

11 July 2013

COAG Standing Council on Environment and Water Secretariat  
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## **REGULATION IMPACT STATEMENT FOR REDUCING EMISSIONS FROM WOOD HEATERS**

This submission has been put together by the Air Quality Working Group, a sub-group of the Armidale Dumaresq Environmental Sustainability Committee comprising: Councillors Jim Maher (Mayor), Herman Beyersdorf (Deputy Mayor) and Peter O'Donohue, David Carr, Southern New England Landcare, Dr. Navjot Bhullar, UNE's School of Behavioural Cognitive and Social Sciences, Carol Davies, Sustainability Coordinator at Armidale Dumaresq Council (ADC) and Matthew Rand, Environmental Health Officer at ADC.

Armidale's Air Quality Working Group (the working group) gratefully acknowledges the support of Rachael Nicoll in preparing this submission. Ms. Nicoll is a recent arrival to Armidale. She comes with considerable experience working for government and as a consultant on air quality policy and programs in New Zealand and has contributed all of the examples from New Zealand in our submission.

This submission reflects the views of this working group but not necessarily the views of the full elected Council, due to insufficient time to seek Council's endorsement at a council meeting.

The working group appreciates the opportunity to provide comments on the Consultation Regulation Impact Statement (RIS) for reducing emissions from wood heaters and particularly appreciate representatives from the Commonwealth government travelling to Armidale in June 2013 for a public information seminar to provide an overview of the process, to hear first-hand how Armidale is impacted by wood smoke and how ADC has attempted to deal with this issue.

### **Summary of our key points and recommendations**

- Accredited PM10 and PM2.5 monitoring;
- PM2.5 listed as a goal rather than an advisory level;
- Commonwealth led identification and prioritisation of critical airsheds;
- Commonwealth funded campaigns conducted in critical airsheds;
- An emission standard of less than 1.5g/kg;
- An efficiency standard of greater than 65% and a national requirement for this rating to be added to compliance plates;

- National audits and results of these audits publicised and a national list of compliant wood heaters available.<sup>1</sup>

The working group encourages a holistic and evidence-based approach to the development of air quality policy and programs. There is a need for clarity around the responsibilities of government and industry to identify the seriousness of poor air quality and to implement proactive measures to improve air quality. We believe the Commonwealth government needs to take the lead in identifying problem areas and to fill gaps in the network of air quality monitoring stations (AQMS) throughout Australia to determine risks and to prioritise investment in pollution reduction programs.

We support independent testing and national certification of wood heaters. As this would require re-testing of all existing models, it prepares the ground for developing new low emission technologies. We believe new technologies, test methods and labelling are all critical to realising policy objectives. Done concurrently, at a national scale, this would signal the importance of reducing wood smoke emissions and stimulate the market for low emission wood heaters in Australia.

This is an opportunity for the wood heater industry to reduce emissions from wood heaters in the same way the automotive industry reduced vehicle emissions with catalytic converters 30 years ago. The impact on air quality of removing hydrocarbons and other harmful emissions from car exhausts was measurable and with long-lasting benefits; the reduction and/or removal of harmful emissions from wood heaters would have similar beneficial effects to communities and their health.

As a local Council, we need the resources to hire experts in relevant fields; it is not enough to theorise with assumptions from people with inadequate training. At what point does the experience gained on the ground at specific sites become relevant to the wider program and what processes are in place to facilitate that upward flow of information from the grassroots?

## Background

Armidale is a regional community of around 24,000 people, located on the Northern Tablelands of NSW. Our particular interest in public policy for air quality arises from the problems our community experiences during winter months as a result of the use of wood heaters by many residents and businesses in our urban area. It is estimated that about one-third of all Armidale households use wood for heating, with up to half of these households sourcing their wood for free. The impacts of these heating appliances and the fine particles which they emit is exacerbated by our cold winter climate, high pressure meteorological conditions and the valley topography of Armidale, all of which lead to wood smoke being 'trapped' by temperature inversions on many winter mornings.

Given these locational issues and increasing community consciousness about the need for responsible environmental management, improved community health and energy efficiency, our Council has taken an active role for over 20 years seeking to bring about an improvement in local air quality. This has involved educational, financial and regulatory components and a considerable investment of Council staff time and financial resources, as well as grant funding for various projects from the NSW Government. It is estimated that Council has committed more than \$300,000 (excluding wages) in the past 10 years on wood smoke abatement measures; a significant expenditure for a Council of our size.

In particular, Council has:

- Established a community advisory Committee to Council to assist with appropriate policy direction and implementation;

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<sup>1</sup> New Zealand Ministry for the Environment website [www.mfe.govt.nz/laws/standards/woodburners/authorised-woodburners.html](http://www.mfe.govt.nz/laws/standards/woodburners/authorised-woodburners.html). The National Performance Review of Woodburners Phase 1 & 2 reports can also be found at the same website address.

- Provided significant financial incentives, such as interest free loans and subsidies for insulation and new heating systems/technologies;
- Undertaken a range of public education and related media programs on domestic energy efficiency, including the construction of a display home;
- Monitored air quality in Armidale and regularly reported the results to the community;
- Conducted smoke patrols and issued abatement notices for excessively smoking chimneys; and
- Maintained a dialogue with relevant government agencies and industry groups, including making submissions such as this in relation to future actions and initiatives.

