

11th July 2023

Department of Climate Change, Energy, the Environment and Water
GPO Box 3090
Canberra ACT 2601

Via email: airquality@dcceew.gov.au

**Dear Department of Climate Change, Energy, the Environment and Water - Air
Quality Policy Section**

Re: Managing noxious emissions from non-road diesel engines

Lung Foundation Australia strongly support the management of noxious emissions from non-road diesel engines in Australia and thank the department for the opportunity to provide feedback on the non-road diesel engine consultation. We acknowledge the health-based approach this consultation has taken, as evidence has demonstrated there is no safe level of exposure to air pollutants and adverse health impacts can occur from even low levels of exposure. Lung Foundation Australia strongly support the implementation of Management Scenario 3 (MS3) in line with the Cost-Benefit Analysis (CBA) as it delivers the most beneficial outcome for the community. Reducing air pollution will ensure Australians are able to live healthy lives now and into the future.

We further note the importance of this and alignment with the National Clean Air Agreement – work plan for 2021-2023.¹ The evaluation of the potential for a national approach to non-road diesel engine emissions in the agreement highlights the significance and ability to reduce noxious emission from non-road diesel engines in Australia. We are pleased to provide our feedback and support for MS3 to reduce noxious emissions from non-road diesel engines, and ultimately protect health.

Lung Foundation Australia is greatly supportive of the goal to introduce non-road diesel engine emission standards to reduce noxious emissions and thereby delivering consequent improvements in human health and the environment. As the peak health body for lung health, we acknowledge and highlight the importance of reducing emissions, as research has clearly linked air pollution to a range of poor lung health outcomes and importantly has significant impacts for vulnerable populations such as the 1 in 3 Australians living with a lung disease. We need to do more to protect the lung health of Australians and reducing non-road diesel emissions will play an integral role in ensuring clean air in Australia. Whilst this consultation and work being done to address non-road diesel plays an integral part in improving air quality in Australia, on-road diesel remains a significant concern and requires further government action. We look forward to contributing to discussions in relation to on-road diesel, as well as Australia's adoption of the WHO Air Quality Guidelines, in the near future to protect the health of Australians and reduce avoidable health impacts.

About Lung Foundation

Lung Foundation Australia (LFA) is the only national charity and leading peak-body dedicated to supporting anyone with a lung disease including lung cancer. For over 32 years we have been the trusted national point-of-call for patients, their families, carers, health professionals and the general community on lung health. There are over 30 different types of lung disease currently impacting 1 in 3 Australians. Our mission is to improve lung health and reduce the impact of lung disease for all Australians. We will continue working to ensure lung health is a priority for all, from promoting lung health and early diagnosis, advocating for policy change and research investment, raising awareness about the symptoms and prevalence of lung disease and championing equitable access to treatment and care. As a patient representative charity, we have partnered with patients, health professionals, researchers, medical organisations and the Australian community to drive reform in the delivery of health services in Australia to benefit more than 7 million Australians impacted by lung disease and lung cancer.

The Environment and Health

The health of the environment directly influences human health. Improving environmental health can prevent poor human health outcomes and in turn reduce the economic burden placed on the health system. According to The World Health Organisation in 2016, 24% of global deaths were linked to the environment, accounting for 13.7 million deaths a year.² The physical, chemical, and biological factors external to a person exert an influence on health and wellbeing and this notion, known as environmental health, aims to address the health risks linked to our environment, including air, water, and food quality.³ Improving the health of the environment in key areas such as air can prevent disease and improve human health, as our health and wellbeing are thoroughly linked to the state of the environment.⁴ In 2018, Australia recorded more than 3,200 deaths due to particle matter air pollution, signifying the need for strong implementation of environmental legislation and consistent work to maintain healthy environments.⁵ Furthermore, air pollution is estimated to cost Australia \$16 billion annually and thus is a significant economic burden.⁶

