Woodsmoke emissions in the regional city of Armidale during winter are a major health concern. Serious action needs to be taken to reduce woodsmoke emissions at both Local and State Government levels.

The Armidale situation

In an Agenda report to the Armidale Regional Environmental Sustainability Advisory Committee (8/12/16) it was stated:

*The Armidale community is passionate about air quality. The city’s cold climate and low winds result in wood smoke from thousands of homes accumulating in the valley during winter. Accordingly, improving air quality has been a focus of community concern and Council efforts for many years.*

*With NSW EPA assistance, Council has been monitoring the level of wood smoke and other fine airborne particles through a DustTrak monitor on the roof of the Civic Administration Building since June 2008. Information is shared with the community via the Council website in a deliberate effort to inform the community and encourage compliant, responsible behaviour.*

*Council is committed to reducing wood smoke pollution in the Armidale urban area in order to meet national fine particle (PM 2.5) air quality standards by 2020.*

Despite Council’s best efforts, in 2015 there was a large spike in the number of days when the NEPM was exceeded although this data may have been skewed due to problems with the DustTrak machine. Council has called on the community to assist with the following actions:

- consider replacing your wood heater with an alternate form of heating
- if you have a wood heater, make sure it does not produce excessive smoke
- contact council for a FREE education kit
- contact council if you see a smoky chimney

Clearly Council needs a stronger approach but this is only possible through both legislative and financial support at State Government level.

In a presentation about wood smoke pollution in Armidale to the Armidale Regional Environmental Sustainability Advisory Committee Meeting held 8/12/16, [Redacted] EPA stated that the wood smoke particle target of 2.5ppm was set in 2008. Wood heaters have been regulated since 2007. Smoke generated by heaters goes downhill and settles in the Armidale basin in an inversion layer creating a health hazard. Health warnings seem to have little effect. Since monitoring has taken place, there is an annual average of 25 days when particles exceed 2.5ppm. This is unacceptable.
There seems to be a cultural problem with local residents not willing to give up traditional methods of heating. Harvesting wood is unregulated in the district with some residents being able to obtain 'free fuel' from private properties. These residents are not willing to replace their solid fuel heaters despite all the health warnings. Many residents have little understanding of the moisture content of wood which should not be burned above 25% moisture content.

There will be no change to the current situation without legislative support or financial incentives.

The Health Risks
The long term risks to health from fine particle pollution have been well known for some time. In her article 'What makes a successful Woodsmoke Reduction Program' published in *Air Quality and Climate Change* Vol. 50 No.3. Aug. 2016, Dr D L Robinson summarised the effects on health in a woodsmoke polluted zone.

Woodsmoke, and the PM2.5 pollution it contains, is linked to reduced ability of the lungs to fight infection, elevated blood pressure, increased risk of heart attacks, strokes, lung diseases, Alzheimer’s, smaller brains, cancers (lung, mouth, throat, breast and cervical cancers in adults, blood and brain cancers in children), cot deaths, genetic damage in babies and reduced IQ and behavioural problems when children start school (AAQG 2015). For women over 70, increased exposure of 3.5 g/m3 PM2.5 reduced the volume of white matter in the brain by 6.2 cm3 (Chen et al. 2015). The American Heart Association published a study in their journal, Stroke, showing that, for people over 60, increased PM2.5 exposure of just 2 μg/m3 was associated with a 0.32% smaller total cerebral brain volume and a 46% higher risk of covert brain infarcts, a type of silent stroke (AHA 2015). One in six Australians will be affected by stroke, the nation’s leading cause of disability (Fisher 2015). Living downwind of one Australian wood heater (new or old) will often increase annual PM2.5 exposure by more than 2g/m3.

Woodsmoke was found to cause 12 to 30 times as many tumours in mice and mutations in bacteria as the same amount of cigarette smoke (Naether et al. 2007). Breathing cigarette smoke transports chemicals to the bloodstream and directly to smokers’ brains. Similarly, the cancer causing chemicals in woodsmoke enter the bloodstream and are carried to every organ in the body, causing similar health problems – heart attacks and strokes as well as lung diseases, cancers and premature aging (Numan et al. 2015). Few people realise that PM2.5 causes more premature deaths than any other air pollutant (WHO 2016), that there is no safe level of PM2.5 pollution, or that the average new Australian wood stove emits more PM2.5 per year than 1,000 passenger cars (AAQG 2011).

