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AUSTRALIAN CONSERVATION FOUNDATION

06 August 2019

Dear National Environmental Protection Council,

Thank you for the opportunity to provide a submission on proposed variation to the ambient air quality measure standards for NO_2, SO_2 and ozone.

We note that this is a rare opportunity to improve Australian's national air pollution standards for NO_2, SO_2 and ozone, which impact the health of Australians and have not been updated in over two decades. The science and understanding of the human health impacts of these pollutants point to a clear need for these standards to be strengthened, and for more regular reviews to occur. As a comparison, many foreign jurisdictions review their air pollution standards every five or ten years.

According to medical professionals, health effects occur at lower concentrations than previously thought. The health risks tied to even low exposure of pollutants require careful consideration of the air pollution standards that are recommended through this process.

Recommended standards for NO_2, SO_2 and ozone

The objective of the National Air Pollution Measures (NEPM) is to "minimise the risk of adverse health impacts from exposure to air pollution for all people, wherever they may live".

This is a very clear objective, and it is against this objective that ACF believes new standards and additional monitoring should be established. Minimising adverse health impacts requires that international best practice standards be set to protect Australians. On this basis, ACF recommends the following standards as put forward by health experts at Doctors for the Environment and explained in their submission[1]. These recommended standards and the commentary that follows is also informed by the health expert position statement that can be found here.[2]

Pollutant	Time	Number	Form
SO2	1 hour	60 ppb	99th centile of daily worst hour, averaged over 3 years
SO2	24 hours	8 ppb	Maximum value

[1] Doctors for the Environment, Submission on the proposed variation to the ambient air quality measure standards for ozone, NO2 and SO2, June 2019.
[2] Expert Position Statement on health-based standards for Australian regulated thresholds of nitrogen dioxide, sulfur dioxide and ozone in ambient air.

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NO2	1 hour	72 ppb	99th centile of daily worst hour, averaged over 3 years
NO2	Annual	9 ppb	Maximum value
Ozone	8 hours		

One-hour standard for SO_2

Even brief exposure to SO_2 can be responsible for adverse health impacts. For example, SO_2 can trigger acute asthma attacks in vulnerable people. The 1-hour standard should properly protect against even limited exposure. Other countries such as the United States and Canada, have standards based on 99th centile of daily worst hour. The proposed standard in this review is based on yearly worst hour. However, as noted by Doctors for the Environment (DEA), 'the worst hour of the year is in statistical terms always an exceptional event, and whether a region is or is not in compliance with this standard will be influenced to a large degree by chance.' Further, DEA notes that daily worst hour is preferable due to the time profile of asthmatic reactions to the irritant gasses SO_2 or NO_2. The worst hour of the day will trigger reactions in susceptible people, and levels for the other hours in the day will not make much difference. The 99th centile of daily worst hour permits 4 bad air days, while 99th centile of hourly values potentially allows for 87 bad air days per year.[3]

The standard of 100ppb is an improvement on the poor current standard of 200ppb but remains too high. For example, it is much higher than US (75ppb) and Canada (70 ppb). It has been noted that 75ppb could be set for 2025, and this standard could be met with little abatement required. Based on the core objective of protecting public health, there is no reason to delay setting a stronger standard. As noted, ACF recommends 60ppb as 99th centile of daily worst hour as a single upper threshold.

24-hour standard for SO_2

The World Health Organisation's 24-hour standard for SO_2 is 7.6ppb, with no exceedance. Australia's current standard is 80ppb, which is ten times the WHO standard. This review provides an important opportunity to fix this measure and bring it up to a best practice standard. The proposed 20ppb standard still falls short. ACF encourages further consideration of this proposed standard with the aim of strengthening it to meet the WHO standard (which rounded is 8ppb as a maximum value).

One-hour standard for NO_2

[3] Doctors for the Environment, Submission on the proposed variation to the ambient air quality measure standards for ozone, NO2 and SO2, June 2019.

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As covered above for SO_2, ACF's recommended measure for a one-hour standard is based on 99th centile of daily worst hour as recommended by health experts[4] rather than yearly worst hour as proposed in the NEPM impact statement. We note that 90ppb is proposed in the impact statement, and that 80ppb is noted for 2025. We recommend not delaying until 2025, and instead proposing 72ppb expressed as a 99th centile of daily worst hour for the compliance standard.