Air pollution from non-road diesel engines

We re-iterate the significant pollution emitted from non-road diesel engines which accounts for 10-15% of national anthropogenic NO_x emissions, up to 5% of PM_{2.5}, 1-2 % of PM₁₀ emissions and 5% of national GHG emissions.⁷ The health impacts of this are large resulting in 5,387 combined annual years of life lost (YLL) for Australia, costing society \$1.6 billion. In terms of overall pollution this equated to around 9% of all YLL due to anthropogenic PM_{2.5} and Nitrogen dioxide (NO₂) concentrations in Australia.⁸

Vehicle emissions are the combination of a range of air pollutants and in Australia it is one of the most widespread sources of anthropogenic air pollution.⁹ Emissions from vehicles incorporate black carbon and toxic gases with the main air pollutants emitted by including carbon monoxide (CO), nitrogen oxides (NO_x), particulate matter (PM) and volatile organic compounds (VOC). Vehicle exhaust and evaporative emissions account for the largest proportion of VOC emissions.¹⁰ Ground ozone is created as a secondary pollutant by the chemical reaction between nitrogen oxides (NO_x) and volatile organic compounds (VOCs) in the presence of sunlight.¹¹ Additionally, vehicles increase the level of fine particle

concentration in the atmosphere, particularly particulate matter (PM) 2.5 and PM10.¹² Particulate matter can penetrate deep into lungs and bloodstream, as well as cause a range of adverse human health effects.¹³ Additionally, those living with a lung disease are vulnerable to the impacts of air pollution and exposure can exacerbate their condition and induce inflammation in the respiratory tract and lung, reducing the pulmonary function of COPD patients and lead to worsening of the symptoms.¹⁴ Further particulate matter is a key indicator for United Nations Sustainable Development Goal 11 to make cities and human settlements inclusive, safe, resilient, and sustainable.¹⁵

Additionally, non-road diesel vehicles emit harmful air pollutants and exposure to diesel engine exhaust is a health risk for many Australian workers. DEE is listed as one of the 38 priority carcinogens relevant to working conditions in Australia as it is known to cause lung cancer.¹⁶ The significant exposure highlights the need to reduce emissions and we support the implementation of stronger regulations and hope the Government explores further emission reduction strategies given the worker, the community, and environmental impacts.

We highlight the importance of emission standards to reduce current air pollution levels and protect the health of the public. Air pollution has been linked to serious health effects and the Australian Government needs to take further action to promote and encourage clean air. The implementation of MS3 aligns with the strong government action that is necessary to tackle ongoing poor air quality in Australia and demonstrates the Government's commitment to clean air.

Consultation Questions

1. Do you agree that the information above and provided in the CBA Report supports the introduction of non-road diesel engine emission standards in Australia?

Lung Foundation Australia agrees the information provided in the CBA Report supports the introduction of non-road diesel engine emission standards in Australia. Diesel engines are significant contributors to air pollution and the pollutants emitted are associated with a range of health impacts for humans as well as detrimental environmental impacts including climate change.¹⁷ Australia continues to fall behind other countries with international countries having already implemented non-road diesel engine regulations since the mid 1990's.¹⁸ The following figure demonstrates the reduction in particle emissions in light of the US standards being increasingly tightened (Refer to figure 1).¹⁹ The implementation of non-road diesel engine emission standards in Australia will result in significant health benefits and annual health savings for the Government as health outcomes improve for Australians.

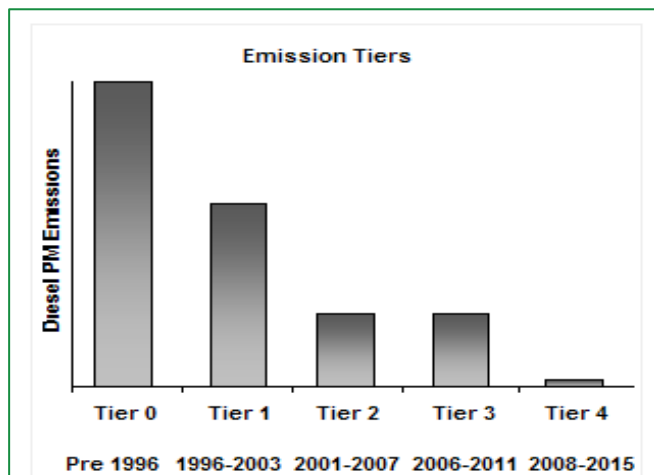


Figure 1: Reduction in particle emissions as US EPA non-road diesel engine standards are tightened over time.

