMR wood consumption, but this is very limited in its scope and in the number of responses it receives. This survey is unverified, is potentially biased and is therefore unreliable. For example the 2008 inventory estimated GMR wood consumption to be 647,802 tonnes. A survey of 153 wood merchants in the GMR conducted recently by the FAA indicates that wood consumption in 2012 (purchased and self collected) was probably around 250,000 tonnes.

Emission Factors

The emission factors used for this cRIS (10 g/kg ave.) and the NSW GMR Air Inventory (12 g/kg ave.) assume that all wood heaters and open fires are operated badly. In the real world, ignoring Tasmania, many wood heaters are operated on high or medium burn settings the whole time and therefore produce less than their rated emission, which is determined by averaging emissions from high, medium and low burn cycles. This is because many households only use their wood heaters to provide additional radiant heat to supplement gas or electric heating and for the ambience created by flames.

The Tasmanian situation, where many of the referenced studies have been carried out, is somewhat unique. In Tasmania there are no high density tree species such as Red Gum, Jarrah and Ironbark, which are the preferred species for firewood on the mainland. In order to slow the rate of burn of these lower density species and thereby conserve wood, Tasmanians frequently close the air flow inlet on their heaters prematurely, before the fire has reached correct operating temperature after it is reloaded.

Further, because of this need to recharge heaters more often there is an increased frequency of early stage gas emissions from pyrolysis of the wood. Incomplete combustion of these pyrolysis gases is what generates smoke. Due to the long wood burning season in Tasmania it is very common for wood merchants to run out of seasoned wood well before the end of winter. This leads to a greater incidence of people burning unseasoned wood. The combination of low wood density and wet wood makes excessive smoke emissions far more common in Tasmania than on the mainland.

In most locations (other than Tasmania) and for most wood heaters in Australia an emission factor that is the average of high and medium burn emissions, say around 2.5g/kg would be more appropriate.

The application of an exaggerated emission factor to an over-estimated consumption quantity creates the false impression that domestic wood smoke is a significant contributor to ambient levels of fine particle pollution. As the air measurement data clearly shows, this is not case.

Surveys carried out in Armidale by the University of New England (Hine & Bhullar) found that only 15% of wood heaters could be said to be operated so poorly or carelessly that they produce the amount of emissions assumed in the cRIS estimates. In truth most heaters are operated correctly and do not consistently produce significant smoke, even those in Tasmania.

Dispersion Modelling

The quantity of particulate that is estimated to be emitted by wood heaters is assumed to be equally distributed throughout an “air shed”. Because consumption estimates are only obtained on a macro scale, for example the NSW GMR or the whole of Australia, it must be assumed that the area for which an emission quantity has been estimated constitutes a single ‘air shed’. An air shed is commonly defined as; *“a geographical area within which the air frequently is confined or channelled, with all parts of the area thus being subject to similar conditions of air pollution”*

The use of “air shed” modelling to determine the distribution of particulate generated by domestic wood combustion is a gross and misleading oversimplification of the actual situation. The dispersion of wood smoke from domestic fireplaces is initially highly localised in the vicinity of a flue or chimney and then, because smoke is highly motile, it will travel in the direction of the prevailing wind or air flow. Therefore the potential exposure to fine particulate from domestic wood fires is not in any way uniform throughout any given population. Anything other than a clearly defined, distinct area that shares the same air in which particulates are distributed evenly, cannot be classed as an ‘air shed’ for modelling the effect of pollutants such as wood smoke. There are much better methods for modelling the dispersion of a smoke plume from the flue of a high emitting wood fire, such as the Gaussian and Briggs equations. There are also a great number of commercial modelling systems which provide a better analysis of smoke dispersion than the simplistic and inappropriate ‘air shed’ model.

Therefore, there are major flaws in the methodology that forms the basis of the assumptions used by the cRIS. Both in the quantity of particulates emitted by wood heaters and also in the assumption that every resident in an air shed is equally exposed to the same level of smoke particulate. The latter is clearly absurd! Smoke from a wood heater at Berowra Waters is not going to be inhaled by someone in Cronulla, even though they are both said to be in the same (Sydney) air shed.

Because many of the assumptions used by the cRIS are invalid, the cost:benefit assumptions that are used to justify the range of proposed government actions to reduce domestic wood smoke are meaningless. The FAA believes that the cRIS does not provide an accurate analysis of the issue of domestic wood smoke pollution nor does it offer a practical solution

Why is Domestic Wood Smoke a Problem?

Domestic wood smoke is a local neighbourhood problem that affects residents within close proximity to an incorrectly operated heater, or who share a common air shed with incorrectly operated heaters. This can be a particular problem where topographic and climatic conditions combine to cause winter temperature inversions which confine the smoke within a locality.

For example the Dumaresq river valley within the town of Armidale, or the low lying areas at the convergence of the North Esk and South Esk rivers at Launceston. In these areas, on still cold nights adiabatic air flow can drag wood smoke from domestic fires and other sources, such as fuel reduction and agricultural burns, in surrounding areas into valleys where it can become trapped by a temperature inversion. This can create unpleasant and unacceptable smoke levels for residents within the affected air shed.

Far more commonly, it is a problem for residents who have a nearby neighbour who either operates their wood heater incorrectly so that it produces excessive smoke or who burns unacceptable material in their fireplace. This can be treated, painted or contaminated wood such as old rail sleepers, unseasoned wood or even household refuse such as plastic and soiled nappies.

It is these local area issues that are the cause of all complaints about smoke pollution received by councils, not ambient levels of PM₁₀ in an air shed. Therefore this is the main area of concern to local government and is the area where COAG support would be most valuable.

The FAA believes that the cRIS does not properly or adequately address this important issue. Even though the cRIS acknowledges the fact that *“the major reason for excessive emissions is due to poor wood heater operation”* it dismisses any attempt to address this problem as a *“market failure”* and does not propose any alternative regulatory options to provide a solution.