Annual standard for NO_2

The annual standard for NO_2 should align with the latest science on health impacts found in the Australian Child Health Air Pollution Study (ACHAPS)[5]. ACF is concerned about the impacts of NO_2 on all Australians, and in this case, we particularly note that the effects on child health should be fully considered. The proposed annual standard for NO_2 in the impact statement is 19ppb, and while ACF notes that this is in line with the WHO standard, we encourage consideration of 9ppb as the compliance standard on the basis that it will better protect children, as evidenced in ACHAPS. Some of the main impacts noted regarding children is lung function and childhood asthma. There are other impacts that need further study in Australia including potential cognitive impacts. Studies done overseas also present findings that back ACHAPS. For example, a recent study in France on short-term exposure of air pollution on healthy adults in urban areas, which makes the following conclusion:

> *A short-term exposure to air pollution was associated with a subclinical decrement in distal lung function and increment in inflammatory markers in healthy inhabitants of two urban areas in France. If these exploratory results are confirmed, this could suggest that even moderate levels of air pollution could have an impact on respiratory health on the general population, and not solely on susceptible individuals.*[6]

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[4] Doctors for the Environment, Submission on the proposed variation to the ambient air quality measure standards for ozone, NO2 and SO2, June 2019.

[5] Knibbs, Cortes de Waterman, Toelle, Guo, Denison, Jalaludin, Williams. The Australian Chid Health and Air Pollution Study (ACHAPS). 2018. This was a national population-based cross-sectional study of long-term exposure to outdoor air pollution, asthma, and lung function.

[6] Dauchet L[1], Hulo S[2], Cherot-Kornobis N[3], Matran R[4], Amouyel P[5], Edmé JL[6], Giovannelli J[7]. Short-term exposure to air pollution: Associations with lung function and inflammatory markers in non-smoking, healthy adults. 2018.

ACF notes that there many relevant studies done in Australia in recent years that demonstrate statistically significant health impacts of nitrogen dioxide, sulfur dioxide, and ozone at concentrations well-below the current and proposed thresholds.

An expert position statement released on 6 August cites a list of recent studies. The statement, available here, was organised by health and pollution experts from a range of organisations including the Lung Health Research Centre, Doctors for the Environment Australia, Royal Australasian College of Physicians, Lung Foundation of Australia, Climate and Health Alliance, Melbourne Energy Institute, Environmental Justice Australia, Clean Air and Urban Landscapes Hub, Melbourne Sustainable Society Institute, Royal Melbourne Hospital and the Peter MacCullum Cancer Centre. These experts also provide a joint recommendation on proposed standards. ACF encourages consideration of the recent reports that are outlined in the statement, their findings, and the standards proposed by these health experts. A summary of the standards they propose is provided in the following table:

Importance of expanding NEPM compliance monitors

Widespread source emissions, such as those from coal-fired power plants and major roadways, present a range of health risks to the Australian community. Currently, many people living near these major sources of pollution do not have the advantage of proper monitoring and therefore their exposure cannot be properly evaluated. This is inconsistent with the objective of the NEPM to "minimise the risk of adverse health impacts from exposure to air pollution for all people, wherever they may live." There is an injustice if people who live near major widespread sources of pollution are exempt from efforts to uphold this core NEPM objective.

ACF recommends that the existing network of compliance monitors be expanded to ensure appropriate monitoring of widespread sources of air pollution so that pollutants and their risks are better monitored, understood and addressed.

Public right to know

All Australians wherever they live have the right to know what they are breathing, and whether pollutants in the air they breathe are impacting their health and the health of their loved ones. That includes Australians that live near major widespread source emissions (as noted above). In addition to expanded monitoring, this requires information to be readily available to the public.

ACF recommends that air pollution monitoring data be made publicly available in real time, preferably through a coordinated national website.

Publicly available data should include key pollutants that are monitored daily and modelling that shows pollutant dispersal from sources such as coal-fired power plants. Information that is made publicly available should extend to historical data.

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A good model for a national website is provided by the New South Wales air pollution monitoring website.

Strong standards now and a framework for continual improvement are needed to protect public health

As noted above, Australia has fallen behind in updating air quality standards and that means communities, families and individuals pay the price by bearing the burden of preventable health impacts. Armed with the knowledge that there is no truly safe threshold for air pollution, it is incumbent upon this process to ensure safe standards are not delayed until a future date.