In spite of this range of actions, local air quality measurements by Council indicate that in winter 2012, Armidale was still experiencing air pollution instances above national recommended levels for fine air particle (2.5 Microns - PM<sub>2.5</sub>) concentrations. The relevant details for the past four years are attached to this submission, from which it is apparent that the city is experiencing exceedences of the national advisory level for approximately 3-4 weeks each year. This is of concern, but not altogether surprising, as most housing stock in Armidale pre-dates the initiatives listed above, and home heating and other energy systems are only occasionally replaced.

Moreover, most of our older housing stock are primarily weatherboard cottages built without regard to passive solar and other energy efficient housing techniques that are now available to the construction industry. Given how cold it gets in Armidale in winter, it is imperative that people adequately heat their homes and many people view wood heating as a cheap and reliable source of heat. An emerging factor which appears to be persuading home owners to retain wood heating as their principal form of space heating is the rising cost of electricity. This, together with the well publicised concerns about unflued gas heaters (an indoor air quality issue), has maintained a significant market share for wood as a fuel, as it remains relatively affordable.

### **QUESTIONS ASKED IN THE REGULATION IMPACT STATEMENT**

The working group endorses your committee's agreement on the need for a nationally consistent approach to managing wood heater emissions and the development of a national plan for clean air and we are pleased to present our views and evidence based on our LGA experience.

### **CHAPTER 2 – Australian Wood Heaters**

*1. What is your view of the wood heater industry in Australia? Are there specific aspects of the industry that require attention? Please provide details.*

The working group would like to see representation from local government on the Joint Technical Committee reviewing the standards to more broadly represent stakeholder interests. We understand that, at least in the past, the Committee has largely been comprised of industry representatives and manufacturers of wood heaters.

It is now widely acknowledged that wood heater operation is usually the main reason for excessive emissions (RIS p.1). With this in mind, the working group favours options to improve wood heater technology so reduced emissions are less dependent on operator skill.

We understand the emission standards for heaters sold in New Zealand and overseas are considerably lower than those required in Australia. We believe the existing technologies for heaters sold nationally can be significantly improved and the wood heater industry in Australia should be required to propel

the improvements. The *AS/NZS4013 – Domestic Solid fuel burning appliances* was last reviewed/republished in 1999 and we estimate that any new standard will be in place for at least the next 20 years. Because of these long timeframes, we recommend setting the strictest possible emission standard now to signal the need for research and development and to stimulate markets for heaters with emissions comparable or lower to those sold overseas.

We believe the RIS fails to address an important legal requirement, the Trans-Tasman Mutual Recognition Arrangement between Australia and New Zealand. New Zealand already has an emission standard of no more than 1.5 g/kg and an efficiency of at least 65% for wood heaters in urban areas and we would like to see these requirements implemented here.

In addition to testing wood heater emissions in laboratory conditions, which is necessary to compare 'apples to apples', the working group advocates the implementation of test methods to reflect the way householders operate their wood heaters. We understand that the 'real life' emissions when devices are operated outside laboratory conditions can be up to ten times higher than the test results.

Residential wood heater usage in Armidale is estimated at over 30%, three times higher than the figure used in the RIS based on the Australian Bureau of Statistic's survey (ABS 2008). Similarly we believe the proposition of a general decline in the use of wood for home heating does not apply here. In Armidale there are four wood heater retailers and this number has grown from three in 2010.

In 2010, UNE researchers contacted the three local retailers and each said that the rising price of electricity was a prominent reason given by people purchasing wood heaters. One retailer reported that wood heater sales at their Armidale store were significantly above other stores nationally, including other stores in the region. As a result, that retailer was introducing a new line of wood heaters for winter 2012. In Armidale last year Council officers approved the installation of 40 wood heaters. Based on the number of local retailers, we estimate that the number actually installed is much higher.

## *2. Can you provide evidence of new or different operational or marketing paradigms that would affect the stated view?*

In 2010, Council unanimously endorsed a Local Approvals Policy under the NSW Local Government Act 1993 which requires wood heaters installed in new homes in our urban area to have an AS 4013 tested emission rating of 2.5g/kg and 3g/kg for all other homes. This was based on an estimate that at that time the policy related to 60% of heaters on the market. Notably, in 2013 when the policy was revised to extend the stricter standard of 2.5g/kg to all urban wood heater installations, not a single submission was received in the public exhibition, and again the policy was endorsed unanimously by Council. Looking forward 20+ years, and in order to stimulate development of better technologies, the working group recommends that this RIS must improve on the policy standard set by Armidale in 2010.

New Zealand has 18 authorised importers and/or manufacturers that can provide wood heaters for sale with emissions of less than 1.5 g/kg and efficiencies of at least 65%. Some of the wood heaters for sale in New Zealand have emissions of no more than 0.5 g/kg and some of the wood heaters with wetbacks can achieve emissions of under 1 g/kg. It should be noted that when New Zealand initially proposed their new emission standard and efficiency requirement in 2004 there were no wood heaters with wetbacks that could meet the new requirements. Now there are more than 10<sup>2</sup>.