The FAA has no specific comment to make on measures to further reduce the rated emission levels for wood heaters – this is the province of the Australian Home Heating Association, which represents wood heater manufacturers. However, as Dr John Todd has demonstrated, in a worst case scenario the “real world” emissions from a modern heater can be up to 25 times greater than the rated emission, when the heater is operated incorrectly. This shows that the actual emissions generated by a wood heater are far more dependent on how it is operated than on the AS 4013 rated emission.

Further, there is no practical way to prevent owners modifying their heater after installation to reduce the aperture of the air inlet on the low burn setting, should they choose to do this. Failure to properly clean and maintain a heater so that design air flows are achieved will also negate any improvements in heater design and consequently negate any reduction in smoke emissions achieved by better heater technology.

The FAA believes that the most effective way to reduce problem wood smoke emissions is to ensure that wood heaters are operated in the correct manner, burning only the fuel that they are designed to burn. We believe that the only practical way to achieve this is for local jurisdictions to run monitoring programs to identify heavy smoke emitters, and then to implement effective intervention programs. The UNE Armidale study identified that 85% of total smoke emitted came from just 15% of wood burning households, while the Launceston programs run by the Tasmanian EPA have demonstrated that appropriate targeted intervention can effectively eliminate the problem.

The fact that the consultation Regulatory Impact Statement report (cRIS) dismissively rejects such programs using the rhetoric of “market failure” is just one of many criticisms that we have of the report. In our view it lacks objective balance, it is inaccurate, it makes highly speculative use of source statistics and references, its cost:benefit analyses are over-optimistic and suspect, and it is incomplete. For example, there is no serious evaluation of smoke reduction programs in other countries, particularly in Europe and North America, where the recognised environmental credentials of wood heating have led to rapid growth and market share. But most importantly all of the options it proposes to address this overstated problem will have negligible effect.

The most complete option (Option 9) will cost \$39 million to achieve an 18% reduction in twenty years time. This option takes twenty years to achieve a projected reduction in total PM₁₀ of only 0.25% which represents a very inefficient use of tax payer funds

We consider that the cRIS should be seen as a false start, but one from which a far more effective regulatory platform can be developed. As the title clearly states, the objective of the cRIS is to reduce emissions from wood heaters. Although each of the nine proposed options includes an “In-service” component based around education and wood heater replacement incentives, the major focus of the report is on reducing rated heater emissions, compliance requirements and auditing.

In our view the focus and emphasis should be the other way around. The simplest and most effective way to reduce smoke emissions is the direct way – identify the high wood smoke emitters and carry out direct intervention procedures to change their behaviour, a mix of education, encouragement and enforcement. These intervention procedures should be guided and managed to allow for flexible, local implementation through the application of a national regulatory framework.

The FAA, The Hills Shire and the University of New England are currently carrying out a research project in Sydney which is designed to demonstrate the effectiveness of this approach. This project will use car based smoke surveys to identify problem smoke emitters. The identified smoke emitters will be subjected to a range of different targeted interventions that are principally designed to achieve a behaviour change but will also identify any issues with the fuel or burning equipment. This could be inadequate maintenance of the heater, incorrect installation, green wood, burning rail sleepers and a myriad of other issues. The critical element is establishing one-to-one contact with the problem operator and thereby being able to directly determine the cause of the high smoke emissions. Once the cause is known a combination of education and enforcement should resolve the issue. An outline of this project is provided in Appendix 2. The FAA is willing to share the knowledge gained from the project with SCEW.

