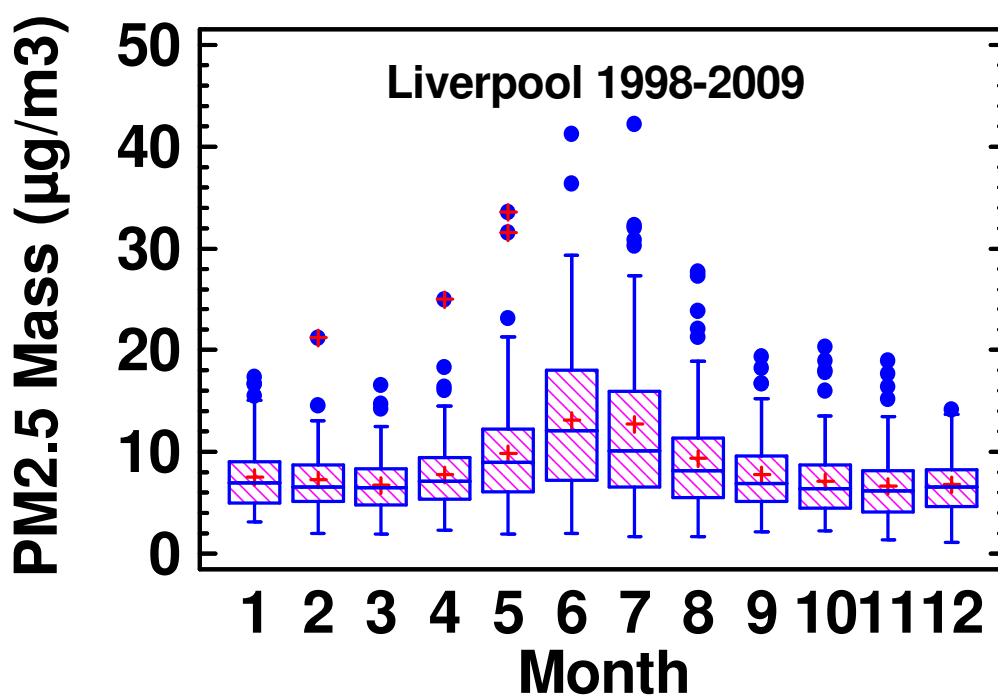
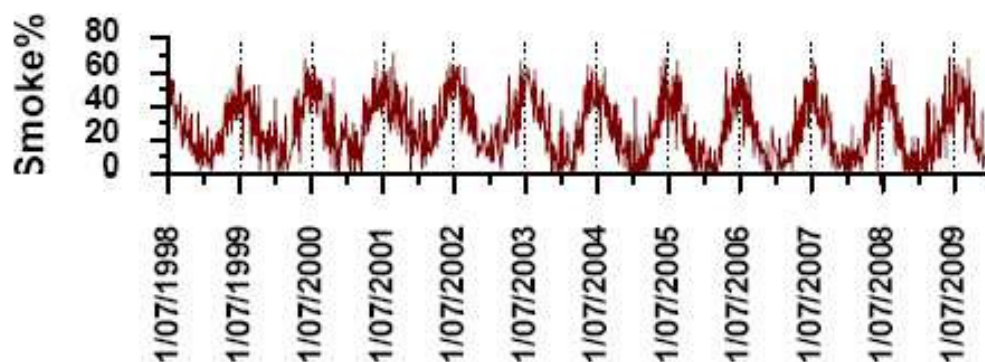


