

Submission on the Working towards a National Clean Air Agreement discussion paper

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Healthy planet, healthy people.

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Doctors for the Environment Australia (DEA) is a non-profit, non-politically aligned independent national organisation of medical doctors which advocates on health issues due to environmental factors. The organisation is aware that environmental exposures on a local, national and global scale can have a strong influence on health, and that the most profound disease prevention strategy is to ensure a healthy environment.

Recommendations

- Protection of health should be the overriding objective of air quality management.
- Air quality standards should be in line with international best practice and revised in a timely fashion (less than 10 years). The current length of time to review the NEPMs is unacceptable on health grounds. Time to review requirements should be built into new legislation.
- National compliance standards for particulates and sulphur dioxide should be improved without delay:
 - a national ambient air quality standard (NEPM) for annual PM₁₀ should be introduced as recommended in the 2011 NEPM review, with a limit of 20µg/m³
 - the current PM_{2.5} advisory standard should be made a compliance standard
 - the process should be commenced now for downward revision of the SO₂ NEPM
- More stringent emission controls are required for mercury and sulphur dioxide from coal-fired power plants. These highly polluting facilities should be phased out, with the most polluting prioritised for closure first.
- New regulations are required to regulate air emissions, particularly of volatile organic chemicals, from new oil and natural gas developments, as have been enacted in the USA.
- Air quality monitoring and reporting should be improved nationally, with prioritisation based on public health risk rather than merely population size.

Introduction

Contamination of the air we breathe is a special case of environmental exposure. Although the individual risk from air pollution is very low, exposure is ubiquitous and across the entire population so the low individual risk multiplies to a large public health problem.

The scientific understanding of these risks has developed greatly in the last ten years. Exposures that were previously thought to be insignificant are now recognised as damaging to health and the range of disease outcomes attributed to air pollution is expanding.

The increasing recognition of the health burden from ambient air pollution at levels that were previously regarded as safe should be followed by a regulatory system that ensures continual improvement in air quality and an expectation that polluting industries will be expected to do better than just continue business as usual. There are many incremental improvements that could be made to polluting processes but they will not occur unless there is a financial or a regulatory incentive to drive improvements. The opportunity for a National Clean Air Agreement is a welcome opportunity to put in place structures that can drive progressive reductions in air pollution from the major sources.

This submission should be read in conjunction with the DEA submission on the NEPM for particulate air pollution, supporting the PM_{2.5} daily (25 µg/m³) and annual (8 µg/m³) standards, the PM₁₀ annual limit (20 µg/m³), and the monitoring of air quality at any community that hosts a polluting industry, based on health risk rather than population size.

Previous submissions by DEA and a position statement on air quality can be found at:

[http://dea.org.au/images/uploads/submissions/AAQ - NEPM Submission 10-14.pdf](http://dea.org.au/images/uploads/submissions/AAQ_-_NEPM_Submission_10-14.pdf)
[http://dea.org.au/images/uploads/submissions/Impacts on health of air quality in Australia Submission.v1_03-13.pdf](http://dea.org.au/images/uploads/submissions/Impacts_on_health_of_air_quality_in_Australia_Submission.v1_03-13.pdf)
[http://dea.org.au/images/general/DEA Air Pollution Policy 03-12.pdf](http://dea.org.au/images/general/DEA_Air_Pollution_Policy_03-12.pdf)

Goal, purpose, principles and scope

Principles:

- Mobile emission sources should be regulated by uniform Australian standards as they move between state jurisdictions. This is as true for outboard motors as it is for railway locomotives.
- Residual uncertainty is no excuse for delay. It should not be necessary to do a cost benefit analysis on every possible regulatory action before taking the first action.
- While national ambient air quality standards that protect the health of all Australians are necessary to ensure equity, continual improvement measures to drive down emissions to reach air quality better than the standards will yield further health benefits.
- Strong national legislation which can impose substantial fines on polluters is a necessary backstop for a system based on co operation and collaboration. Centralised implementation will reduce the opportunities for undue influence

over regulators and for state governments to attract industrial development by offering lax environmental laws.

- Measures to reduce carbon dioxide emissions will have co-benefits from reductions in other air pollutants, which from a societal perspective can be of equal magnitude¹. Australia's policy response to air pollutants must recognise these co-benefits.