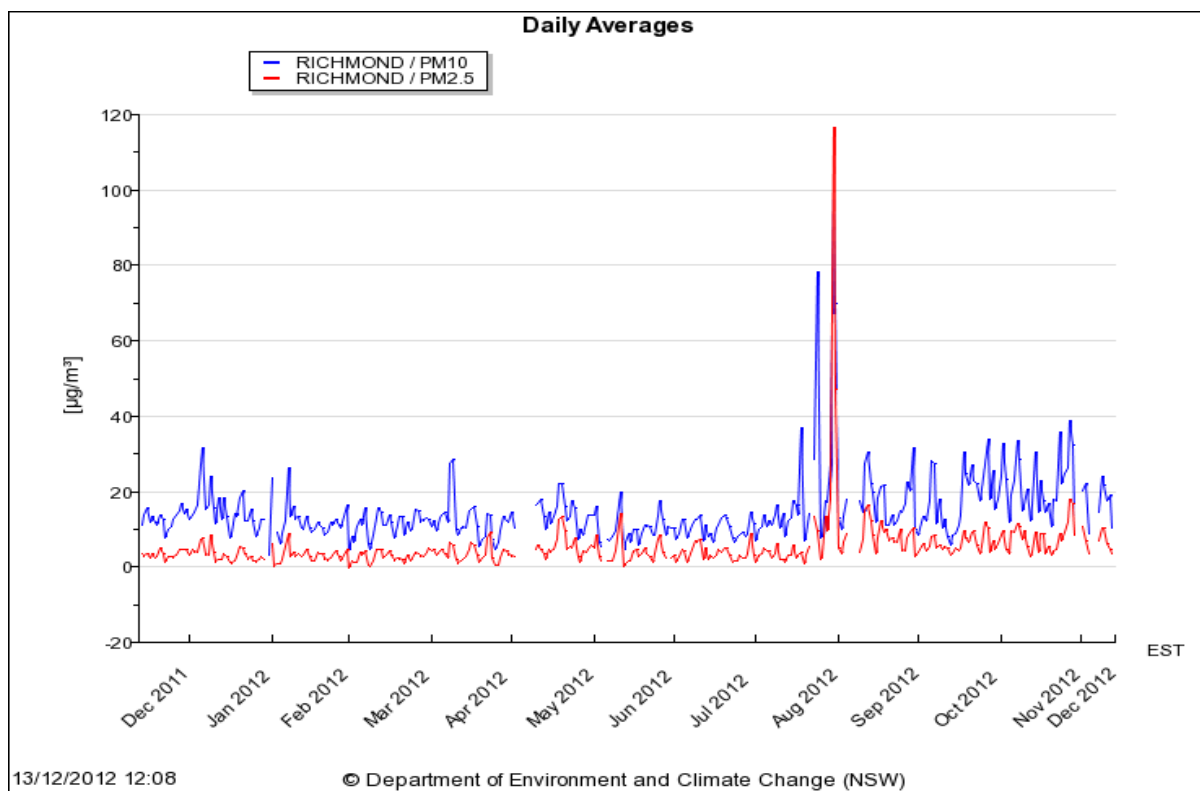
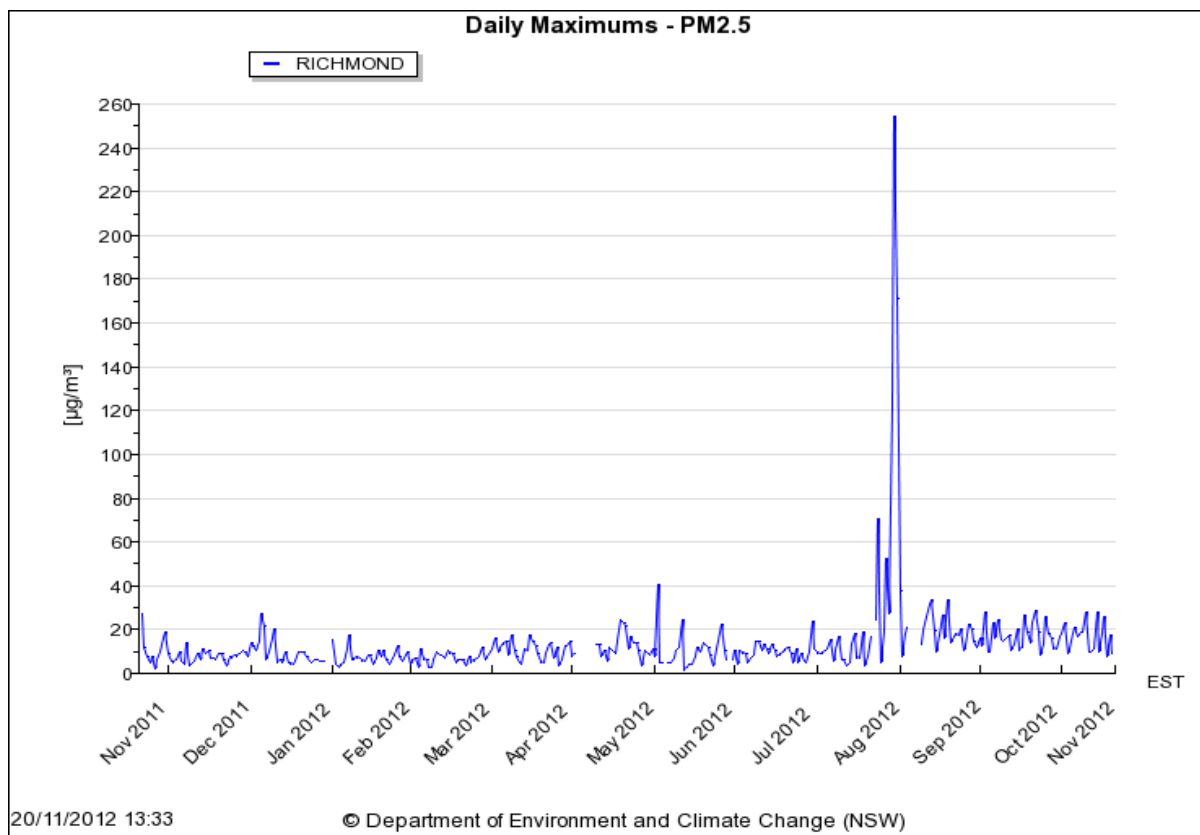
There is no need to waste time and money on those who use their wood heaters properly and do not emit smoke after a short start up period – nor is it necessary to restrict the activities of people in remote locations through prescriptive controls, or make them pay more for more highly rated heaters.