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<sup>2</sup> New Zealand Ministry for the Environment website  
[www.mfe.govt.nz/laws/standards/woodburners/authorised-woodburners.html](http://www.mfe.govt.nz/laws/standards/woodburners/authorised-woodburners.html)

## **CHAPTER 3 – Statement of the Problem**

### *3. Do you consider wood heater emissions to be a significant issue relative to other forms of air pollution?*

Since July 2008 ADC's environmental health officers have conducted year-round monitoring of urban air quality in Armidale using a DustTrak. This work, which has been done entirely at Council's expense, enables us to ascertain the level of winter pollution and to raise awareness in the community, complement education initiatives, measure the performance of strategies and provide support for further representations to State and Federal agencies.

Winter emissions in Armidale from wood heaters are the major source of PM<sub>2.5</sub> particle pollution (see Appendix 1). Council's monitoring shows that, despite our efforts, we are not reducing local levels of PM<sub>2.5</sub> pollution. Comparisons of winter and summer particulate levels indicate that, in Armidale, this pollution is almost exclusively the result of wood heater use.

As a Council, we do not have the resources to undertake widespread monitoring or a detailed assessment of the impacts of wood heaters on the health of the Armidale community. However, accredited PM<sub>10</sub> and PM<sub>2.5</sub> monitoring<sup>3</sup> combined with a comprehensive inventory and source apportionment would clearly define the extent of the wood smoke problem in Armidale. Unfortunately, the RIS does not quantify the anticipated health benefits under any scenario (ie. premature deaths avoided, reductions in hospital admissions, restricted activity days, reduced doctors visits, etc) so we cannot ascertain any resultant health benefits.

New Zealand has undertaken significant investigation into the impacts of wood heaters on air quality and human health and as a quick and rough gauge Timaru in the South Island of New Zealand could be considered to be comparable in numbers of PM<sub>10</sub> exceedences, size of the exceedences, weather conditions, housing stock and population (27,000 in the Timaru airshed). The Health and Air Pollution in New Zealand Study estimated that in 2006 all domestic fires in Timaru contributed social costs of 97.5\$M NZD<sup>4</sup>. Whilst we cannot estimate with any confidence what the social cost to Armidale from domestic fires is, using Timaru as a guide, it is likely to be significant.

## **CHAPTER 4 – Rationale for Government Intervention**

### *6. Do you agree that the current policy measures for the abatement of wood heater emissions are not successful in realising the policy objectives? Can you provide other evidence to support this?*

The working group is of the opinion that the current policy measures are not successful and believes there needs to be more clarity around the responsibilities of the different levels of government, and of industry, to identify the seriousness of poor air quality and to implement decisive measures to improve air quality. There is a need for government to identify problem areas and to fill gaps in the network of air quality monitoring stations (AQMS) throughout Australia in order to determine risks and prioritise investment in pollution reduction programs. We encourage a holistic and evidence-based approach to

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<sup>3</sup> DustTrak PM<sub>2.5</sub> monitoring is not an accredited method for determining fine particle emissions. However this method is relatively inexpensive and enables our small Council to provide indicative air quality levels. We would not be able to undertake any monitoring if we were required to use an accredited method and as stated in our submission would support a Commonwealth government lead monitoring programme in Armidale.

<sup>4</sup> Kuschel et al (2012) "Updated Health and Air Pollution in New Zealand Study, Volume 1, Summary Report" Table A1-6b. Total social costs from PM<sub>10</sub> air pollution in 2006 by source and airshed.

the development of air quality policies and programs, coordinated with industry and across all levels of government, with the aim of reducing fine particle pollution.

Council has experience gained from working on this issue for over 20 years and intensively over the past five years with the NSW government (Environment Protection Authority, Environmental Trust and Office of Environment and Heritage), psychologists and pollution scientists at UNE and industry groups such as the Australian Home Heating Association. The status quo in NSW regarding poor air quality from wood heater emissions is that it is largely the domain of environmental health officers (EHOs) working in local Government. NSW policy relating to wood heater installations and use is found in areas of planning, local Government and environmental protection. In the past, council staff in Armidale has struggled navigating NSW policy and departments for information such as the definition of a solid fuel heater and the extent of council's regulatory authority.

Over the years at Council we have received funding and training from the NSW Government for wood smoke reduction programs and while this support is appreciated, it has not led to any visible or lasting improvements. We believe we could get better results if future programs included longer timeframes and an inbuilt commitment to best practice. In this instance, best practice means specialists in areas of communications and the social and environmental sciences, operating with sufficient budget and timeframes to bring their particular skill sets to bear.

Precedents set in Launceston (RIS p.110), Nelson and Christchurch support this contention while demonstrating the scale and range of the programs necessary to achieve an environmental outcome and the need for the programs to be temporally sustained.

## **CHAPTER 5 – Identification of Feasible Policy Measures**

*8. Do you agree that the policy measures listed for the abatement of wood heater emissions will be successful in realising the objectives? If not, please provide your reasons including supporting evidence.*

The working group questions whether the policy actions comprising Options 1-9 will achieve sufficient reductions in wood heater emissions to result in improved air quality in critical airsheds and provides the following comments on individual policy measures.