Scope:

We are disappointed to see that figure 3 of the discussion document has co-operation and partnership in large font, but does not mention regulation and enforcement anywhere. It is overly optimistic to expect co-operation from commercial entities unless there is an enforceable fallback position.

High priority issues

Non road diesel emissions have been regulated in the US and Europe since the mid 1990s and the problem has been recognised in Australia for a long time, as evidenced by the May 2010 discussion paper '*Cleaner Non Road diesel emissions*'. Australia now lags the US by 20 years and this seems to typify the Australian response of conducting endless enquiry but being very slow to act. Non road diesel emissions should be at the top of the list of unfinished business.

The intention to act on lawn mowers and outboards is in itself worthy and is worth comparing to the off road diesel problem. The non road petrol motors are small and rarely used in comparison to off road diesel engines that are hundreds of times larger and some are in nearly continuous use.

The regulatory response to small spark engines is relatively simple as these kinds of equipment have short working lives and are turned over frequently, making emissions standards for new equipment a simple and effective policy option.

Off road diesel engines on the other hand can stay in use for decades. Consequently, in the absence of firm regulatory barriers, they may still be polluting the air many years into the future. Regulations that require significant upgrades or retirement of old equipment will impose costs on the operators, however these costs have been imposed on the owners of road engines for years. State level regulators have to date been too shy of measures that would impose costs on industry, but these are now necessary to prevent harm to human health.

Rail transport

Locomotive emissions are currently unregulated putting Australia years behind jurisdictions in Europe and North America. Locomotives stay in service for many years, so the approach of setting emissions standards for new equipment that has worked for cars would not work for locomotives. Freight movement by rail has environmental benefits over trucking by road. Therefore the best environmental and health outcomes will be achieved by measures to clean up rail operations whilst increasing the proportion of freight moved by rail.

The corridors used for coal transport are a special case. Train movements are frequent with 3 locomotives per train and 3 or 4 trains per hour in busy areas. Air pollution arises not only from the exhaust emissions but also from the loads, and even more from empty coal wagons. As an example the community at Beresfield on the Newcastle coal corridor has an EPA ambient air quality monitor which shows that for

three of the last 6 years the annual $PM_{2.5}$ has been at or exceeded the NEPM limit of $8 \mu\text{g}/\text{m}^3$. This exposure probably occurs in all the residential areas along the coal corridor but the NSW EPA is very slow to act.

The only choice for Australia, as a small market for locomotives, is to adopt either the American or the European standards. Particulate pollution from wagons can be controlled by washing empty wagons and covering full ones. Veneering may be an option if it is demonstrated to be effective on real trains, not just laboratory models.

The National clean air agreement should force states to take prompt regulatory action on rail emissions and to guard against undue influence over regulators, by industry, at a local level.

Shipping

Shipping has been identified as a significant contributor to both $PM_{2.5}$ and sulphur dioxide (SO_2) air pollution for ports in Australia and elsewhere in the world. The International Maritime Organization MARPOL annex VI agreement covers pollution from international shipping. The MARPOL annex VI is signed by 77 parties, and covers 94.8% of merchant shipping. It allows states to declare emission control areas (ECA) but to date Australia has not done this. In 2011 the USA declared an ECA of 200 nautical miles from both East and West coasts including even the US Virgin Islands which has only a tiny population. Within ECAs the maximum permitted fuel sulphur up to 2014 was 1% dropping to 0.1% in 2015. Outside an ECA bunker oil can contain 3.5% sulphur; with projected drop to 0.5% in 2020 but only if this is found to be "feasible".

We would not allow an unregulated diesel burning power station to set up in a residential area, but that is what happens at wharves for both bulk cargo and for cruise ships. In Newcastle the coal wharves are continually occupied, so there are nearly always four to six ships running auxiliary engines day and night. In Sydney air pollution from cruise ships at Balmain has caused local residents to complain of health issues such as asthma exacerbations and respiratory irritation. Grid sourced electricity also creates air pollution; however the emissions are not released in residential areas.

Australia should move to uniform requirements for commercial shipping to use shore power while berthed. As shipping is by its nature mobile, regulation should be done nationally rather than by states and national clean air legislation would be the best way forward.

Australia should move quickly to declare MARPOL Emission Control Areas within 200 Km of all cities, and to require the use of shore power while berthed.