## **Appendix – Other Relevant Information, provided by the Australian Air Quality Group**

### **NSW EPA Emissions Inventory – 50.6% of all Sydney’s PM2.5 emissions are woodsmoke from domestic wood heaters.**

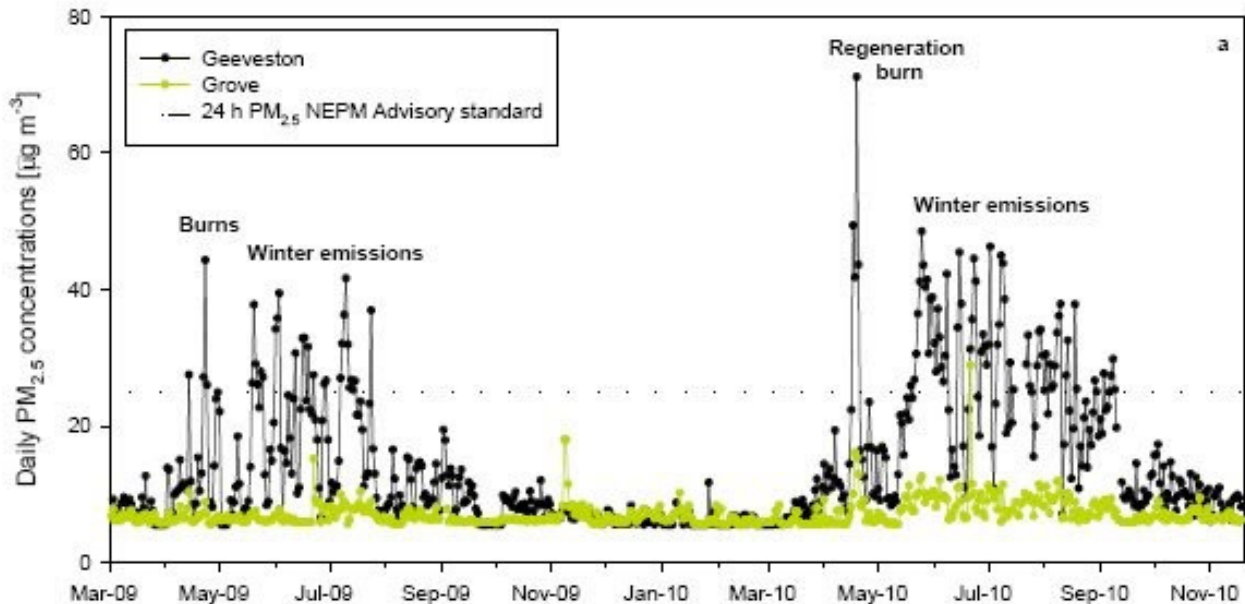
The NSW EPA recently compiled an emissions inventory for Sydney. In 2008, a total of 10,770 tonnes of PM2.5 were emitted to Sydney’s air, of which 5,457 (50.6%) was from domestic wood heating. This is 2.6 times the PM2.5 emissions of all Sydney’s on-road trucks, buses and passenger cars. Sydney has 1.8 million vehicles but only 83,300 households (5%) using wood as the main form of heating[12]. More importantly, while PM2.5 emissions from vehicles have decreased by 11% since 2003, wood heater emissions have increase by 21%, resulting in increased health costs of \$224 million per year. A typical new wood heater installed in Sydney will emit 19 kg of PM2.5 per year, 190 times as much as a new diesel SUV or 4WD satisfying Euro 5 standards.

The graphs show results from a study in 2011, characterising airborne particles in Liverpool, Sydney. Woodsmoke was identified as a major source in winter “*Clearly wood heaters in the Liverpool area in winter are a major source of fine particle pollution.*”[13] This confirms the results of the NSW EPA Emissions Inventory, and the NSW EPA carbon dating analysis of samples collected a Rozelle, Sydney CBD Jul/Aug 1993 (4 pm to 8 am) – 67% were from modern sources, i.e. wood, not traffic or coal.



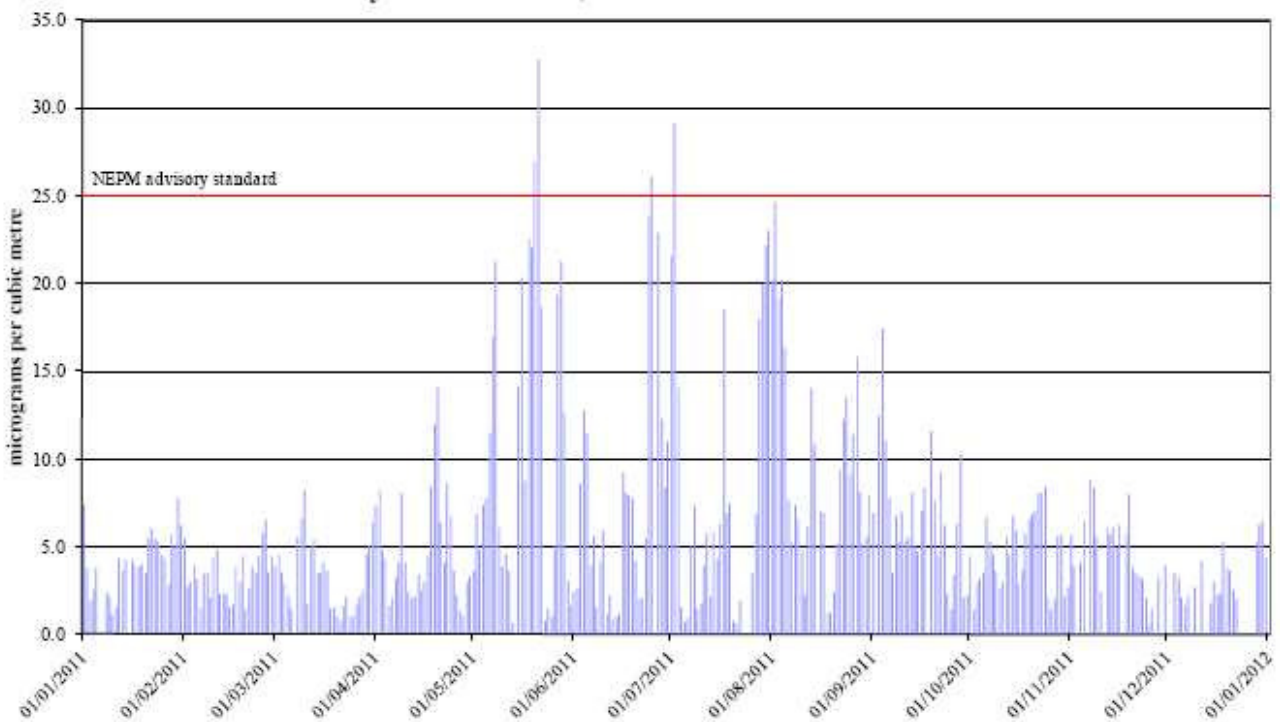
## Small town with 277 houses is one of the most polluted areas of Australia – most PM2.5 exceedences attributed to domestic wood heating