We need strong government reforms to ensure the vehicle industry utilise available technology and subsequently reduce their emissions. One in three Australians currently living with a lung disease and the broader Australian community are at risk from exposure to air pollution and as no level of air pollution is safe action must be taken. Australia needs to implement best practice standards that align with international best practice and implemented as soon as practicable. We strongly support and urge the government to proceed with implement MS3 to support public health.

2. Are there other avenues that are available to address the harm caused by non-road diesel engine emissions?

We note the need for strong government legislation and improved monitoring, enforcement, and penalties to ensure industry is held accountable and responsible for reducing noxious emissions. Australia is far behind international standards and action is required urgently to protect the health of the environment and Australians.

3. If you do consider there is an alternative pathway, what data and analysis can you provide that supports this?

NA

4. Do you agree that the information above and provided in the CBA Report supports the need for government intervention?

The information provided and within the CBA report supports the need for government intervention and strong intervention is necessary to protect the health of the environment and Australians. We cannot wait for industry to act, and we must set clear, strong regulations to reduce harmful emissions as soon as possible. Importantly, industry must be held accountable, and monitoring and enforcement will play a key role in ensuring the success of the regulations to reduce emissions. Australians continue to be exposed to harmful air pollutants that is resulting in severe health outcomes which is in turn causing increased financial pressure on the Australian Government.

5. In the near to medium term, will the uptake of horizon technology be sufficient to remove the need for new non-road diesel engines and equipment? In all sectors?

Despite the availability of alternative options, the implementation of horizon technology (electric or hydrogen fuel cell engines) should not be relied upon to reduce the non-road diesel emissions. The implementation of such technology will take time and many industries may delay transferring to this technology if this is not required. We need the Australian Government to require industry to change by implementing legislative requirements to ensure emissions are reduced as soon as possible.

6. If so, can you provide data/evidence of such movement in the market that is sufficient to remove the need for government action?

NA

7. Are there other viable management scenarios that should be included in the evaluation?

NA

8. Do you feel that the CBA provides sufficient evidence of health benefits to the community for government to introduce emissions standards?

Yes, the analysis and evidence presented clearly highlights the health outcomes for each MS and the importance of implementing MS3. The CBA outlines and considers the key air pollutants from the industry, however, there will be additional benefits in reducing other air pollutants outside of PM2.5 and NOx. The links between air pollution and health will be discussed further below.

9. Are there any elements in the results of the CBA that you feel do not reflect the true position of the market as a whole?

NA

10. Do you believe there has been sufficient consultation with all stakeholders during the development of the cost-benefit analysis?

We note that as the peak body for lung health, Lung Foundation Australia advocates and supports the 1 in 3 Australians living with a lung disease and the lung health of Australians more broadly. We note our role in the air quality space and environmental health more broadly has been growing and so we look forward to being involved earlier. We appreciate the length of time given for this consultation, and the early notice shared with stakeholders ahead of the consultation opening. This is important for NGOs, and we appreciate the Department's openness to engaging with us and other key stakeholders. The Department have undertaken the consultation process well and the recommendations made from the CBA are sound, so we recognise the efforts and undertakings of The Department in this consultation.

11. If no, what other types of consultation would you have liked to have been included and why?

NA

12. Which management scenario would best meet your purposes (including BAU)?

The cost benefit analysis completed in mid-2022, assessed the potential outcomes for three different management scenarios. The evaluation identified that MS3 would be the most effective approach and immediate implementation would result in the best health and economic return over the long term. MS3 is described as best practice standards and regulated by the Commonwealth aimed to ensure emission standards align with international best practice and introduced as soon as practicable. We strongly support the implementation of MS3 which has the greatest reduction in emissions of both NO_x and PM2.5 and the greatest reduction in premature mortality of 27% from 2018-2063. Reducing emission rates will significantly improve the health of all Australians and subsequently the health costs associated with poor air quality such as the need for healthcare will be reduced. We urge the government to implement the management scenario that has the greatest health benefits for Australians and align with international best practice.