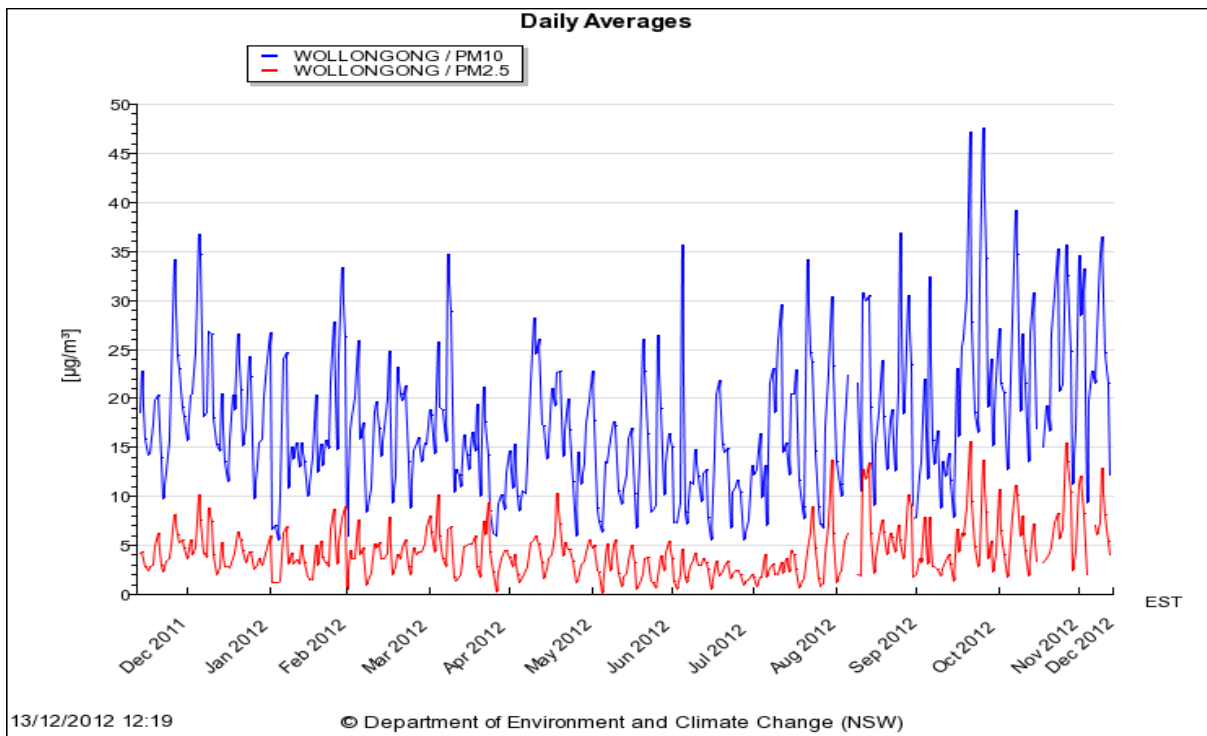
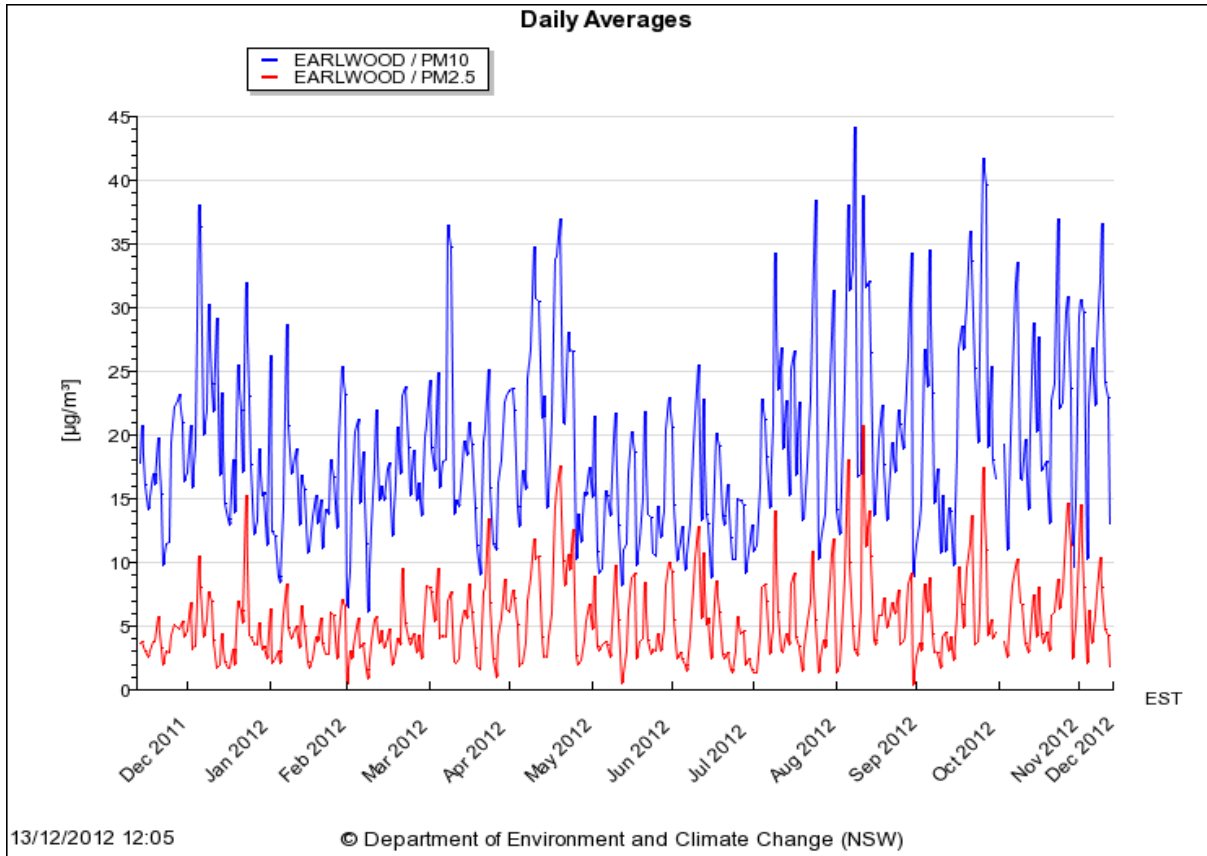
Yours sincerely