Particulate emissions from mining

The national pollution inventory shows that there has been a steady year on year increase in PM₁₀ emissions from coal mining over the last 5 years from 210,000 tonnes in 2009 to 430,000 tonnes in 2014, an increase of 105%. The coal industry has been promising 'best practice dust management' all along, so self regulation has patently not worked. The wealth created by selling coal is at the expense of environmental degradation. A system of national regulation with significant penalties is needed to protect coal affected communities. The planning process for coal mine approvals should include consideration of cumulative impacts and must ensure that existing communities are protected against exceedances of the new NEPM standard for annual PM₁₀. A system of offsets is accepted planning practice for biodiversity and should be introduced for PM₁₀. This would mean that in order to gain approval for a new source of PM₁₀, an old source should be removed from production so that total emissions are not allowed to go on increasing.

Coal fired power stations

Control of pollutants from coal-fired power plants, principally SO₂ and mercury have not been managed effectively to date and must be improved if national air quality is to be improved. Sulphur dioxide from power stations is a considerable source of sulphate particulates found in the PM_{2.5} fraction. In NSW it has been shown in research by Dr David Cohen at ANSTO that 47% of sulphate particulates at Richmond in western Sydney can be traced back to one of the six big coal fired power stations at Lithgow, Lake Macquarie, or Muswellbrook despite the fact that these power stations are 66 to 138 Km away². These large scale emitters should be expected to progressively reduce SO₂ as technology improves and the population health impacts are recognised.

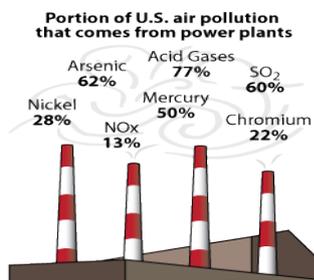
A successful SO₂ reduction program in the North East USA in response to acid rain used a cap and trade system to ensure that the most cost effective SO₂ emission reductions were found by industry. Whether motivated by cap and trade or direct regulation, generators can limit SO₂ emissions by selecting low sulphur fuel or by installing flu scrubbers if they are given an incentive to do so. Comparing SO₂ data from the national pollutant inventory to historical generation data shows that of the six big NSW power stations Mt Piper produces twice as much SO₂ per gigawatt hour of electricity (Mt Piper 4.7 tonnes of SO₂ per GWh, the average of the other five was 1.8 tonnes / GWh). The Angelsea power station in Victoria produces the same quantity of SO₂ as Mt Piper but is rated at only 150MW compared to Mt Piper's name plate capacity of 1,400 MW. Unless there is some incentive for change these excessively damaging plants will keep operating for years.

The Latrobe valley has five brown coal fired power stations and many coal mines. Almost half of all the SO₂ emitted in Victoria is emitted in the Latrobe Valley: 140 million kg per year of SO₂ is emitted in Victoria by energy generators and 100 million kg of this is emitted in the Latrobe Valley. Despite this, there is very limited air quality monitoring in the area- an issue that was highlighted during the recent fires at the Hazelwood mine. Evidence given by Dr Lynette Dennison, Principal Scientist, Air Quality EPA Victoria, in October 2011, during a VCAT hearing notes that studies on the health effects of SO₂ in Australia mirror results of international studies and that these effects are well documented to affect mortality, respiratory conditions and child health and that there is no safe level of exposure, particularly for sensitive groups.

The state standards for SO₂ (AAQ SEPP) relate to the national air quality standards (AAQ NEPM) which were set over 14 years ago. In recent years there have been extensive reviews of the health impacts of SO₂ which has led to the World Health Organization (WHO) and the US EPA significantly tightening their standards, so they are now much more stringent than Australian state and federal standards. It is essential that national standards for sulphur dioxide are strengthened to be in line with international best practice.

Mercury

In 2011, the US EPA finalised the first national standards to reduce mercury and other toxic air pollution from coal and oil-fired power plants. Power plants are the dominant emitters of mercury, acid gases and many toxic metals the United States. The standards were for Hazardous Air Pollutants emitted by coal- and oil-fired electricity-generating units with a capacity of 25 megawatts or greater. Australia should learn from this approach.



<http://www.epa.gov/mats/powerplants.html>

Globally, the largest sectoral source of mercury is the combustion of fossil fuels, largely coal. This sector accounts for a total of ~46% of emissions of mercury to atmosphere. In Australia, coal combustion in power plants is the second biggest contributor to mercury in the atmosphere with 2,271 kg emitted annually³.