13. What are the arguments to support this option, including priorities you think the government should give more weight to for any decision?

We highlight the importance of giving weight to the health impacts of ongoing diesel emissions for both the health of the community and the health of the environment. Australians are being exposed to harmful air pollutants which can be reduced and avoided resulting in improved health outcomes and reduction in both morbidity and mortality.

Health Impacts of Air Pollution

Lung Foundation Australia strongly advocate for improved lung health, and we note the significant impacts of air pollution and the need to improve air quality. There is no safe level of air pollution as even exposure to small amounts of air pollution can cause health impacts.²⁰ The significant health impacts associated with vehicle pollution is a substantial economic burden for the government, with exposure linked to serious health harms and premature deaths. In 2015, The International Council on Clean Transportation estimated that transport related air pollution caused an economic cost of about \$10 billion in Australia.²¹ Exposure to air pollutants can result in a wide range health effects including asthma, heart disease, stroke, lung cancer, and chronic obstructive pulmonary disease.²² New research from the University of Melbourne demonstrates that the health impacts resulting from vehicle emissions are worse than previously thought and may cause:

- 11,105 premature deaths in adults per year;
- 12,210 cardiovascular hospitalisations per year;
- 6,840 respiratory hospitalisations per year;
- 66,000 active asthma cases per year.²³

Air pollution disproportionately impacts the health of those who are vulnerable, including the 1 in 3 Australians living with a lung disease. Air pollution plays a significant role in the onset and exacerbation of the symptoms in patients with pre-existing lung diseases and air pollutants such as particulate matter can induce inflammation in the respiratory tract and lung, reducing the pulmonary function of COPD patients and lead to worsening of the symptoms.²⁴

Health impacts are observed for all levels of exposure to many air pollutants. Air pollution causes detrimental effects to the respiratory system including decreased pulmonary function, increased infections, increase in respiratory symptoms (cough, phlegm, and wheeze), acute exacerbations of chronic obstructive pulmonary disease (COPD), asthma, increased respiratory hospitalisations, higher prevalence of childhood asthma and premature mortality in people with chronic lung disease.²⁵ Ambient air pollution can also cause significant health impacts including ischaemic heart disease, stroke, and lung cancer.²⁶ Furthermore, air pollution has been linked to poor brain health with increased incidence of neurological and psychiatric disorders such as cognitive decline, dementia, anxiety, depression, schizophrenia and attention deficit hyperactivity disorder (ADHD).²⁷

Additionally, children, the elderly and pregnant women can be particularly impacted by air pollution.²⁸ Pregnant women exposed to high levels of air pollution over time may experience adverse pregnancy outcomes such as reduced birth weight or preterm birth.²⁹ Children are especially vulnerable as their lungs are growing and developing, immune and metabolic systems are developing, they suffer from frequent respiratory infections, they breathe at a higher rate, and they typically spend more time outdoors and closer to the ground where pollutants fall.³⁰ Older people are also more likely to be affected by air pollution due to weaker immune systems, or undiagnosed respiratory or cardiovascular health conditions.³¹ Given many populations are vulnerable to the impacts of air pollution and the impacts to the general public more broadly, we need to start effectively reducing emissions particularly from industries that emit large amounts of air pollution. The health impacts not only impact quality of life but are costly for the government and we can and should be doing more to protect our most vulnerable.

Climate change

Australia can do more to protect the environment and actions such as strong non-road diesel standards are important in achieving improved environmental health. The link between the environment and human health has been well established and importantly we are able to do more in Australia to protect the health of our environment and Australians more broadly.