A CSIRO study measured compared PM2.5 pollution in Geeveston, a small town in Tasmania with 277 houses, exposed to smoke from domestic wood heaters with Grove, a rural area of Tasmania, exposed only to forestry burns. The difference is shown in the graph below. The forestry burns led to a one exceedence of the PM2.5 standard. In Geeveston, the PM2.5 standard was exceeded on 99 occasions. The NEPM requires monitoring in larger urban areas. In NSW, NEPM PM2.5 monitors are installed in 4 Sydney locations (Chullora, Earlwood, Liverpool, Richmond), 2 locations in the lower Hunter (Beresfield and Wallsend) and Wollongong. The NSW NEPM compliance report for NSW indicates 1 exceedence of the PM2.5 standard at 1 monitoring station (Beresfield). For some reason the 37 exceedences in Armidale, NSW in 2010 (based on DusTrak measurements by the local council) are not even mentioned!

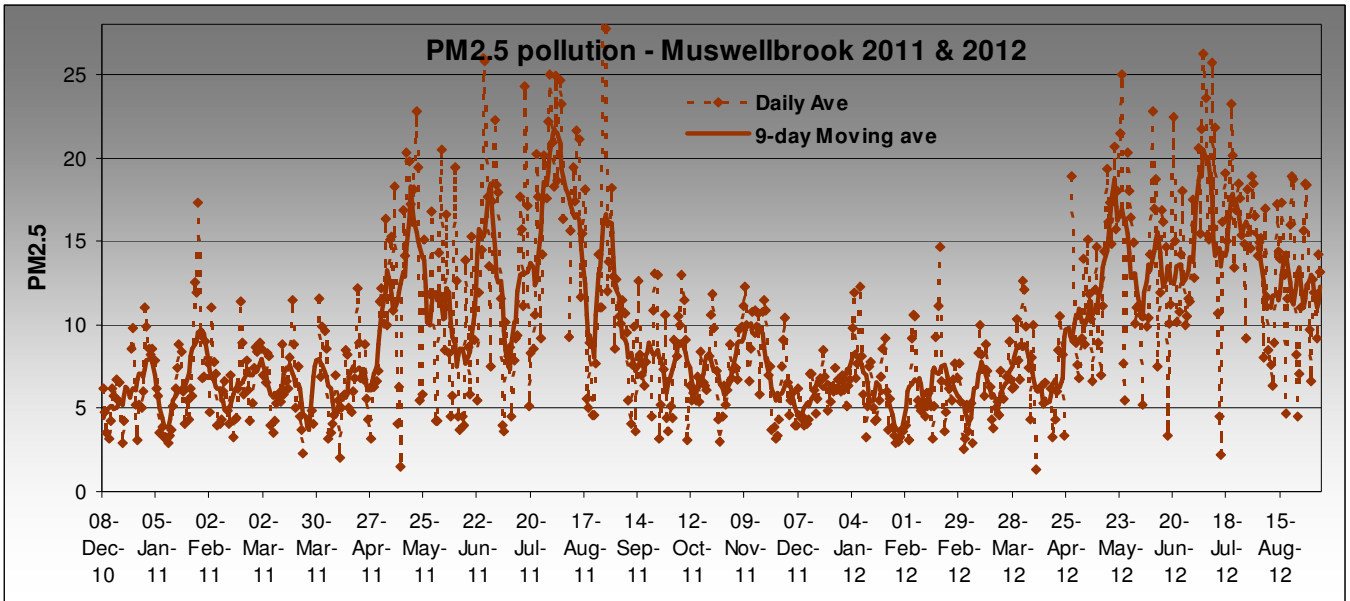


## Canberra -2.3% of households using wood as the main form of heating cause high wintertime PM2.5 pollution and exceedences of the PM2.5 standard in Canberra