In the environment, mercury can be transformed by bacteria into methyl mercury. Methyl mercury then bioaccumulates in fish and shellfish and also biomagnifies. The human nervous system is very sensitive to mercury. At high doses, mercury can damage the brain, kidneys and developing foetus. Foetal exposure to methyl mercury can occur from mother's consumption of contaminated fish and shellfish, and can adversely affect the baby's growing brain and nervous system.

Vehicle Idling

Studies from around the world have shown that children are especially sensitive to vehicle exhaust fumes during the period of rapid lung growth. This was shown in the California Children's Health Study showing significant improvements in lung growth in communities that had reduced SO₂ and NO_x levels⁴. One of the possible responses is to limit vehicle idling time. This is especially important at places where children congregate such as schools. As of 2014, 19 US states have anti idling laws (source: <http://www.idlefreevt.org/idling-laws.html>) and while education may be a more appropriate response than legislation, this is an issue that should be addressed by a clean air agreement.

At a more general level, policies that decrease vehicle use in cities such as improving public transport and conditions for cycling will have air pollution benefits as well as health and safety benefits. This is in the opposite direction the current Federal government's enthusiasm for urban motorways which will have adverse health impacts through worse air quality from increased vehicle use.

Wood heaters

Wood heaters are an enormous source of PM_{2.5} and should not be permitted in urban areas. One wood heater meeting the current AS4013 standard, using two tonnes of wood in a winter produces 19.6 kg of PM_{2.5} particulates which is the same as 200 modern cars produce in a year and older heaters produce much more. The scope for improving this by better heater design is limited by the variability of fuel quality and the requirement for advanced air pollution control mechanisms like catalytic converters to be regularly maintained to remain effective. A national clean air agreement should set a timeline for every state to ban new installations in urban areas.

Unconventional gas industry- an emerging air quality threat

The extraction of gas from coal seams, shale, and other tight geology has led to a proliferating industry of wells and pipelines. Overseas operations have been linked to fugitive emissions of methane, benzene, toluene, n-hexane and other hazardous gasses, which can be difficult to detect due to releases from any point in a large network of wells and pipelines.

Air pollution from coal seam gas and shale gas exploration and mining is a major concern for the health of nearby residents. Air pollution can occur locally around CSG wells transferring volatile chemical pollutants into the atmosphere. These can contribute to ground level ozone, a respiratory irritant that can inflame lungs and reduce lung function. While research is currently limited, a number of scientific papers suggest that cancer and non-cancer health risks of residents living close to unconventional gas wells may be increased⁵.

The US EPA has recently announced new regulations to control air pollution from oil and gas sites, <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3404676/>. There is no effective systematic regulation to control air pollution from unconventional gas operations in Australia, and monitoring of emissions is minimal. This makes it particularly difficult to assess a situation, such as in the Tara gas fields in Queensland where residents developed health symptoms after the introduction of mining. The American Public Health Association has produced a policy statement in relation to hydraulic fracturing of unconventional gas reserves in the US which notes *"significant potential to impact local and regional air quality". "Levels of ozone, PM₁₀, and PM_{2.5} have been found to be elevated near gas activity. Hydrocarbon emissions from gas drilling activity have also been shown to be high in Colorado, where researchers found that twice as much methane was being leaked into the atmosphere from oil and gas activity than was originally estimated"*⁶.

National standards for monitoring and controlling fugitive emissions, and restricting gas development in proximity to residential areas will be required to prevent an emerging impact on health.

Can you provide any suggestions for cooperation/partnerships and or knowledge, education and awareness for the purpose of assisting governments to manage air quality?

The establishment of a network of air quality monitors is a key ingredient of understanding the health impacts from air pollution and engaging the community in this issue. The number of monitors and the availability of the data is highly variable from state to state. The guiding principle should be to monitor air at several sites in all cities, and at any residential area close to a polluting industry. The NSW EPA network of monitors is the best in the country but notably lacks monitors at Lake Macquarie and Lithgow, towns that each host two coal fired power stations. The data from the NSW monitors is available online in close to real time, a practice that should become the national benchmark.

Whilst a co operative approach to driving down air pollution levels is ideal, co operation is much more likely if the regulator is carrying a big stick. Fines for environmental breeches have been laughably small and seem to be regarded as a cost of doing business rather than an incentive to avoid pollution. In the USA the National EPA can impose fines of hundreds of thousands of dollars per day, making a much stronger financial case to avoid air quality breeches.

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