Additionally, we are seeing continual environmental degradation leading to climate change. In 2023, the World Meteorological Organisation released a new report finding that the chance of the global surface temperature exceeding 1.5°C above preindustrial levels for at least one year between 2023 and 2027 is likely.³² The National Preventive Health Strategy 2021-2030, identifies climate change as a significant issue and importantly, a policy achievement by 2030 includes evidence-based approaches are developed and implemented to identify, address and mitigate the impacts of climate change on the health system.³³ In 2023, Australia began developing the first National Health and Climate Strategy, recognising the relationship between climate and health, and increasing the connection between climate policy and public health policy.³⁴ This work aligns more broadly with public health policy and goals at a national level to protect health of Australians in face of an ever-changing environment.

Further, the Australian Government remains committed to addressing climate change having set new targets aiming to reduce greenhouse gas emissions by 43% below 2005 levels by 2030 which further ensures Australia will be on track to reach net zero emissions by 2050.³⁵

The new target set in 2022, demonstrates an increased response and effort by the Australian Government, increasing reduction by 15% than previous set goals.³⁶

Diesel exhaust emissions – workplace hazard

Diesel exhaust emissions have long been linked with adverse health effects and exposure to diesel engine exhaust is a health risk for many workers as outlined in the '*Managing risks of Diesel Exhaust in the Workplace*' by Safe Work Australia and '*Occupational Cancer Risk Series – Diesel Engine Exhaust*' by Cancer Council Australia.^{37,38} International evidence such as the Human Health Assessment for Diesel Exhaust by Canada in 2016 draws attention to diesel exhaust emissions (DEE) from on- and off-road vehicles and brings light to the associated health impacts by providing a comprehensive review and analysis of potential adverse health effects.³⁹

Workers exposed to Diesel Exhaust Emissions (DEE)

DEE is listed as one of the 38 priority carcinogens relevant to working conditions in Australia as noted by Cancer Council⁴⁰. DEE is known to cause lung cancer and current data suggested that approximately 1.2 million Australian workers are exposed to this with an estimated 4,450 lung cancer cases will be developed over the lifetime attributed to DEE⁴¹. In Australia, DEE is the second most common carcinogen workers are exposed to and each year approximately 130 Australians are diagnosed with lung cancer caused by work-related exposure to DEE.⁴² Research estimates that in 2011 (latest figures) 1.2 million Australian workers were exposed to diesel exhaust in the workplace with acute and long-term exposure having a negative impact on worker's health and wellbeing.⁴³ It is well reported that workers who are exposed to high levels of diesel engine exhaust (DEE) have an increased risk of lung function decline and increased airway resistance.⁴⁴ We note the importance of reducing diesel engine emissions for both the health of the public but also to protect workers who are increasingly exposed to the pollutants being emitted from non-road diesel engines. Implementing emissions standards to limit noxious emissions from off-road diesel is an important action to control workplace exposure and protect the health of Australian workers.

14. Why are these priorities more important in the context of providing the best outcome for the whole community?

The above priorities are integral in ensuring the best outcome for all Australians. The public health needs of Australians must be priority in the decision made by the government and it is clear that we can greatly improve the health of Australians by reducing noxious emissions. It is important that decisions made have the greatest impact for all and do not solely represent the wants of only industry or individuals who may have vested interests. Legislative requirements to reduce emissions will ensure industries are responsible for their harmful emissions and act to protect the health of all. Similar requirements have been implemented internationally for decades and we are able to utilise this knowledge and technology which will ultimately support and ensure the success of these regulations.

15. Is your industry more or is it less supportive of the goals of introducing non-road diesel engine emission standards – i.e., reducing noxious emissions and thereby delivering consequent improvements in human health?

Lung Foundation Australia is greatly supportive of the goal to introduce non-road diesel engine emission standards to reduce noxious emissions and thereby delivering consequent improvements in human health and the environment. As the peak health body for lung health we acknowledge and highlight the importance of reducing emissions, as research has clearly linked air pollution to a range of poor lung health outcomes and importantly has significant impacts for vulnerable populations such as the 1 in 3 Australians living with a lung disease. We need to do more to protect the lung health of Australians and reducing non-road diesel emissions will play an integral role in ensuring clean air in Australia.