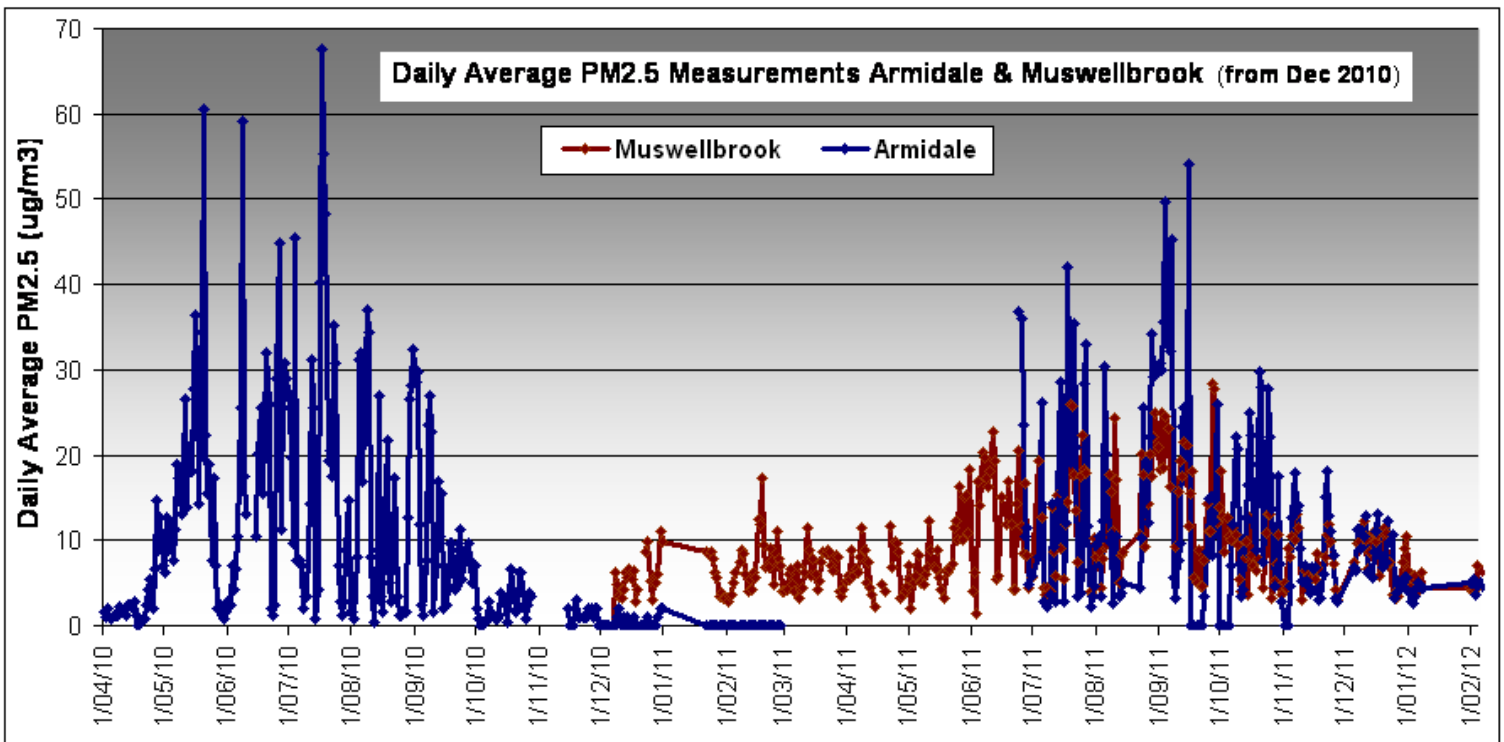
Daily PM2.5 levels, Monash 2011



**Domestic wood heating blamed for high PM2.5 pollution in mining town (Muswellbrook)**



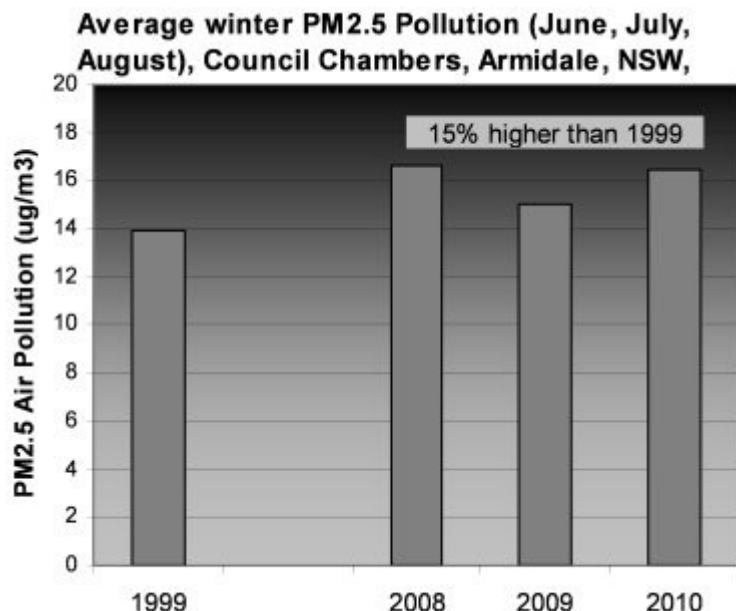
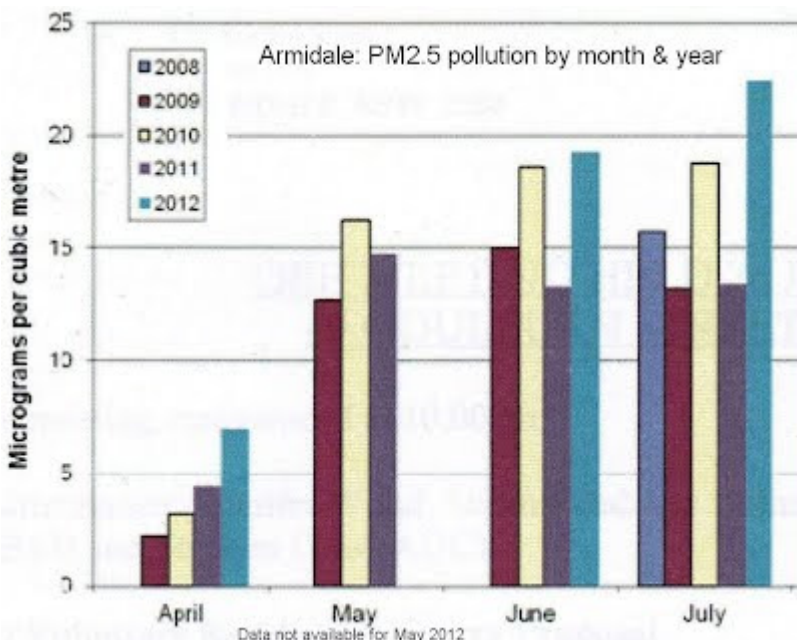
**Media release: 28 June 2011:** “The NSW Office of Environment and Heritage reports today that higher concentrations of PM2.5 particles measured at the Muswellbrook and Singleton air quality monitoring sites in the Upper Hunter over the weekend was likely due to woodheater use.”



**Colder areas such as Armidale have even worse PM2.5 pollution than mining towns.**

Armidale Council uses a DuskTrak monitor (calibrated for woodsmoke by John Innis, EPA, Tasmania) to measure PM2.5. Despite Armidale’s high PM2.5 levels, State and Federal Governments do not help with pollution monitoring and have provided little assistance to solve the problem.