Emission standard: The working group encourages the Commonwealth Government to introduce a new framework to support the introduction of more stringent standards for wood heaters, as the RIS indicates previous attempts under the existing framework have consistently failed (p. 116).

As stated earlier, we support setting the strictest possible emissions standard now to signal the importance of reducing wood smoke emissions and to stimulate the need for new low emission technologies in the Australian market.

We would like to see an emission standard of 1.5g/kg or lower. In January 2011 ADC implemented new emission standards of 2.5g/kg for wood heaters installed in new homes in our urban area and 3g/kg for installations in all other homes. Data from the DustTrak shows that this has not resulted in a change in air quality in Armidale.

Efficiency standard: There is a requirement that heaters installed in Armidale must have a minimum efficiency rating of 57% and we support the requirement for all new wood heaters entering the market to be tested and certified for compliance against a fuel efficiency standard. With annual firewood use in NSW estimated at 1 million tonnes, we believe technologies with optimal efficiency are central to the long-term sustainability of using wood for fuel. Additionally, if an efficiency standard is not included, there is a risk of perversely incentivising a wood heater that meets the emission limit (grams per



kilogram of wood burnt) but still has high emissions (grams per hour) because it has very low efficiency (ie. lots of wood being burnt per hour). It is important from a 'warm homes' perspective that people get as much heat as possible out of their fuel.

Labelling requirement: In NSW, the Protection of the Environment Operations (Clean Air) Regulation 2010 requires all new heaters sold to carry certificates of compliance with an emissions rating. In Armidale we use this information for assessing applications to install wood heaters. We recommend that this labelling should be required nationally and that an efficiency rating should be added to compliance plates. We encourage AHHA to publish, on their website, the emission ratings of heaters sold in Australia.

New wood heater compliance test method: We support test protocols for determining particle emissions from wood heaters to more closely simulate real world conditions. In addition to 'tightening' the standard and encouraging modifications like starter controls (RIS p.122), we believe this will more accurately identify critical airsheds, the magnitude of the problem and the likely impacts of interventions. However, it should be noted that the current AS/NZS 4013 standard is not designed to improve wood heater performance and does not simulate 'correct' wood heater operation. Rather, it is to standardise the testing of particulate emissions so that wood heaters can be compared in a meaningful way.

Requirement for starter controls on new wood heaters: It is recognised that wood heater operation is usually the main reason for excessive emissions and that anecdotal and empirical evidence suggests that a significant percentage of householders do not allow their fire to become well-established before turning down air flow controls. With this in mind, we favour starter controls specifically and more generally, any technologies that reduce reliance on operator skill to reduce emissions (RIS p.120).

National audits: The National Wood Heater Audit Program conducted in 2003 found there was significant non-compliance including: serious design faults; labelling faults and heaters failing to meet AS/NZ 4013 particle emission limits. As well, the Program revealed a number of shortcomings in manufacturing and certification procedures (RIS p.106). Similarly, audits conducted by NSW Department of Environment and Climate Change in 2007 revealed non-compliant plates / labels in 34% of 217 wood heaters inspected (RIS p.108). Based on this, the working group supports national audits to maintain quality control and support continuous improvement. We believe testing should be undertaken by an independent party to ensure compliance.

New Zealand uses two local government agencies to certify wood heaters and has a wood burner auditing programme in place. The results of these audits are publicised and a national list of compliant wood heaters is available<sup>5</sup>.

Nationally coordinated funding for state-based audit and enforcement: The working group does not support state-based audit and enforcement. Instead, we favour national audits and enforcement coordinated nationally and conducted by an independent party.

Independent testing and national certification: The working group supports this measure under a regulatory option and as it requires re-certification of all existing wood heater models, we believe this measure aligns with a number of other measures, namely: emissions testing, labelling requirement, new test methods to simulate real-world conditions and a new stricter emissions standard (see above).

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<sup>5</sup> New Zealand Ministry for the Environment website

[www.mfe.govt.nz/laws/standards/woodburners/authorised-woodburners.html](http://www.mfe.govt.nz/laws/standards/woodburners/authorised-woodburners.html). The National Performance Review of Woodburners Phase 1 & 2 reports can also be found at the same website address.

Education targeted at critical airsheds: The working group wholeheartedly supports this measure as part of an integrated approach with other interventions, eg. incentives, compliance and regulation. We believe Commonwealth funded education campaigns provide opportunities to build on past education programs and to integrate current education programs conducted in each airshed.

Effective communication and education is key to realising the objectives of the RIS and as such, we have provided comments on education in the following sections: Summary; Question 6 - Likely success of current policy measures; and Question 9 “nudge” programs. However, whilst we consider effective communication and education are key, we do not believe they will provide satisfactory reductions in emissions without additional regulatory controls. Launceston and Nelson have shown that a two pronged approach of regulation and education is necessary.

Incentives for replacement of heaters in critical airsheds: The working group wholeheartedly supports this measure. Over some years, Council has funded an incentives program offering residents in the urban area up to \$1,000 to replace their wood heater with an approved alternative, generally resulting in 15-20 old / high emission heaters being replaced annually. We believe that with the increasing cost of electricity and other heating fuels, incentives are necessary to encourage residents to replace their wood heaters.