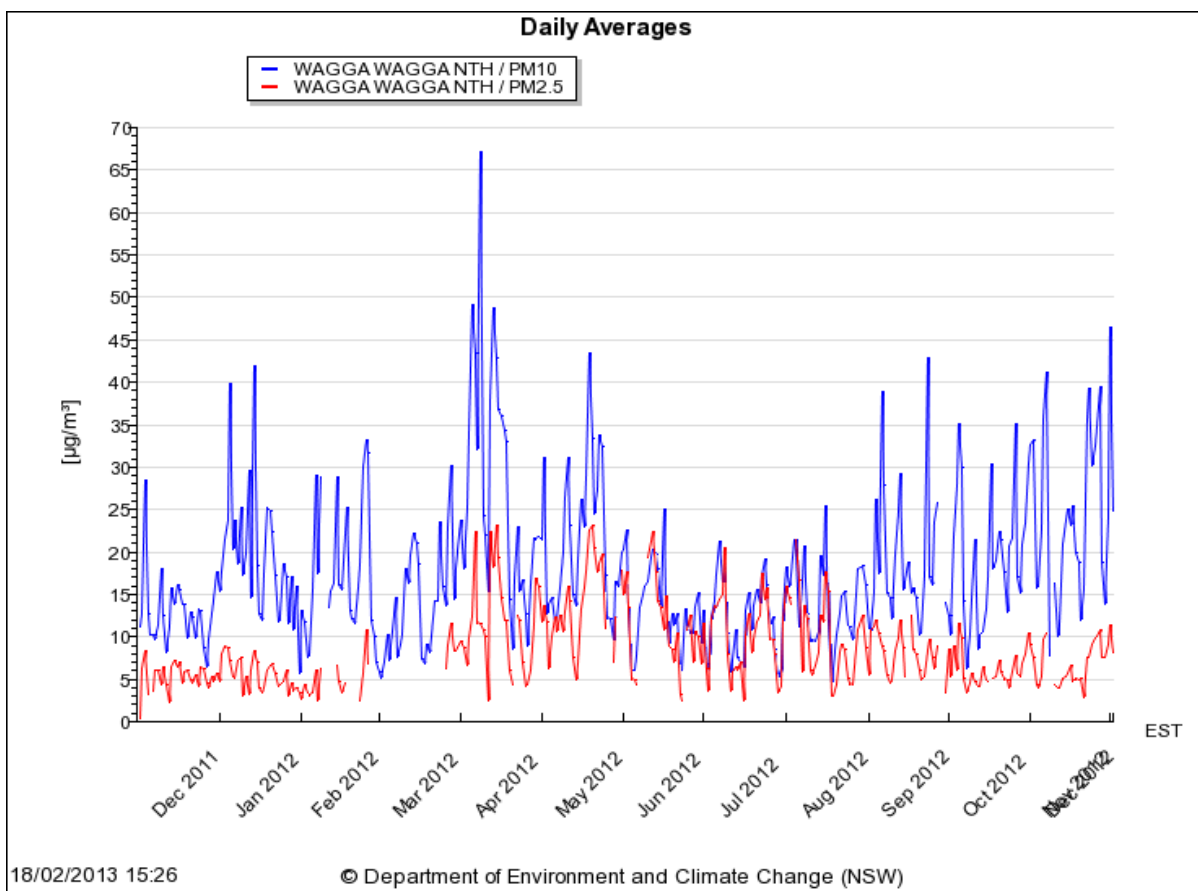
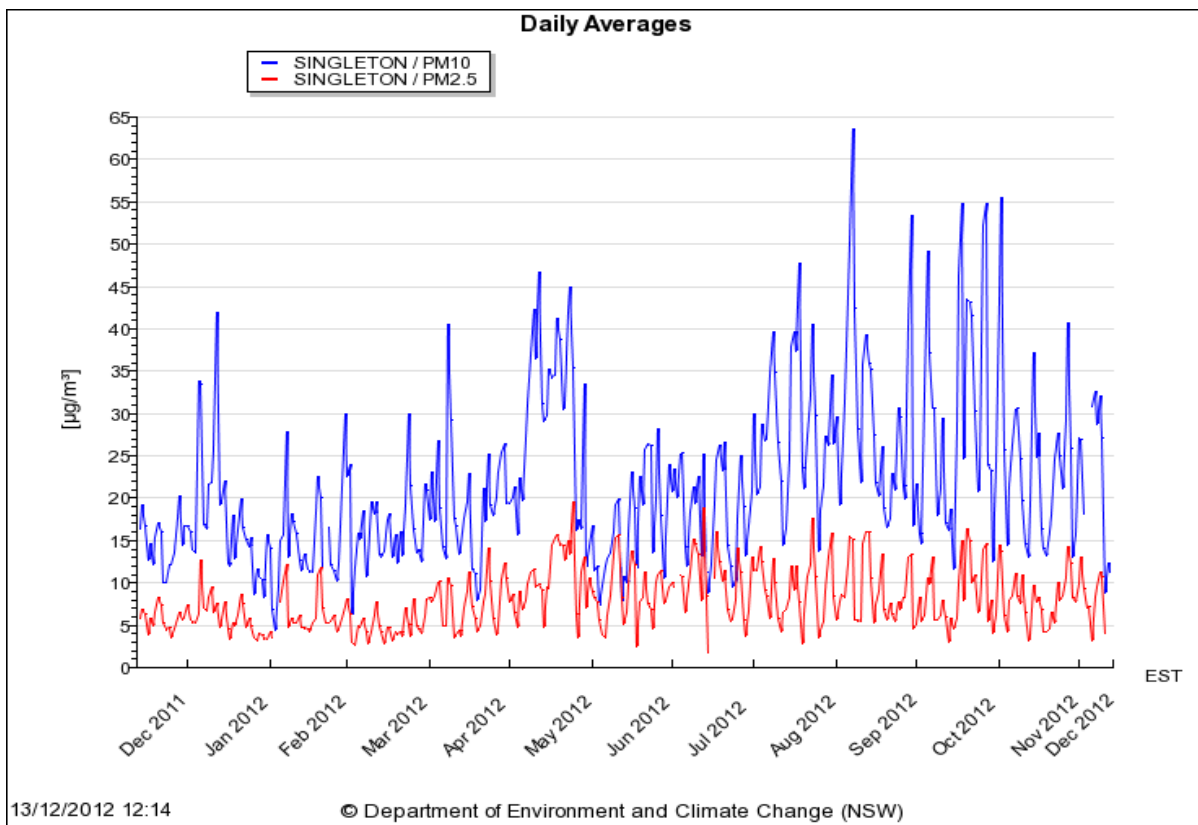
A handwritten signature in black ink, appearing to read 'Alan McGreevy', with a stylized flourish at the end.