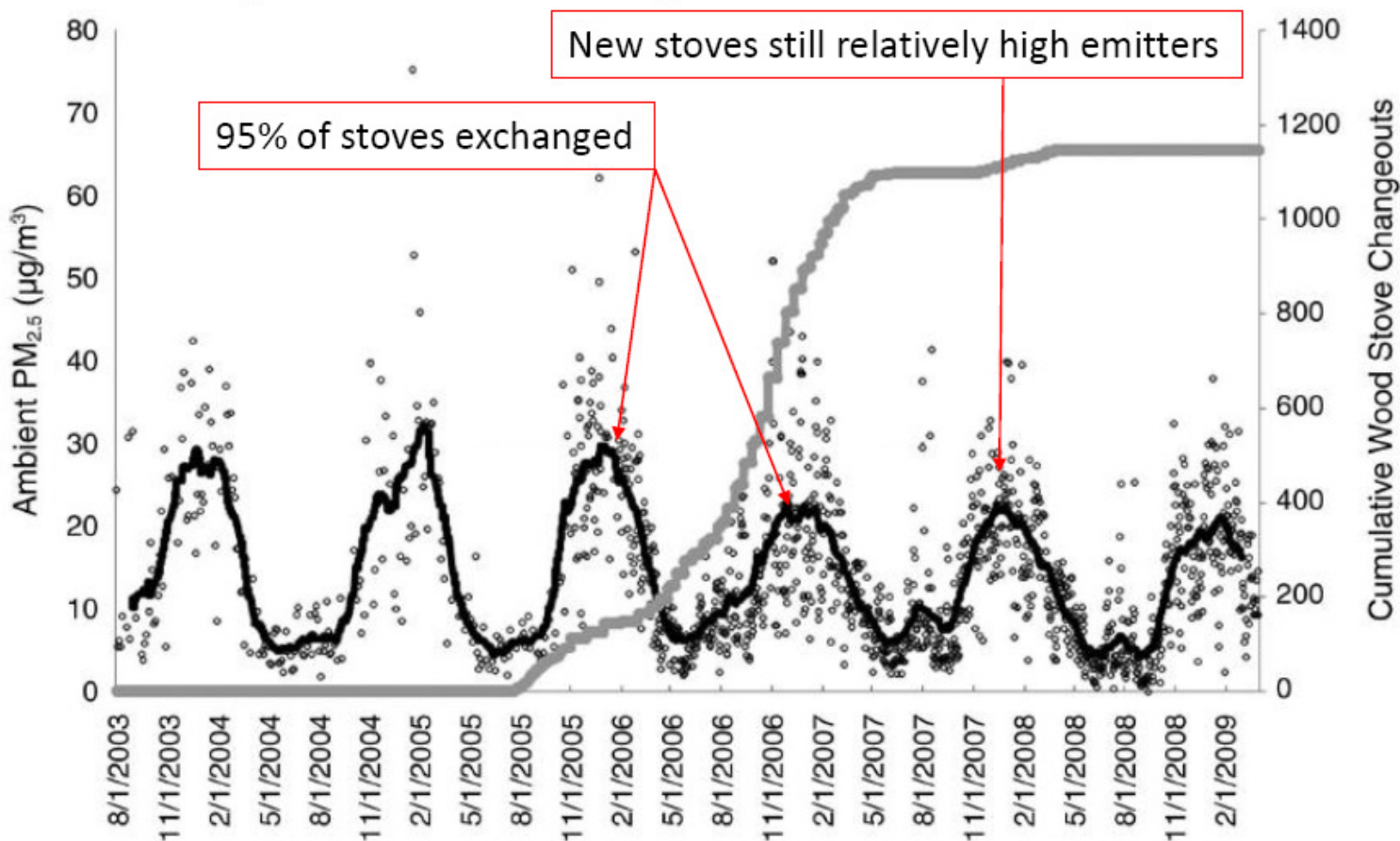
**The \$2 million woodsmoke reduction program in Launceston, Tas, led to substantial improvements in health.** From 2001 to 2004, the number of households that used wood-burning stoves fell from 66 to 30 per cent.” Wintertime particulate pollution fell by 40 per cent. "Deaths among men fell by 11.4 per cent, particularly from cardiovascular causes, which saw a decline of 17.9 per cent, and from respiratory causes, which retreated by 22.8 per cent ..."[15]



Few people who understand the serious health consequences of breathing woodsmoke, including heart and lung disease, genetic damage in babies, low birthweights, reduced cognitive function, actually want to use wood heaters. Successful woodsmoke programs, such as in Launceston, focused on the health effects of woodsmoke and emphasise the importance of switching to non-polluting heating. As well as providing subsidies to low-income families to cover the cost of switching, education is also needed on the most cost effective ways to heat homes, including upgrading insulation, to ensure that switching away from wood heating does not compromise cost or comfort.

Unsuccessful programs, such as in Armidale, where PM2.5 levels are now higher than in 1999 tried unsuccessfully to follow the industry line that the problem can be solved by switching to new heaters. The Australian wood heating industry body (the AHHA) claims that "On completion of the change-out program, Libby, Montana, has improved its air quality by more than 80%". The change-out in Libby, a town of 2,600 residents cost over \$2.5 million. Independent researchers estimate the reduction was only 28% - see graph below, with many winter days when woodsmoke is at totally unacceptable levels. 'Truth in Advertising' legislation is needed to prevent the people who profit from wood heaters mis-representing the truth.

### Libby, Montana stove exchange



**Climate change: Soot's role 'underestimated' says study** "Scientists say that particles from diesel engines and wood burning could be having twice as much warming effect as assessed in past estimates. They say it ranks second only to carbon dioxide as the most important climate warming agent ... This new study concludes the dark particles are having a warming effect approximately two thirds that of carbon dioxide, and greater than methane." "Reducing emissions from diesel engines and domestic wood and coal fires is a no-brainer as there are tandem health and climate benefits," said Professor Piers Forster from the University of Leeds.