We do not offer incentives to upgrade wood heaters, although pellet heaters are listed as an approved alternative. The working group has discussed offering incentives for upgrades when wood heater performance significantly improves but note that improper wood heater operation is a significant factor in excessive emissions (see Q1 above).

Controls on modifications and installation: Armidale’s Local Approvals Policy has a tiered fee structure for processing applications to install a wood heater, with a reduced charge for wood heaters installed by a certified plumber, as this negates the need for Council to inspect the installation.

The working group understands that a large variation in emissions is due to installation (RIS p.18) and supports the introduction of a national system for certifying people to install wood heaters, as is led in New Zealand by the Home Heating Association.

Other initiatives for consideration are training for related skills such as flue cleaning and investigating the effect on insuring houses if domestic fires are not properly installed or regularly cleaned. We understand that some insurance companies in New Zealand will decline a claim if the wood heater has not been professionally cleaned or installed by a registered installer in accordance with the NZ Building Act.

We support new national regulations requiring heaters installed in existing homes to comply with AS4013 and banning the modification of heaters.

Controls on second hand heaters: In Armidale we discourage the sale of second hand heaters. As part of developing the Local Approvals Policy, we contacted second hand dealers to discuss Armidale’s new stricter emissions standard and the need to get an approval to install a wood heater. Anecdotally, we no longer see second hand wood heaters for sale at these businesses. Additionally, there has not been an application to install a second hand heater since the policy was endorsed in 2010. We would like to see any regulations drafted to apply to all installations of wood heaters as this would capture second hand heaters.

Removal of non-compliant wood heaters: The working group strongly supports this measure and suggests that it could be complemented with an incentives program (above) to reduce concerns about this measure being inequitable.



*9. Do you believe that the “nudge” programs will be helpful in reducing wood heater emissions?*

Local government often takes the lion’s share of responsibility for achieving goals such as improving local air quality and must deliver their programs despite having inadequate control as well as inadequate resources, finances, staff and time. We believe that education plays an important part in changing behaviours, though it may be over-relied on in attempting to fix complex problems. In line with this, developing an effective education program resulting in a desired change within a segment of the community is both a science and an art. Often the skill required to do this well is undervalued; as social science studies show, simply telling people what they should do rarely works. In Armidale, over many years, we have utilised education with incentives, compliance and providing technologies to support and encourage behaviour change. Council has been supported in much of this work by academics at UNE in areas of pollution science and environmental psychology. Our experience is that industry groups like the Australian Home Heating Association are cooperative in providing education resources and support with delivery. However, what they can offer is limited and the interaction generally focuses on activity rather than outcomes, eg. behaviour change and environmental improvement.

*10. Are there other measures that are not listed in the document that should be considered?*

The following additional measures are put forward for consideration:

- Ban on installing open fireplaces in new dwellings in critical airsheds through the Building Code of Australia
- Ban on installing wood heaters in new dwellings in critical airsheds through relevant State or Territory laws
- Stimulating development of pellet and other low emission heaters.

Armidale Dumaresq Council supports an holistic approach to addressing emissions from wood heaters in line with objectives in its Sustainable Domestic Energy Use and Local Air Quality Policy. The working group believes energy efficiency programs are key to realising objectives in the RIS and recommend the Commonwealth government consider reinstating its energy efficiency programs. In Armidale in 2009/10 many of our residents took up rebates to insulate their homes and had their homes assessed for energy and water efficiency through the Commonwealth’s Home Insulation and Home Sustainability Assessment programs.

Similarly, in July 2013 Council has launched a Sustainable Home Checklist (Appendix 2) to assist residents in considering how a home may make effective use of the sun and economical use of other energies. We believe programs like these complement policies aimed at reducing emissions from wood heaters.

## **CHAPTER 6 – Identification of Feasible Policy Combinations**

*11. Which of the listed policy combinations do you favour in addressing a reduction in wood heater emissions? Why do you favour these measures?*

Policy combinations 6-9 fall into the category of a national regulatory approach requiring independent testing and national certification and we support this, as well as efficiency standards greater than 65%.

The working group favours policy 7 as it includes education and incentives, controls on modifications and installations and on selling second hand heaters. However, we feel that the emissions standard of

3g/kg is too high and recommend an emission standard of less than 1.5g/kg. As mentioned earlier, in January 2011 Council implemented new emission standards of 2.5g/kg for wood heaters installed in new homes in our urban area and 3g/kg for installations in all other homes. Data from the DustTrak shows that this has not resulted in a change in air quality in Armidale.

*12. Are there policy combinations that you would not support? Please provide reasons.*

Policy combinations 1 & 2 fall into the category of a non-regulatory national program. We did not focus on these options as they target critical urban airsheds – e.g. Sydney and Melbourne.

Policy combinations 3 – 5 fall into the category of collaborative approaches retaining jurisdictional control. As stated earlier, we support independent testing and national certification.

## **CHAPTER 8 – Conclusions**

*16. Do you agree with the conclusions? If not, please provide reasons.*

The working group does not believe the base case (BAU) scenario of wood heater emissions falling over time applies to Armidale. We agree Options 7 & 8 will have only a modest impact on the Australian wood heater manufacturing industry. We propose that lowering the emission standard from 4g/kg to 3g/kg will not realise the objectives of the RIS and will result in continuing significant impacts on local communities such as Armidale. As such, the working group recommends an emission standard of less than 1.5g/kg. The working group feels strongly that this is the time to instigate change in order to secure the future of using wood for home heating without the current problems associated with adverse air quality issues.