None of the proposed standards in the NEPM impact statement are the strictest of the standards considered.

The cost-benefit analysis that underpins the proposed standards appears unfit for purpose and based on very old data which does not appropriately consider the current costs and benefits of the standards (or abatement measures) being considered.

The ACF endorses the findings outlined in the Australia Institute (TAI) submission to this process, which thoroughly assesses the cost-benefit analysis and the work underlying the analysis. More detail on this assessment is outlined further later in this submission.

Exposure reduction framework

One of the questions posed in this consultation is about the merits of introducing an exposure reduction framework for the air pollutants. ACF's view is that an exposure reduction framework is indeed recommended. However, a framework to improve standards over time should not be interpreted as an endorsement for lower than best practice standards now. ACF recommends a framework that starts with best practice standards and provides a structure for continual improvement so that the process is more responsive to evolving science and health findings as they become available in the future. The goal should be to remove all the health risk possible from air pollution.

Polluters should bear the cost of pollution-reduction technologies

Many of Australia's largest sources of air pollution such as coal-fired power plants have readily available technologies to reduce pollutants yet are choosing not to implement them. While this may offer a saving for the owners of those plants, the burden is unfairly being placed on communities. The NEPM impact statement suggests that "locations that are dominated by large industrial sources" should not be regulated through national standards and that state-based abatement measures would be most suitable to achieve compliance." This does not accord with the objective of the NEPM, which as noted above is to "minimise the risk of adverse health impacts from exposure to air pollution for all people, wherever they may live." In this case, there also seems to be an assumption that where there are large industrial

sources of pollution states will choose to regulate based on stronger requirements than NEPM. There is no clear evidence that is the case. Rather, states appear to use the NEPM as the framework for their own regulation and do not go beyond NEPM standards.

Remove the exemption for small population centres

The NEPM currently exempts small population centres—under 25,000 people--from monitoring and reporting obligations. This again is counter to the core objective of NEPM to protect people wherever they live. In cases where small population centres are exposed to heightened levels of O_3, NO_2 and/or SO_2, this exemption is putting them at risk by keeping them in the dark about the level of risk they face. The exemption is unfair to these communities. It may not be the case that all small population centres have reason for concern but those that do should have proper monitoring and reporting requirements in place.

The NEPM variation should therefore remove the threshold population requirement and require all small population centres that have known or likely risks from these pollutants to be monitored.

Cost-benefit analysis should not be the deciding factor on determining NEPM variation. However, to the extent it is factor, cost-benefit analysis should be rigorous, up-to-date and fit for purpose.

The National Environmental Protection Act 1994, Section 15 states:

15 General considerations in making national environment protection measures

> In making any national environment protection measure, the Council must have regard to:
> (a) whether the measure is consistent with section 3 of the Agreement; and
> (b) the environmental, economic and social impact of the measure; and
> (c) the simplicity, efficiency and effectiveness of the administration of the measure; and
> (d) whether the most effective means of achieving the desired environmental outcomes of the measure is by means of a national environment protection standard, goal or guideline or any particular combination thereof; and
> (e) the relationship of the measure to existing inter-governmental mechanisms; and
> (f) relevant international agreements to which Australia is a party; and
> (g) any regional environmental differences in Australia.

Therefore, according to (b) the Council must have regard to the environmental, economic and social impact of the measure. To the extent a cost-benefit analysis is a relevant consideration, a poorly done analysis is particularly concerning.

Any analysis that underpins decisions that will impact human health should carefully quantify those health impacts as well as the broader societal benefits from removing health risks. The cost-benefit analysis that underpins this review is out-of-date, not fit for purpose, and based on a subjective assessment technique that has risks for public policy-making.

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The concerns outlined below are summarised and fully explained in the Australia Institute submission entitled *Coffin it up: Submission to NEPM air quality review regarding cost benefit analysis,* by Rod Campbell and Tony Shields. The extraction below is from their submission summary. ACF shares the concerns outlined below and therefore would like to emphasise these findings.

Summary

The standards proposed are inadequate and will likely be met with minimal abatement effort. The proposed standards appear directed towards preventing air quality from getting worse, rather than at achieving air quality that maximises the welfare of the Australian community.

The process and supporting documentation for this review of air quality standards is not fit for purpose. The cost benefit analysis in its own words "does not necessarily provide an indication of the likely costs and benefits of meeting alternative AAQ standards."