Woodsmoke reduction programs

Success in Launceston – 40% less PM2.5 and fewer deaths
Launceston’s successful woodsmoke program reduced deaths in winter from respiratory disease by 28% and cardiovascular disease by 20%. Year round, for men, the reductions were 23% (respiratory), 18% (cardiovascular) and 11.4% all deaths, (Johnston et al. 2013). The program focussed on the health effects of woodsmoke pollution. Wood stove users were encouraged to switch to non-polluting heating by the slogan: “Isn’t it time to you gave up smoking?” Expenditure was modest 2,000 households received subsidies of about $500 to remove wood heaters. Many other households replaced wood stoves with non-polluting heating entirely at their own expense. (Robinson, 2016 p. 25).

Unsuccessful woodsmoke reduction programs were carried out in Tasmania and Muswellbrook. Here the emphasis was on educating the public on the correct burning techniques. Both programs proved to be ineffective in reducing the level of particle emissions. Muswellbrook received grants of $40,000 in 2013 and 2014 for woodsmoke reduction (UHAQAC 2015). The NSW EPA’s ‘Stay warm, breathe easy’ leaflet, told homeowners that “By making a few simple changes you can enjoy the warmth of your wood heater and reduce wood smoke and its impact on you and other people in your community.” The program had very little effect on pollution levels. (Robinson, 2016 p. 25).

In a study commissioned into heating methods and attitudes of wood stove users in the Hunter Valley (Databuild 2016). The study found that a considerable majority of households (73%) in Muswellbrook and Singleton do not use wood heating. About half the households with wood heaters (14% of the total) were in town centres or other urban areas, where population exposure to PM2.5 pollution is of greatest concern. Attitudes of wood heater users were determined from a sample of 203 households using wood heating; 77% were in town centres and 23% in villages out of town. Only 28.6% of respondents agreed with the statement that “particles in the smoke coming out of the
chimney can be harmful to my family and my neighbours’ health.” A similar lack of understanding was shown in Armidale Dumaresq Council’s consultation on wood heater policy in 2010; only 34% of the 84 respondents thought that woodsmoke was a serious health problem. (Robinson, 2016 p. 28).

The resistance of wood heating households to educational programs is a major factor in unsuccessful reduction programs. Such programs have been shown to be ineffective. The only clear way to reduce woodsmoke pollution in problem areas is to gradually replace the wood heaters with non-polluting systems.

Modern heat pumps have superseded piped natural gas as the most cost-effective heating in Australian cities (Forcey 2015). Efficient heat pumps can deliver 5 or 6 times as much heat to the home as they use in electric power (Wright 2011). They are also effective at low temperatures, providing 3 to 4.5 times as much heat even when the outside temperature is 10ºC (10 degrees below freezing). They are affordable (cheaper than buying a wood heater), cause less global warming (zero in households that use green power) and have lower running costs than buying firewood.

Legislative and financial support from the NSW Govt. is required

After consultation with a number of residents and local doctors, I am proposing the following actions:

1. Provide Councils experiencing woodsmoke pollution problems a grant to define and map the problem zone based on inversion layer boundaries.

2. Ban the installation of wood heaters in the defined zone and offer financial incentives for residents to replace their wood heaters with a non-polluting system.

3. Houses offered for sale within the problem zone should be required by law to replace their wood heater with a non-polluting system.

I support the NSW Govt’s Action plan to update the Clean Air Regulation regarding wood heaters for households outside woodsmoke hazardous zones. It is proposed that changes to the wood heater regulatory framework will adopt the updated Australian/New Zealand Standards for new wood heaters, which set more stringent emission limits and new efficiency limits. The EPA will undertake periodic compliance audits to ensure that heaters offered for sale in NSW are complying with the new national standards.

I also support an investigation into other measures to reduce wood smoke emissions for households outside woodsmoke hazardous zones.

The EPA is undertaking further research into the impacts of wood heaters across the GMR and lower emission standards. This research is a collaboration with NSW Health, CSIRO and the Centre for Air quality & health Research and evaluation (CAR). In consultation with stakeholders and the wider community, it is proposed that the EPA will investigate further improvements to the wood heater regulatory framework for consideration by Government, as well as education, training and replacement programs.

The proposed Government Actions do not address the need to gradually remove wood heaters from woodsmoke pollution zones such as those experienced by regional towns with winter inversion layers. I am calling on the Government to legislate for removal and replacement of wood heaters in such zones. Fine particle pollution represents a major health hazard which needs to be dealt with without delay.
References quoted in Dr Robinson's article


AAQG. (2015). “Health experts advise that current wood heater models are too polluting to be allowed. Australian Air Quality Group. Available at: http://woodsmoke.3sc.net/health.”