No doubt sustainable firewood supply and other considerations beyond the scope of this RIS will be the subject of subsequent exchanges.

Thank you again for the opportunity to make a submission and for your consideration.

Please contact Carol Davies on (02) 6770 3686 or by email at [cdavies@armidale.nsw.gov.au](mailto:cdavies@armidale.nsw.gov.au) if we can be of further assistance.

Yours sincerely



Shane Burns  
**General Manager**

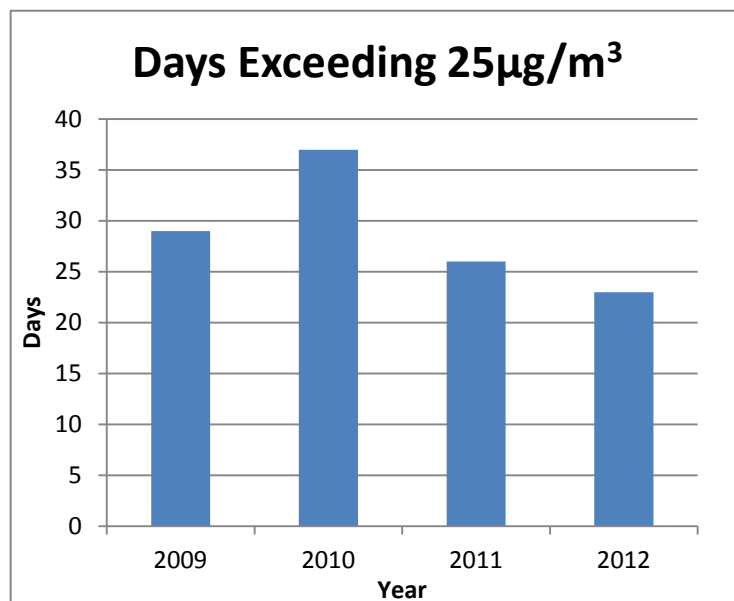
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Appendix 1 - Air Quality Armidale CBD 2009 – 2012

Appendix 2 - Armidale Dumaresq Council's Sustainable Home Checklist

## Appendix 1.

### AIR QUALITY ARMIDALE CBD, 2009-2012



Year	Annual Average	No. of days with exceedences	Average exceedence > 25ug/m3	Range of measurements >25ug/m3
2009	7.7	29	7.28 ug/m3	25.20 - 52.50
2010	9.3	37	9.75 ug/m3	25.62 - 67.62
2011	9.7	26	6.34 ug/m3	25.14 – 49.26
2012	8.4	23	11.63 ug/m3	28.00 - 65.00

## WATER SUPPLY, PLUMBING AND DRAINAGE

Q27 Are there water tanks for domestic use? Y N F  
□ □ □

New homes typically incorporate around 5000L tank storage for garden irrigation, toilet flushing etc. Mark N if there is no room for tanks or F if they can be added later. See Further References and check with local suppliers, including whether electric pumps will be needed to operate tank systems.

Q28 Can laundry and bathroom grey water be re-used for a second purpose (e.g. garden)? Y N F  
□ □ □

Mark Y if connected to an approved treatment unit, or directly into a percolation pipe in garden subsoil. Mark N if connected to the sewer. Mark F if a diverter can be fitted to the laundry tub which gives a fall to garden level with an extension hose and check details with Council and local suppliers.

Q29 Are metal leaf guards fitted to all gutters? Y N F  
□ □ □

No? Mark F as they are easily fitted. Guards improve rainwater quality, prevent clogged drainage and reduce fire risk.



Photographs courtesy of RSW Real Estate Armidale

## HOW TO ASSESS YOUR Y N F ANSWERS

TOTALS Y \_\_\_ N \_\_\_ F \_\_\_

**All Yes answers?** This house appears to be designed for your comfort with low running costs and lower impact on the environment!

**Some No answers?** Consider each No answer carefully in relation to your needs. No answers are likely to make the home less energy efficient, more expensive to heat and cool and less comfortable to live in.

**For each FIXABLE answer,** consider whether you can fix it yourself (and when) or if you will need professional help. Consider the likely cost in relation to potential long term savings and improved comfort. Turning any No into a Yes helps residents and the environment.

## OTHER ISSUES

## Is there a BASIX certificate for the dwelling?

If the dwelling or any significant extension to it was built after 2005 a NSW BASIX (energy and water efficiency) certificate should have been issued. This should provide more information about relevant features of the home, including insulation and water saving (WELS rated) fittings.

A copy of the certificate may be obtained from Council if not available from the owner.

BASIX Certificate No. \_\_\_\_\_ Issue date \_\_\_\_\_

## ACCESS, SAFETY AND OTHER FEATURES

Please list other features you would like to include that are not covered above (e.g. level access to the home, wide doorways, property number visible from street, fencing, external lighting etc). Refer to Further Reference 1 for more information about important home access and safety features.