16. Some non-road diesel-powered equipment will be fitted with a replacement engine several times throughout its useful life. Under MS2 and MS3, standards would apply to all within-scope equipment introduced into Australia for the first time, including imported second-hand equipment. What approach would support users to source suitable replacement engines?

NA

17. If government decides to regulate, do you believe that the proposed use of the Product Emissions Standards Act is an appropriate approach?

Yes, the Product Emissions Standards Act is an appropriate approach to regulate both the import and supply of non-road engines as it will provide a strong regulatory framework and ensure the implementation of offences for non-compliance. We note the need for increased compliance monitoring and enforcement particularly following the implementation of the new requirements, to ensure industry aligns and is held accountable. We need the implementation of MS3 to effectively regulate the emissions from this industry and improve air quality in Australia.

18. If not, what alternative approach do you propose?

NA

19. If a mandatory standard was introduced what factors would impact its effectiveness against lower noxious emissions?

If a mandatory standard was introduced, it is important to have clear implementation dates and enforcement of noxious emission standards. Industry must be held accountable for meeting the standards and monitoring and compliance will be required to ensure such regulations are effective in reducing air pollution. The Government will need to work closely with industry to support the transition during implementation but further ensure strong penalties are in place for non-compliance. We highlight the need for ongoing review and strengthening of standards to ensure effective reduction of noxious emissions and ensure Australia remains in line with other countries. However, this is an important first step to re-align Australia with international best practice and allow for ongoing reductions in emissions for the industry.

20. If Tier 4f based emission standards were introduced into Australia, do you think members of your industry sector would retain their older, lower standard engines longer than planned?

NA

Summary

We congratulate the Australian Government, and Department of Climate Change, Energy, the Environment and Water on its work to improve emissions from the vehicle sector. We must continue to do more to protect the health of Australians and the environment, particularly in the light of climate change and the exacerbation of impacts to human health. We again reaffirm our support for diesel engine emission standards that align with MS3 to ensure the greatest health benefits to Australians and the environment. Immediate implementation remains a priority as Australia is behind other countries in implementing standards of non-road diesel engines. We can no longer delay action that will provide significant health benefits for Australians. Australians deserve to breathe clean air and be protected from avoidable health harms and premature mortality. We thank you for the opportunity to provide feedback on this consultation. If you would like to discuss the recommendations further, please contact Paige Preston, Senior Manager of Policy and Advocacy at Lung Foundation Australia on PaigeP@lungfoundation.com.au.

Yours sincerely,

A handwritten signature in black ink, appearing to be 'Mark Brooke', with a stylized flourish extending to the right.