The cost benefit analysis does not consider the economic impacts of either the proposed draft standards or the range of standards that have been proposed by the Air Thematic Oversight Group of various government officials. Instead, it is a cost benefit analysis of an 'abatement package' of nine potential policy measures, largely retrofitting industrial facilities.

There is no transparency around how the abatement package was developed. The nine measures were picked via a multi criteria analysis (MCA) in 2016. This analysis has not been released because the "consultant who completed the MCA did not want the MCA publicly released."

What is known about the MCA is that it was based on a literature review of 64 sources with an average publication date of 2009. Much of the analysis is based on material that predates commercial renewable energy, the Paris Agreement and various state policies on energy and emissions standards. This is all the more concerning as MCA is a very subjective assessment technique, not based on strong economic foundations and described by prominent economists as "a significant risk to the quality of policy formulation by Australian governments."

The cost benefit analysis compares the costs and benefits of the abatement package to a 'business as usual' (BAU) emissions scenario. This scenario is also based on outdated information. For example, the Victorian forecast "assumes" that in 2030 "most electrical power will be generated using natural gas, brown coal, co-generation and tri-generation … Smaller amounts of power will be generated using wind, black coal, hydro-electric, biomass (from landfill), liquid fuels and solar." This assessment is derived from a 2006 report from the Australian Bureau of Agriculture and Resource Economics which forecast the amount of solar energy in 2019 at just 1/20th of current levels.

Australian decision makers are making air quality policy decisions in 2019 based, at least in part, on forecasts made in 2006 that have been shown to significantly underestimate the potential for renewable energy and other technologies that can improve air quality. In correspondence the Victorian EPA has acknowledged that "the BAU scenario may be underestimating possible improvements in air quality as a co-benefit of action on climate change."

Beyond comparing two badly modelled scenarios with limited relevance to current policy decisions, the cost benefit analysis underestimates the benefits of improved air quality while overstating the costs of the abatement package.

On benefits, there is no attempt to quantify or meaningfully assess reductions in health impacts that would not result in hospitalisation. There is no consideration of improvements in workforce productivity, or of impacts on agriculture and ecosystems. Such estimates have been made in international studies and are usually found to be substantial, if highly variable depending on assumptions made.

Health benefits considered only relate to changes in ambient air quality. However, the abatement package would bring considerable health benefits to the workers in and neighbours of industrial facilities and other emissions sources. These local level benefits of reduced pre-dispersal pollution are ignored.

By contrast, local level costs are included. Every megawatt of capacity in every power station that would need retrofitting attracts a cost – even of the Hazelwood power station that has already closed. Hazelwood is included in the analysis because despite announcing its closure in November 2016, this was "about six months after the air dispersion modelling work for this review was completed."

Many costs are overstated. Taking SO2 out of power station emissions is done by 'flue gas desulphurisation' (FGD). The cost benefit analysis prices this process at AUD$1,090 per megawatt of power station capacity, based on an extrapolation of price rises recorded in a 2010 source. The United States Energy Information Agency estimates the average installed FGD cost at AUD$150 per megawatt in 2017.

A similar overstatement seems to be included in the assessment of NO2 reduction measure Selective Catalytic Reduction (SCR). Furthermore, the cost benefit analysis appears to include the costs of SCR to both gas and coal fired power stations, while the air quality modelling assumes SCR is not applied to gas-fired power stations.

The result of the cost benefit analysis is that the costs are up to 100 times greater than the benefits of air quality improvement. This result is a major outlier in the economic literature, where international studies almost always show that the benefits of air quality improvement outweigh the costs. For example, an analysis of the economics of the US Clean Air Act estimated that its benefits could have been 90 times its costs.

This difference is not due to unique air quality conditions in Australia, but due to the flawed process that has been employed by the authors of these studies. Decision makers should ignore this cost benefit analysis and air quality modelling exercise and seek advice from independent doctors and health researchers to set ambitious air quality standards that maximise the wellbeing of the Australian community.

ACF recommends reconsideration of the cost-benefit analysis and either a significant update with a methodology that ensures a fair assessment of pollution abatement measures –

particularly Flue Gas Desulfurisation and Selective Catalytic Reduction (SCR) or removal of the analysis as an input for NEPC's determination of new standards.

For more information:

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The ACF community speaks out for a healthy environment, Australia's special places, climate action and for lasting social and economic change.