Thoughts on Managing Wood-smoke

In [redacted] NSW, where I live, my asthma has become worse, and is occurring in bed at night when all windows and doors are closed. I am also closer than previously to congestive cardiac failure. I feel it is clear that my health would be better without PM2.5 particles. My own space heating is a combination of solar, electricity and gas. It appears that there is no safe level of PM2.5 particle 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. **Wood-smoke is the major source of PM2.5 particles - even in Sydney's mild climate, where only 5% of households use wood as the main heating** - and **it** 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

In Armidale, NSW, despite local govt. expenditure of hundreds of thousands of dollars to apply emissions limits for wood heaters of 2.5 g/kg in new houses and 3.0 g/kg in existing households, Armidale's wood-smoke measurements in 2012 were worse than in 1999. The 3 most cost-effective measures listed in the NSWWC Recommendations build on the successful approach in Launceston, which achieved major health benefits by replacing wood heaters with alternatives. Problems elsewhere remain mostly unresolved because local councils have neither the expertise nor the resources to deal with them.

Major health benefits will result from reducing wood-smoke. It 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***. These benefits are so large and significant that I certainly don't consider wood heaters worth the large increase in early deaths from heart and lung diseases, including possibly mine!***

The toxic PAH (polycyclic aromatic hydrocarbons - the main chemical toxins in wood-smoke) have 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 – **http://woodsmoke.3sc.net/pah**.

Two Canadian studies reported serious health effects of woodsmoke **at 10 ug/m^3 PM2.5** – ie., less than half the current Australian advisory standard of 25 ug/m^3.

Here in [redacted], wood-smoke concentrations were noted to increase 4-fold within 40 metres, indicating that even *individual* wood heaters can cause serious health problems for immediate neighbours. This matters when there is no safe level of PM2.5 pollution.

The CRIS (Consultation Regulation Impact Statement) estimates that the **economic costs** of PM2.5 pollution range from $113 per kg of emissions in smaller regional centres such as Wagga and Armidale to $263 in capital cities *(ie.,* hospital costs plus accepted valuations of loss of healthy years of life*.)* 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 economic costs of a new wood heater average about $4,520 per year in regional areas and over $5,250 in capital cities*. ***Beyond the costs in lost health, how could it possibly be in the public interest to continue to allow the installation of new heaters with such major economic costs as well?***

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, if we continue to permit installation of wood heaters that have estimated health costs to government of $4,000 or more per year. *A moratorium on the installation of new heaters is the only viable option while the RIS (*Consultation Regulation Impact Statement*) is being revised* to assess the estimated costs of new heaters in urban areas, and what level of economic costs to government 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 had very limited success. Despite considerable time, effort and expense, the graphs show that measured pollution levels here in [redacted] were higher in 2008-12 than in 1999, the year when a University of New England research project showed a significant relationship between wood-smoke pollution and the number of visits to Armidale GPs for respiratory problems.

When heater emissions were found to cause 12 to 30 times as many mutations and tumours in bacteria and mice as the same amount of cigarette smoke, what sense is there in consulting the industry about regulation? **A new *health*-based standard for heaters, set by independent health authorities, should surely be developed as soon as possible.** *Once the new standard has been set, the*

moratorium would be lifted to allow only the installation of new heaters which satisfy the health-based standard.

I agree with the proposal that 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.

To hasten the shift and fund wood-smoke-reduction programs and the replacement of heaters that are affecting people's health, a 'polluter-pays' tax should also be levied on heaters that do not meet the legislated standard.

The **NSW Wood-smoke Control Options Report** considered 3 measures that together would reduce wood-smoke's economic costs by 75%. These were: (i) removal of existing heaters that do not meet a health-based standard when houses are offered for sale, (ii) not allowing the installation of new heaters that do not meet a health-based standard, and taxes and licencing fees on non-compliant heaters to cover the cost of wood-smoke-reduction programs and to assist people whose health or lifestyle has been affected by wood-smoke.

Estimated economic cost benefits of various NSW wood-smoke control options

	Health Benefit $million	Cost $million	Net Benefit $million
4) Phase out at sale of house	$4,015	-$36	$3,978
2) Ban on non-compliant 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]

It seems likely that a wood-smoke NEPM (National Environment Protection Measure - a Federal Government process) will be needed, to solve the problems of wood-smoke pollution. The NEPM should be set up with specific goals and targets, e.g. provision of a 24-hour hotline to deal with health-hazardous emissions from neighbours, a target of a 90% reduction in wood-smoke within 10 years, and no evidence of wood-smoke detrimentally now affecting public health. Given the Canadian research showing significant health impacts at exposure even of 10 ug/m^3, this level of pollution should be considered the absolute maximum acceptable level, with much lower levels to be achieved whenever possible.

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