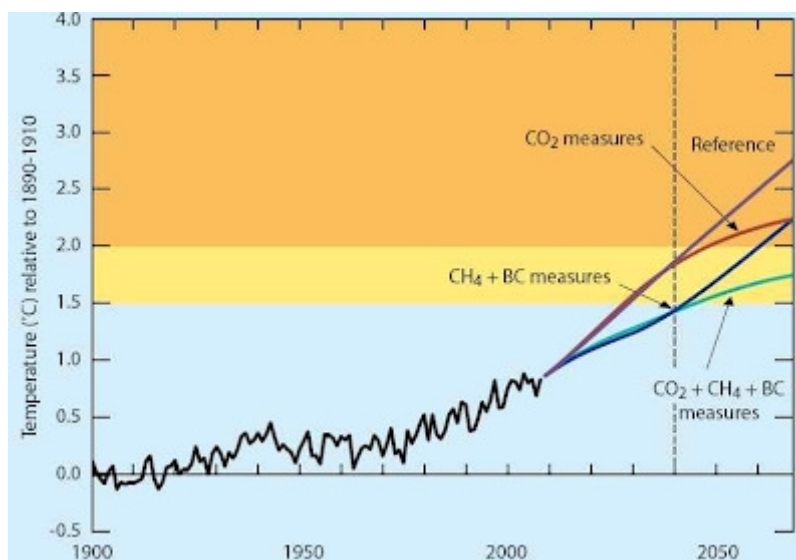
"If we did everything we could to reduce these emissions we could buy ourselves up to half a degree less warming, or a couple of decades of respite," he added - <http://www.bbc.co.uk/news/science-environment-21033078>

## UN Environment Program and World Meteorological Association recommend phasing out log-burning heaters in developed countries to reduce global warming and improve health.

A United Nations report calls for fast action to reduce emissions of black carbon, ground level ozone and methane to help reduce current global warming and prevent the Earth from overheating. **Recommended procedures** include mandatory diesel filters on vehicles, **phasing out wood-burning stoves in wealthy countries**, use of clean-burning biomass stoves for cooking and heating in developing nations, and a ban on the open burning of agricultural waste - [http://www.redorbit.com/news/science/2063763/curbing\\_soot\\_smog\\_could\\_help\\_limit\\_global\\_temperature\\_rise/](http://www.redorbit.com/news/science/2063763/curbing_soot_smog_could_help_limit_global_temperature_rise/).

Methane, ground-level ozone and black carbon cause about half of current global warming. The report calls for immediate action to reduce these emissions to help limit global temperature rises over the next 20 years that could lead to catastrophic climate change from melting of glaciers and polar icecaps (that reflect radiation back into space) as well as [methane permafrost](#) and [frozen sub-sea methane](#), which have been described as a "ticking time bombs" for our climate – see <http://woodsmoke.3sc.net/greenhouse>

The graph from the 2011 [UNEP report](#) <http://www.unep.org/newscentre/Default.aspx?DocumentID=2659&ArticleID=8958&1=en> (published Nov 2011) shows the effect of the measures to reduce methane (CH<sub>4</sub>) and black carbon (BC) on global temperatures. Compared to the purple Reference (business as usual) line the dark blue line shows a rapid reduction in global temperatures of about 0.4 degrees by 2040, complementing the measures to reduce CO<sub>2</sub> emissions. Measures to reduce CO<sub>2</sub> generate benefits from about 2040. By about 2070, half the reduction is due to the reductions in methane and black carbon emissions and about half due to the reduction in CO<sub>2</sub> emissions.