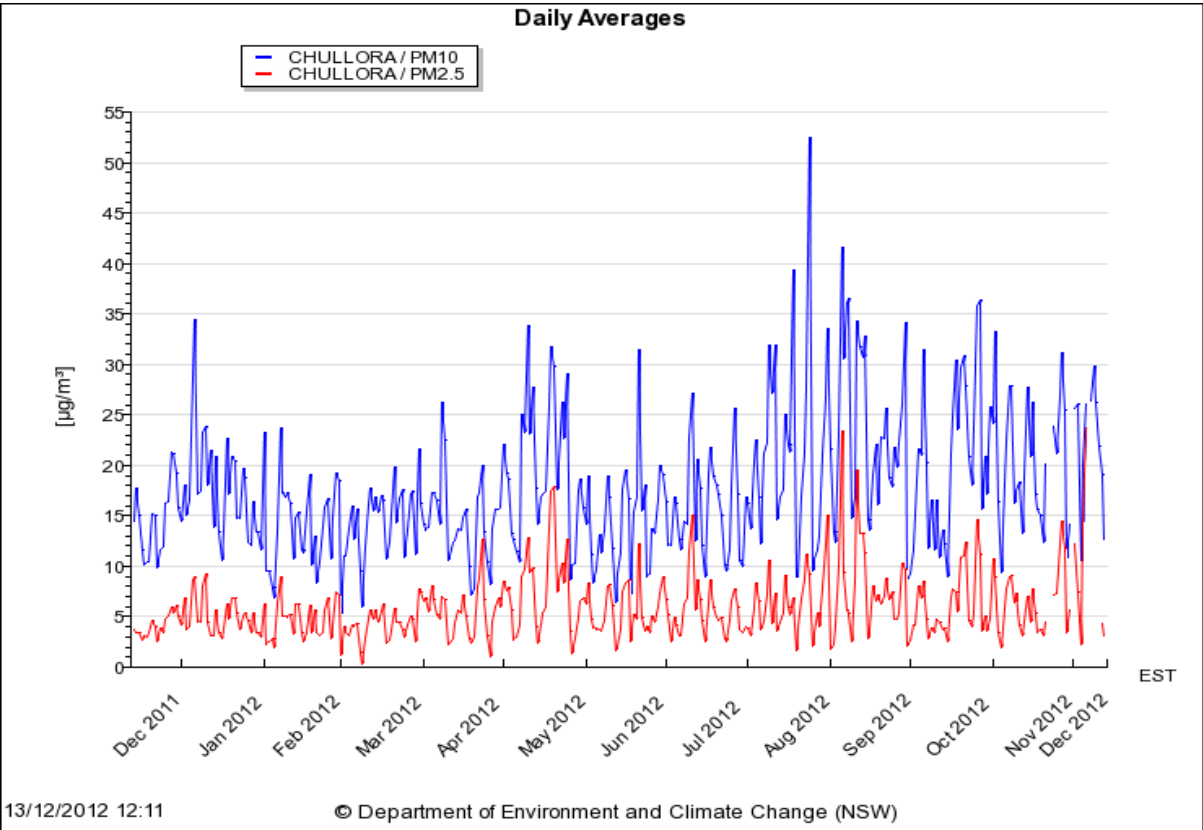
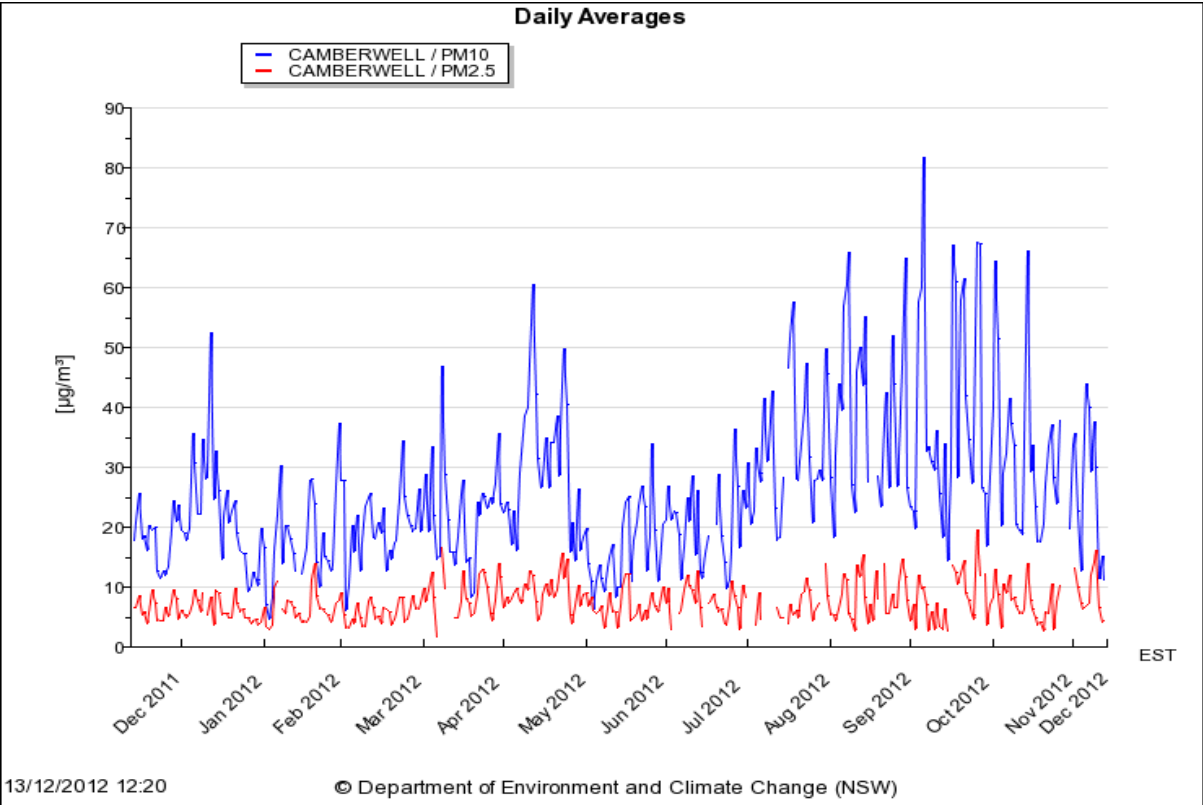
Alan McGreevy
General Manager
Firewood Association of Australia Inc
12 July 2013