Mark Brooke

CEO

Lung Foundation Australia

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- ¹ Australian Government Department of Climate Change, Energy, the Environment and Water 2023, National clean air agreement, <https://www.dcceew.gov.au/environment/protection/air-quality/national-clean-air-agreement>
- ² World Health Organisation 2016, Environmental Health https://www.who.int/health-topics/environmental-health#tab=tab_1
- ³ Environmental Health Standing Committee (enHealth)2016, Preventing disease and injury through healthy environments, [https://www1.health.gov.au/internet/main/publishing.nsf/Content/A12B57E41EC9F326CA257BF0001F9E7D/\\$File/Standing-Committee-Strategic-Plan-2016-2020.pdf](https://www1.health.gov.au/internet/main/publishing.nsf/Content/A12B57E41EC9F326CA257BF0001F9E7D/$File/Standing-Committee-Strategic-Plan-2016-2020.pdf)
- ⁴ European Environment Agency 2022 Environment and health, <https://www.eea.europa.eu/themes/human/intro#:~:text=Human%20health%20and%20well%2Dbeing%20are%20intimately%20linked%20to%20the,and%20material%20inputs%20for%20production>
- ⁵ Australian Institute of Health and Welfare 2022, Natural environment and health <https://www.aihw.gov.au/reports/australias-health/natural-environment-and-health>
- ⁶ Hanigan, I. C., Broome, R. A., Chaston, T. B., Cope, M., Dennekamp, M., Heyworth, J. S., Heathcote, K., Horsley, J. A., Jalaludin, B., Jegasothy, E., Johnston, F. H., Knibbs, L. D., Pereira, G., Vardoulakis, S., Hoorn, S. V., & Morgan, G. G. (2021). Avoidable mortality attributable to anthropogenic fine particulate matter (Pm2.5) in Australia. *International Journal of Environmental Research and Public Health*, 18(1), 1-9. [254]. <https://doi.org/10.3390/ijerph18010254>
- ⁷ DCCEEW 2023, Non-Road Diesel Engines – Noxious Emission Standards: Impact Analysis – May 2023, Department of Climate Change, Energy, the Environment and Water, Canberra, CC BY 4.0. https://storage.googleapis.com/files-au-climate/climate-au/p/prj267cce3a508d29a3be3cc/public_assets/Non-Road%20Diesel%20Engines%20Noxious%20Emission%20Standards%20Impact%20Analysis%20E2%80%9320May%202023.pdf
- ⁸ Ibid 7
- ⁹ Khreis H, Nieuwenhuijsen MJ, Zietsman J, Ramani T. Traffic-related air pollution: Emissions, human exposures, and health: An introduction. In *Traffic-related air pollution 2020* Jan 1 (pp. 1-21). Elsevier.
- ¹⁰ EPA NSW, 2022, proposed clean air regulation, <https://hdp-au-prod-app-nswepa-yoursay-files.s3.ap-southeast-2.amazonaws.com/2816/4601/5354/RIS-Clean-Air-Reg.pdf>
- ¹¹ Ibid 10
- ¹² Department of Environment and Conservation. (2005). *Air Pollution Economics Health Costs of Air Pollution in the Greater Sydney Metropolitan Region Acknowledgments* (pp. 1–73). Department of Environment and Conservation NSW. <https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Air/air-pollution-economics-health-costs-greater-sydney-metropolitan-region-050623.pdf>
- ¹³ Tulchinsky, T. H., & Varavikova, E. A. (2014, January 1). Chapter 5 - Non-Communicable Diseases and Conditions (T. H. Tulchinsky & E. A. Varavikova, Eds.). ScienceDirect; Academic Press. <https://www.sciencedirect.com/science/article/pii/B9780124157668000057>
- ¹⁴ Abbey, D. E., Burchette, R. J., Knutsen, S. F., McDonnell, W. F., Lebowitz, M. D., & Enright, P. L. (1998). Long-term Particulate and Other Air Pollutants and Lung Function in Nonsmokers. *American Journal of Respiratory and Critical Care Medicine*, 158(1), 289–298. <https://doi.org/10.1164/ajrccm.158.1.9710101>
- ¹⁵ United States Government, 2023, Sustainable development goals, <https://sdg.data.gov/11-6-2/>
- ¹⁶ Fernandez RC, Driscoll TR, Glass DC, Vallance D, Reid A, Benke G, et al. A priority list of occupational carcinogenic agents for preventative action in Australia. *Aust N Z J Public Health*. 2012;36(2):111-5.
- ¹⁷ Ibid 7
- ¹⁸ NSW EPA, 2021, Non-road diesel and marine emissions <https://www.epa.nsw.gov.au/your-environment/air/non-road-diesel-marine-emissions>
- ¹⁹ Ibid 18
- ²⁰ Victoria Government, Estimating the health costs of air pollution in Victoria, https://www.climatechange.vic.gov.au/__data/assets/pdf_file/0022/421717/Final_Health-costs-of-air-pollution-in-Victoria.pdf
- ²¹ Climate Council 2023, Fuel Efficiency standards: Benefits every Australian will share, https://www.climatecouncil.org.au/wp-content/uploads/2023/05/CC_MVSA0357-CC-Briefing-Paper-Fuel-Efficiency-Standards_V3-FA-Screen-Single.pdf
- ²² Electric Vehicle Council & Asthma Australia, 2019, Cleaner and Safer Roads for NSW, https://electricvehiclecouncil.com.au/wp-content/uploads/2019/06/EVC-Cleaner-and-Safer-Roads-for-NSW_V3-Single.pdf
- ²³ Barber, B 2023, Vehicle emissions may cause over 11,000 deaths a year, researchers say, <https://www.unimelb.edu.au/newsroom/news/2023/february/vehicle-emissions-may-cause-over-11,000-deaths-a-year-research-shows>
- ²⁴ Abbey, D. E., Burchette, R. J., Knutsen, S. F., McDonnell, W. F., Lebowitz, M. D., & Enright, P. L. (1998). Long-term Particulate and Other Air Pollutants and Lung Function in Nonsmokers. *American Journal of Respiratory and Critical Care Medicine*, 158(1), 289–298. <https://doi.org/10.1164/ajrccm.158.1.9710101>