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## FURTHER REFERENCES

(Books 3-5 available from Council's Library)

1. **YOUR HOME** Technical Manual, see: [www.yourhome.gov.au](http://www.yourhome.gov.au)
2. **LIVEABILITY WEBSITE**, [www.liveability.com.au](http://www.liveability.com.au)
3. **MAKING YOUR HOME SUSTAINABLE**, A guide to retrofitting, Derek Wrigley, Scribe, Melbourne, 2012
4. **WARM HOUSE COOL HOUSE**, Nick Hollo, Aust. Consumers Assoc., Sydney, 2011
5. **THE CSIRO HOME ENERGY SAVING HANDBOOK**, Pan Macmillan, Dr John Wright, Dr Peter Osman and Peta Ashworth, 2011.



## Sustainable Home Checklist

A practical checklist for selecting a more comfortable home with low running costs, while improving our environment

This checklist is intended to assist prospective residents in considering how a home may make effective use of the sun and economical use of other energies and of water. The contents have been developed with grateful acknowledgement from original work by Derek Wrigley, OAM et al; and from other sources - see Further References, on the back page.

However, the circumstances of individual homes and residents are unique. Users should therefore satisfy themselves about all aspects of a property, including any legal requirements, before proceeding.

You will need a compass and measuring tape.

## Why use this checklist?

Your home is probably the most expensive purchase you will ever make. Careful thought now can save you a lot of time, money and future discomfort - and the resale value is likely to be higher if you have selected wisely.

Climate change is generally predicted to result in hotter, drier and more extreme weather conditions in New England. Our housing needs to adapt to these challenges and help reduce the impact of increases in electricity and gas prices, while saving water.

The five most important building design issues for reducing home energy costs and improving occupant comfort are:

- **orientation** with adequate north facing glass to admit the warming winter sun
- **insulation** to minimise heat loss in winter and heat gain in summer
- **shading** to exclude hot summer sun
- **internal mass** (brick or concrete walls) to stabilise internal temperatures throughout the year
- **ventilation** for fresh air and cooling when warm.

This checklist can be used to broadly assess an existing home, a new home, or a new house plan in relation to your comfort in such a home and its likely effectiveness in using energy and water. It does not cover other factors - such as location, views, number of rooms, proximity to shops, schools and work or other personal preferences.

The checklist is simple to use, with little technical knowledge required. However, considering the large amount of money involved in buying and running a home, it is certainly in your interest to inform yourself on aspects you may not have fully considered.

Address:

Agent's name and contact:

Block plan:

A quick sketch of the block and the dwelling will help to remind you of its features when you are comparing homes. Don't forget to put the compass north point on this sketch, bearing in mind that true or 'solar' north is approximately 10 degrees west of compass north. Add any significant trees which might shade the building both now or in future.

## How to use the checklist:

1. Fill in a separate copy of this checklist for each dwelling you wish to consider more closely. Obtain more copies from our website [www.armidale.nsw.gov.au](http://www.armidale.nsw.gov.au), or feel free to photocopy this checklist.
2. Fill in the address and agent details in the box above.
3. For **EACH QUESTION** in this checklist mark either Y (Yes) or N (No) in the right hand margin.
4. Mark F (Fixable at a later time) only if the listed conditions can be satisfied.
5. Consider your marked answers - Y, N or F using the guide under 'HOW TO ASSESS' on the back page.
6. Compare your answers with those from other homes you have considered.

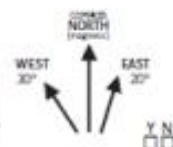


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## ORIENTATION

- Q1 Does the side of the dwelling with windows to the main living areas face between 20 degrees east and 30 degrees west of compass north?



If your answer is No, this dwelling will be less able to use the winter sun for warmth.

- Q2 Is there an adequate, unshaded area for drying clothes?

Mark F if you will be able to install an outdoor clothes line in a suitable location.

## WINDOWS

- Q3 In northern living areas, is the window area larger than half the floor area?

If No, solar heating may not be adequate in winter and you may need more electric lighting. This may be fixable, but only with alterations.

- Q4 Will low angle winter sun be able to enter these northern rooms for most of the day?

Mark N if there is possible shade from existing evergreen or non-removable trees (particularly if on neighbouring land), neighbouring buildings, verandahs or large eaves (see Q5). Mark F if it is likely you will be able to remove the cause of the shading.

- Q5 Can high angle summer sun be excluded by eaves or other external shading devices from these northern rooms for most of the day?

Eaves should start near the top of the window and project horizontally by around 25% of the window height. Eaves should preferably extend beyond either side of the window. Mark N if there are no eaves or shading devices, and F if it would be possible to fit adjustable sunshades extending out from the window or a pergola for deciduous climbing plants. See Further References.

- Q6 Are eastern or western windows protected externally from low angle summer sun?

If No, there could be excessive heat gain and some control will be needed, especially to western windows. Mark F if shade control could be fitted later. Insulated blinds can also help to reduce heat gain.

- Q7 Is each southern window in a bedroom or daytime living area smaller than half the floor area?

Note: double glazed high level windows facing north, or solar tubes and skylights, can allow sunlight into these usually sunless rooms in winter. See Further Reference 3.

- Q8 Are all windows well sealed against draughts?