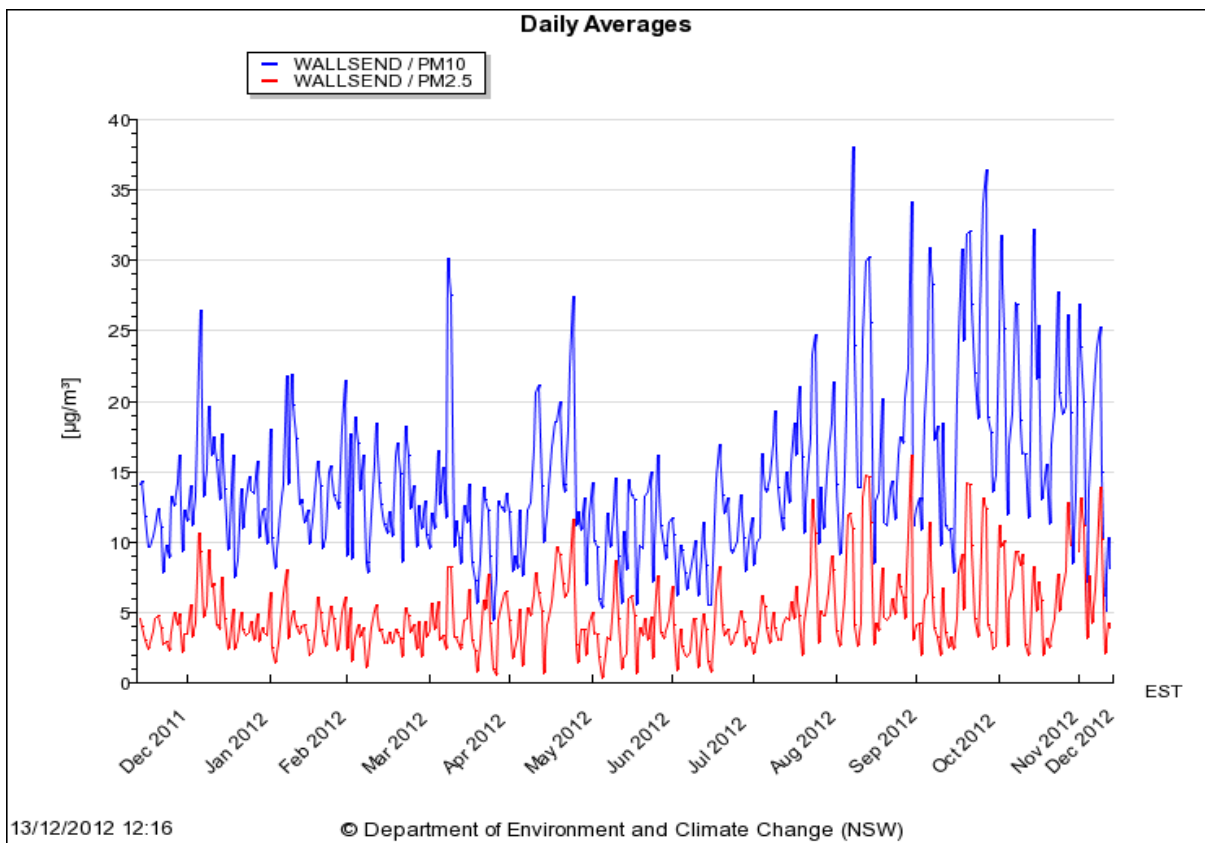
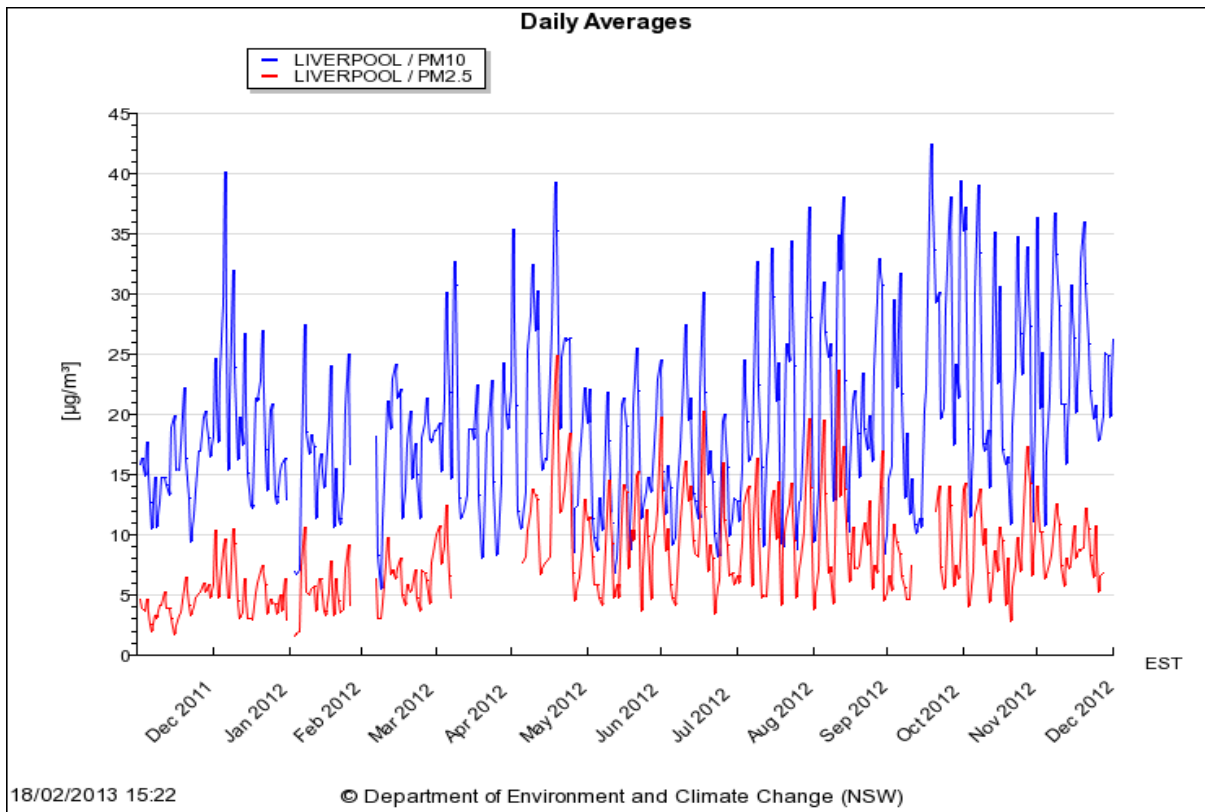
APPENDIX 1











APPENDIX 2

Wood Heating – Solving the Wood Smoke Problem

A Project to Reduce Domestic Wood Smoke in the Sydney GMR

Purpose

To encourage local councils in Australia to support wood heating, by demonstrating effective methods for eliminating nuisance smoke emissions.

Background

As the national body representing the commercial firewood supply chain, the FAA seeks to promote the environmental attributes of firewood as a carbon neutral, low cost source of renewable bioenergy for domestic heating. As part of this objective the FAA and its members have a commitment to tackling any negative environmental or social impacts that may be associated with burning firewood. The emission of high levels of wood smoke can have a major impact on neighbours, mainly as a nuisance factor. Also under certain metrological and topographical conditions, wood smoke can migrate from surrounding areas and become trapped by a temperature inversion layer, creating a pool of dense smoke. Prolonged exposure to wood smoke is known to elevate health risks, especially for people with pre-existing respiratory or cardio-vascular conditions.