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- ²⁵ US EPA, 2022, Particle Pollution and Respiratory Effects, <https://www.epa.gov/particle-pollution-and-your-patients-health/health-effects-pm-patients-lung-disease>
- ²⁶ World Health Organisation, 2019, Health consequences of air pollution on populations <https://www.who.int/news/item/15-11-2019-what-are-health-consequences-of-air-pollution-on-populations#:~:text=Exposure%20to%20high%20levels%20of,people%20who%20are%20already%20ill> .
- ²⁷ Kim H, Kim W-H, Kim Y-Y and Park H-Y (2020) Air Pollution and Central Nervous System Disease: A Review of the Impact of Fine Particulate Matter on Neurological Disorders. *Front. Public Health* 8:575330. doi: 10.3389/fpubh.2020.575330
- ²⁸ Ibid 22
- ²⁹ Ibid 29
- ³⁰ Ibid 29
- ³¹ Ibid 29
- ³² World Meteorological Organisation 2023, WHO Global Annual to Decadal Climate Update, https://library.wmo.int/doc_num.php?ex plnum_id=11611
- ³³ Department of Health 2021, National Preventive Health Strategy 2021–2030, <https://www.health.gov.au/sites/default/files/documents/2021/12/national-preventive-health-strategy-2021-2030.pdf>
- ³⁴ The Hon Ged Kearney 2023, Australia's first National Health and Climate Strategy kicks off, <https://www.health.gov.au/ministers/the-hon-ged-kearney-mp/media/australias-first-national-health-and-climate-strategy-kicks-off>
- ³⁵ Ibid 7
- ³⁶ Climate Analytics 2016, Australia's 2030 emissions: states lead the way, <https://climateanalytics.org/publications/2021/australias-2030-emissions/>
- ³⁷ Safe Work Australia 2015, Guidance for managing the risks of diesel exhaust – information sheet, <https://www.safeworkaustralia.gov.au/doc/guidance-managing-risks-diesel-exhaust-information-sheet>
- ³⁸ Cancer Council Australia 2023, Occupational cancer risk series – diesel engine exhaust, <https://www.cancer.org.au/assets/pdf/occupational-cancer-risk-series-diesel-engine-exhaust>
- ³⁹ Government of Canada, 2016, Human health risk assessment for diesel exhaust summary, <https://www.canada.ca/en/health-canada/services/publications/healthy-living/human-health-risk-assessment-diesel-exhaust-summary.html>
- ⁴⁰ Ibid 16
- ⁴¹ Carey RN, Fritschi L, Driscoll TR, et al. Interventions to Reduce Future Cancer Incidence from Diesel Engine Exhaust: What Might Work? *Cancer Prev Res (Phila)* . 2019;12(1):13-20. doi:10.1158/1940-6207.CAPR-18-0274
- ⁴² Cancer Council Australia. Diesel fumes at work cause 130 lung cancer cases every year: Cancer Council Australia; 2017. Available from: <https://www.cancer.org.au/media-releases/2017/diesel-fumes-at-work-cause-130-lung-cancer-cases-every-year>
- ⁴³ SafeWork Australia. 2015. *Guide to managing the risks of exposure to diesel exhaust in the workplace*. Available at: <https://www.safeworkaustralia.gov.au/system/files/documents/1702/guidance-managing-risks-exposure-diesel-exhaust-in-the-workplace.pdf>
- ⁴⁴ Ibid 44