If No, mark F if windows can be easily sealed and heavy curtains with pelmets above introduced to retain heat at night. For more on window seals, pelmets and curtains see Further References and check with local suppliers.

- Q9 Are windows to bedrooms and living areas double glazed?

If No, mark F if there is at least 20mm thickness of framing inside the existing glass to allow for DIY double glazing, or if a supplier confirms that commercial double glazing can be fitted.

## FLOORS AND INTERNAL WALLS

- Q10 Does the home have a concrete slab floor, with a polished finish or covered with tiles, brick, or slate?

Carpet over concrete reduces its ability to store solar heat. Rugs are acceptable if removed out of the sunlit area during sunny winter days. This is usually not fixable. If No, skip Q11.

- Q11 Is the concrete slab insulated around its exposed external edges?

This may be hard to see – if so ask the owner, or Council may have building plans. It can be expensive to retrofit.

- Q12 If the home has a timber or other suspended floor, has it been insulated underneath to a minimum R2 rating?

If No, mark F only if there is underfloor access to fit insulation. For more information, see Further Reference 1 and discuss with local suppliers.

- Q13 If the home has a timber floor, are there internal masonry walls in northern rooms?

If No, these rooms will be hotter in summer and colder in winter, even if the floor and walls are insulated. This situation is usually expensive to fix.

## EXTERNAL WALLS AND DOORS

- Q14 Are external walls insulated to a minimum R2 – 2.5 rating?

If No, mark F only if cavity walls can be readily retro-filled with insulation. Ask the agent or owner. For more information, see Further Reference 1 and discuss with local suppliers.

- Q15 Are external doors well sealed against draughts?

If No, mark F if doors can be easily sealed. Some sliding doors and older wooden doors are harder to seal. Modern aluminium sliding doors are usually well sealed.

## CEILINGS AND ROOFS

- Q16 Are all ceilings insulated to a minimum R3.5 – 4 rating?

If No, mark F if there is adequate access to roof space to install insulation. Ceilings which are parallel to the roof are more expensive to retrofit. For more information see Further Reference 1 and discuss with local suppliers.

- Q17 Is the roof lighter in colour than a standard terracotta tile?

Dark roofs absorb too much heat in summer, but can be painted or vents may be installed (not in bushfire prone areas). Mark F if this is likely.

- Q18 Is there reflective foil below the tiles or metal roof?

Mark F if foil can be retro-fitted. See Further References and check with local suppliers.

## SOLAR ENERGY SYSTEMS

- Q19 Is a solar hot water system fitted on an unshaded roof or frame facing between north-east and north-west?

If No and you wish to install one, an area of about 2 metres by 2 metres is required with a northerly aspect free of shade for most of the time on sunny days, and a slope towards the sun of between about 20 and 40 degrees. A typical tiled roof has a slope of around 22 degrees. Tilt frames can be added to most systems if needed.

If these conditions can be met, then mark F.

- Q20 Are solar energy (photovoltaic) panels fitted on an unshaded roof or other space facing between north-east and north-west?

If the answer is Yes, check with the owner, system supplier or energy provider about system capacity and tariff arrangements.

If No and you wish to install panels, an area(s) typically between 20-40 square metres is required, with a northerly aspect free of shade for most of the time on sunny days, and a slope towards the sun of between about 20 and 40 degrees. Again, tilt frames can be added to most systems if necessary.

If these conditions can be met, then mark F.

For more information on solar installations, see Further References 1 and 2 and consult with accredited suppliers and Council. If the property has a heritage listing or is in a Conservation Area, check with Council re planning requirements.

## COOLING, HEATING AND VENTILATION

The format of Q21 and Q22 is different in order to produce positive, low energy, low pollution Y answers

- Q21 If reverse cycle or evaporative airconditioning is NOT fitted, mark Y.

Refrigerative systems use a lot of electricity and evaporative ones use lots of water. A well insulated, ventilated and shaded house in Armidale should not need additional cooling. However you can always turn the system off, if so mark F.

- Q22 If in-slab heating is NOT fitted, mark Y.

It is expensive to buy and run. Other heating is preferable. However you can always turn it off or turn down the thermostat, if so mark F.

- Q23 Is a flued gas or ducted heating system installed?

Mark F if flued gas and/or other energy efficient heating system can be installed. Ducted systems can provide better all round warmth in a home. Flued gas appliances provide a healthier indoor environment than unflued models. See Further References 1 and 5 and check with local suppliers.

- Q24 Does the home offer opportunities for good cross-flow ventilation?

A home will offer more comfort in warmer months if it allows for good air flow from one side to the other with doors and windows open. Mark F if the house can be easily adapted for use in this way (eg with lockable screen doors/windows). Prevailing winds in Armidale are generally westerly/easterly. See Further References for more tips.

## LIGHTING AND APPLIANCES

- Q25 Are compact fluorescent, LED or other energy efficient light fittings installed throughout the house?

Mark N+F if halogen downlights installed, however some adaptation of fittings and transformers may be needed. Most old, incandescent bulbs can be replaced with compact fluorescent or other energy efficient lights.

- Q26 Are energy and water saving appliances included in the home?

Mark F if you intend to install more efficient appliances/ hot water system, etc.

For more information on lighting and appliances see Further References 1 and 5 and check with local suppliers.