Contact with councils in the Sydney Greater Metropolitan Region has shown that dealing with wood smoke complaints is not a major part of the workload of environmental officers. Nevertheless nuisance wood smoke is one of the main reasons why a number of local governments across Australia actively discourage the use of firewood by setting controls and restrictions over new wood heater installations. Fine particle pollution is a topic of concern to most environmental health organisations worldwide.

Studies carried out by the University of New England (UNE) in Armidale (Bullar & Hine) demonstrated that a significant reduction in smoke emissions could be achieved by improving heater operation practices. These studies also found that 85% of the smoke emitted by the surveyed population was produced by just 15% of the wood burning participants. This finding shows that problem wood smoke is not actually caused by the wood heaters themselves but is a result of their incorrect use, lack of maintenance, or poor installation. It is the small percentage of high smoke emitters that are not only the cause of most wood smoke complaints but also the main contributor to elevated levels of fine particle pollution from domestic wood burning. By far the most effective way to reduce overall levels of domestic wood smoke pollution is to target the 15% of users who are creating 85% of the problem, rather than by randomly removing heaters, or preventing the installation of new heaters.

The UNE studies found that education concerning the health risks associated with wood smoke was not effective in motivating a change in heater operation practices by high smoke emitters. The UNE team also investigated potential factors for motivating high smoke emitters to change their behaviour. This study investigated several key psychological factors contributing to public support for policies designed to mitigate smoke from wood heaters. As a result of their studies the UNE psychology team believes that the best way to achieve a lasting behavioural change for high wood smoke emitters is to use a non-threatening educational intervention procedure directly targeted only at high wood smoke emitters.

The FAA has been a contributing partner to all of the UNE's wood smoke studies.

This innovative smoke reduction project will confirm and demonstrate the effectiveness of specific, targeted contact with high smoke emitters as a means of achieving a significant reduction in wood smoke. The project will utilise newly developed portable smoke detecting technology to efficiently identify high smoke households that will be subjected to a variety of targeted intervention mechanisms. The UNE Psychology team will assess the effectiveness of each intervention mechanism.

The intended outcome of this project is to develop a 'toolkit' of proven smoke control measures, materials and methods that can be provided to any council who wants to reduce wood smoke from domestic heaters in their local area.

Until the Australian firewood industry is able to provide a practical, affordable and effective solution to problematic emissions that result from the use of its product, it will remain under pressure from governments at all levels and environmental NGO's.

Project Partners and Resources

After canvassing a number of councils in the Sydney GMR, The Hills Shire Council agreed to join the project as a partner, as they are keen to take a proactive approach to wood smoke reduction, rather than just respond reactively to complaints. The number of wood smoke complaints received annually by the Shire is not large, but there are "hot spot" sections within the Shire that can be effectively targeted for this project. The Shire has provided maps and records to assist with the experimental design, as well as the skilled resources to assist with the intervention/education phase of the work.

Our existing associates in the University of New England have agreed to assist with the research design and to develop the targeted education strategies. They will also carry out statistical analysis of the results and assist with report writing.

FAA's contract managers QA Pty Ltd will carry out the wood smoke "audits", supervise the project and act in an advisory and support role for the researchers.

FAA members have made the commitment to provide most of the required funds. For the project to progress to completion, the remaining funding will need to be provided by other businesses or organisations that have an interest in the long term viability of the Australian firewood industry and/or the potential health impacts of domestic wood smoke resulting from the incorrect operation of wood heaters and fireplaces.

The Project Plan

Preparation (March - May 2013)

1. Define three survey areas based on records of recent wood smoke complaints.
2. Estimate the proportion of houses that have wood burning heaters or fireplaces.
3. Develop a detailed demographic profile for each survey area.
4. Purchase and commission the portable smoke (PM 2.5) monitoring station and custom software from Kenelec Scientific.
5. Field trial the detection equipment to determine its spatial resolution for the housing density in the selected survey areas.

Year 1 (June – September 2013)

6. Identify at least 60 heavy smoke emitting households within the survey area using a combination of visual smoke detection and the portable smoke monitoring station.
7. Randomly assign one third of the high emitters to each of three experimental conditions,
 - (a) Standard model - provision of education materials and negative health warnings;
 - (b) Face-to-Face intervention - provision of free wood heater service and flue clean;
 - (c) Enhanced Face-to-Face intervention – provision of free wood heater service and flue clean. Expert advice and instruction on wood heater maintenance and operation as well as wood procurement and storage practices.
8. Record any smoke complaints received and monitor the effectiveness of the existing Council response procedures.
9. Engage with and recruit wood heater service professionals who will deliver the face-to-face householder education.
10. Analyse results and prepare an interim report.

Year 2 (March – September 2014)

11. Train wood heater service providers on the delivery of the face to face interventions.
12. Develop the ‘standard’ education materials in conjunction with The Hills Shire and UNE Psychology department staff.
13. Monitor the identified heavy smoke emitters during and after the period when education and other intervention measures are carried out.
14. Analyse results and prepare a second interim report.

Year 3 (May – September 2015 and beyond)

15. Repeat the initial smoke audit methodology to quantify the outcomes and effectiveness of each of the education/intervention procedures.
16. Advise council on implementing and operating a regular smoke monitoring and mitigation program.

Prepare a project report and conduct a promotion program to raise the awareness of Councils and local communities. Engage with other Councils around Australia to implement effective smoke reduction programs and seek to remove any impediments to the use of wood for heating.

Outcome and Future Benefits

Armed with effective smoke control procedures, councils would be able to actively promote wood heating as a practical means of helping them to achieve their greenhouse gas emission targets. At the same time residents will be able to benefit from the energy cost savings and improved heating performance that can be achieved by using firewood without impacting significantly on local air quality. Concerns that any councils may have over the impact of wood collection on biodiversity can easily be addressed by recommending that wood be purchased from FAA sustainable firewood suppliers.