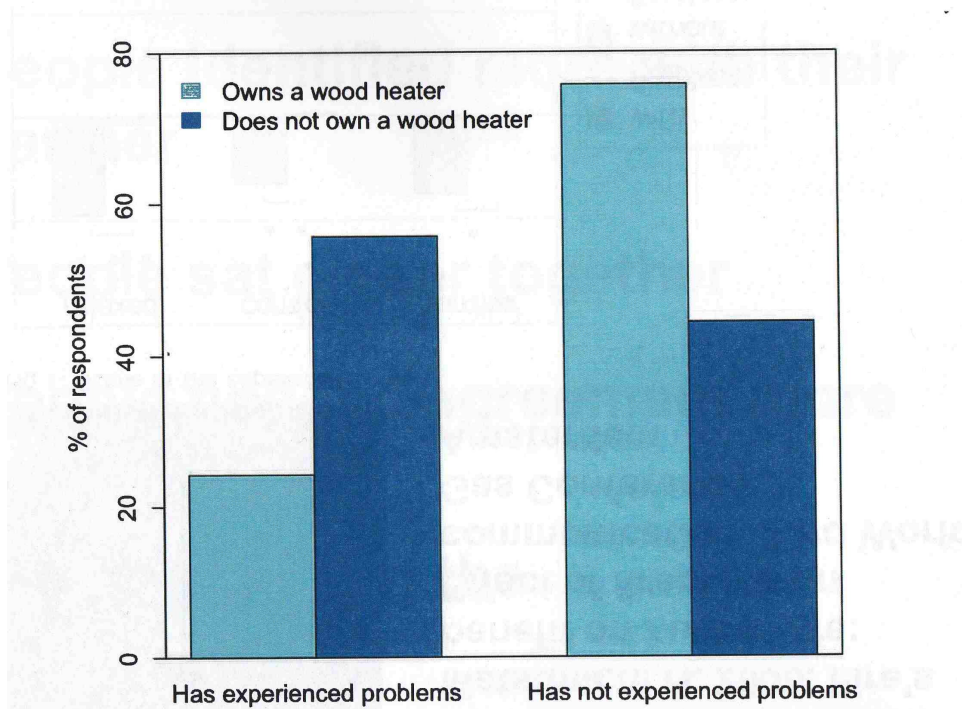


**Policies in Australia and elsewhere.** Several other jurisdictions are not getting on top of their woodsmoke problems. For example, in Montreal, Canada, the installation of new log-burning heaters was banned from 28 April 2009 and subsidies of up to \$900 are available to replace existing wood heaters with alternatives - <http://www.feuvvert.org/home> Montreal's education material highlight the level of emissions from wood heaters: "A **CONVENTIONAL WOOD STOVE** burning for only nine hours *emits as many fine particles as a car does in one year (18,000 km of driving)* - <http://www.feuvvert.org/why-change/quality>"

Subsidies and requirements to remove existing woodheaters and restrictions on the installation of new ones are also common in New Zealand. For example, in Christchurch the installation of new wood heaters is not permitted, except for models with emissions rating less than 1.0 g/kg installed as replacements for more polluting wood heaters. In Otago, all wood heaters with emissions rating of more than 1.5 g/kg had to be removed by 1 Jan 2012.

Several other jurisdictions do not permit the installation of solid fuel heaters e.g. the Sydney Councils of Waverley and Holroyd, with others requiring non-polluting heating in new developments, e.g. Manooka Valley, Oran Park and Turner Road Growth Precincts. As well as not permitting the installation of new heaters (e.g. California's San Joaquin Valley, new houses throughout southern California), many US jurisdictions have 'burn bans' during periods where temperature inversions are likely to trap the smoke and allow it to build up to unacceptable levels.

## Experienced problems with wood heater smoke from other houses



Recent survey of people living in Armidale and other towns on the Northern Tablelands, showing that nearly 60% of respondents who did not have a wood heater reported experiencing problems with wood heater smoke from other houses.

The vast majority of heaters being installed in Australia have higher emissions ratings than some of the models that had to be removed in Otago. The photo below shows emissions, observed for nearly 1 hour, from a brand new model with emissions rating < 2.0 g/kg installed in a brand new house in Armidale, NSW. This is what the AHHA means by a “cleaner and greener wood heater that exceeds the most stringent Australian Standards and even outperform the tighter standards imposed by Armidale Dumaresq Council.”



**Motor vehicles.** Vehicle manufacturers accepted health-based emissions, standards, despite expectation that the new standards will push up the price of a \$40,000 diesel vehicle by about \$980, or 2.5 per cent. The new standards, to be fully implemented by 2018, will cut vehicle emissions by as much as 90-percent. This is on top of previous regulations that cut emissions from diesel cars by more than 97 percent. If vehicles can be made cleaner and more efficient, then why not wood heaters, especially if wood heaters and not vehicles are the major source of PM2.5 pollution in Australian towns and cities?

The reduction in health costs of \$1.5 billion for new vehicle standards for the whole of Australia is much smaller than the estimated \$8 billion for wood heaters in NSW, despite the fact that NSW had only 372,203 wood heaters but 4,633,100 registered vehicles in 2010.

### **How this submission addresses the Inquiry Terms of Reference**

The impacts on health of air quality in Australia, including:

- (a) particulate matter, its sources and effects;
  - (b) those populations most at risk and the causes that put those populations at risk;
  - (c) the standards, monitoring and regulation of air quality at all levels of government; and
  - (d) any other related matters.
- 
- a) This submission notes the proportions of PM2.5 from domestic wood heaters and motor vehicles, and notes that even close to coal mining areas (e.g. Muswellbrook) the pattern of emissions – much higher levels in winter, especially at weekends, suggests that domestic woodsmoke is a more significant source of PM2.5 than mining. The submission also notes that PM2.5 are now considered the most health-hazardous form of air pollution, responsible for many more premature deaths than ozone or coarser particles from 2.5 to 10 microns in diameter.
  - b) This submission also notes serious health effects for unborn children, children starting school, and the elderly, and anyone at risk of heart or lung diseases
  - c) We also note that the current NEPM monitoring is misleading because most locations that exceed the PM2.5 standard lack official NEPM monitors. The 2010 NSW NEPM report 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, NSW (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.
  - d) Other related matters include a list of measures to help reduce the health damage from woodsmoke, including taking action to prevent the people who profit from selling wood heaters from misleading the public.