

PARLIAMENT OF VICTORIA

LEGISLATIVE COUNCIL

Environment and Planning Committee



Inquiry into the health impacts of air pollution in Victoria

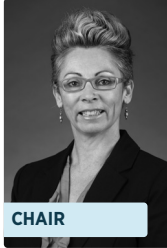
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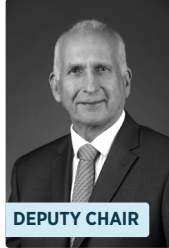
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About the Committee

Functions

The functions of the Environment and Planning Committee are to inquire into and report on any proposal, matter or thing concerned with the arts, environment and planning the use, development and protection of land.

The Environment and Planning Committee may inquire into, hold public hearings, consider and report on any Bills or draft Bills referred by the Legislative Council, annual reports, estimates of expenditure or other documents laid before the Legislative Council in accordance with an Act, provided these are relevant to its functions.

Government Departments allocated for oversight:

- Department of the Environment, Land, Water and Planning
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This report is available on the Committee's website.

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Terms of reference

Inquiry into the health impacts of air pollution in Victoria

On 19 February 2020 the Legislative Council agreed to the following motion:

That this House requires the Environment and Planning Committee to inquire into, consider and report, by 29 October 2020*, on actions to minimise the health impacts of air pollution, including, but not limited to—

- (a) state-wide practical, real-time, cost-effective mitigation strategies;
- (b) ensuring that Victorian air quality continues to track towards meeting or exceeding current international best practice standards and is enforced;
- (c) the impact of economic and population growth on air pollution and health outcomes;
- (d) strengthening commitments across all Victorian Government portfolios to reduce air pollution and minimise the impact on health; and
- (e) any other related matters.

* The reporting date was extended to 28 October 2021 and further extended to 18 November 2021.

Chair's foreword

Overall, Victoria has relatively clean air by world standards. This does not mean, however, that Victorians do not suffer health impacts from air pollution. Certain areas within Victoria are particularly susceptible to poor air quality and the consequent severe health outcomes. Similarly, certain events can create conditions that lead to quite severe health issues for Victorians.

This Inquiry has heard evidence from a significant number of health experts as well as from ordinary Victorians about the impact, and potential impact, of poor air quality. Many people have expressed concerns about their health and that of their families and communities.

The Inquiry was not intended to be an epidemiological study into air pollution and its effects. Instead, it sought to highlight some of the issues that are of concern in the community and identify solutions, both those being pursued by government and those that could be pursued into the future.

During the Inquiry, a number of causes of air pollution were identified, including power generation from coal-fired power stations, industrial emissions, vehicles and transport emissions, the use of wood heaters for domestic heating and bushfires and planned burns.

The Inquiry was intended to provide a snapshot of some of the causes of air pollution and also to highlight the impacts that this poor air quality can have on Victorian citizens. The Committee has made 35 recommendations aimed at improving the monitoring of air pollution and mitigation of its impacts on the community.

It should be noted at the outset that not all of the issues of concern have been able to be fully addressed in this Inquiry. While the Committee has made some observations about the Latrobe Valley, for example, the Committee recognises that the issues confronted by this region are so complex and long standing that further work needs to be done to address the very specific concerns of that community. The Committee acknowledges in the report that community members in the Latrobe Valley have experienced frustration over a number of years and suggests that the Government consider effective community consultation with guidelines as well as some detailed analysis of particular projects of concern. However, the Committee has not gone into detail about these projects as it considers it important that such analyses are done thoroughly. This Inquiry did not have the time or expertise to undertake this task.

The Committee considers that the Government recognises some of the key issues facing Victorian communities with regards to their air quality and has been working on a broad air quality strategy. This strategy will be important in providing a holistic and comprehensive response to the issues. To this end, the Committee has recommended that the strategy be expedited and completed as soon as possible.

The Committee received a number of submissions related to the health impacts of the use of wood smoke from domestic wood heaters. The Committee makes a number of findings and recommendations in regards to this issue, recognising that wood smoke from domestic heating is a significant contributor to air pollution in built up areas across Victoria. The Committee does recognise that not everyone can afford to simply go out and replace their wood fires with other forms of heating, and findings and recommendations recognise this reality. It also recognises that the issue is of greater concern in built up areas. However, it is important that this issue is broadly understood within the community.

Some of the recommendations in the report go to the key issue of consultation with communities and a localised and targeted approach to the impacts of heavy industry, in particular. The Committee has made some findings and recommendations particularly aimed at the Inner West of Melbourne and the Latrobe Valley with the intention of improving monitoring and mitigating the negative impacts of the industrial activity in these regions.

The Committee also discusses the impact of vehicle emissions and some of the important work needed to mitigate its impact. This was particularly of concern in the inner western suburbs of Melbourne which have a long history of poor air quality, as they are a significant thoroughfare for heavy trucks, due to the location of industrial areas and the largest port in Australia, the Port of Melbourne. The Committee has been made aware of some significant planning concerns as well as the impact of particular fuel types, notably diesel, in contributing to poor air quality.

Clearly, the movement towards zero emission vehicles is becoming a crucial element of the mitigation strategy. The Committee acknowledges the Government's comprehensive Victoria's Zero Emissions Vehicle Roadmap which was announced earlier this year. This strategy, which has already commenced, will offset some of the concerns and will encourage greater take-up of electric and low emissions vehicles. This is a crucial element of reducing emissions and poor air quality in Victoria.

In addition to the recommendations made by the Committee, the 16 findings are aimed at highlighting gaps in air pollution management and in encouraging government to continue improvements in mitigation strategies.

The Inquiry was undertaken with a bipartisan and cooperative attitude from members. All members of the Committee demonstrated a clear focus on understanding the issues and considering appropriate mitigation strategies that are both being undertaken and could be undertaken by government.

I would like to thank the members for their collegiate and cooperative approach to the Inquiry and to the willingness they showed to discuss and debate issues. As in any parliamentary inquiry, there were differences of opinion but these were expressed respectfully and with the best interests of the Victorian community at their core.

I would like to also thank the secretariat of the Committee for their diligence and professionalism in the management of the Inquiry and their assistance with the preparation of the report. I would like to thank Michael Baker, the Committee Manager, for his management of the Inquiry. In particular I would like to express my gratitude to Vivienne Bannan, the Inquiry Officer, and Research Assistant Caitlin Connally for their excellent work in collating and synthesising the substantial evidence and compiling the report for the Committee. In addition, I would like to express the Committee's appreciation to Sylvette Bassy and Cat Smith for their excellent administrative assistance throughout the Inquiry.

A handwritten signature in black ink that reads "S. Terpstra". The signature is written in a cursive, flowing style.

Ms Sonja Terpstra MLC
Chair

Findings and recommendations

3 Governance and compliance

RECOMMENDATION 1: That the Victorian Government investigate the viability and consider the introduction of stricter air quality enforcement measures and to appropriately resource enforcement agencies such as the EPA to enforce clean air standards. 42

RECOMMENDATION 2: That the Victorian Government advocate to the National Environment Protection Council for the introduction of stricter air quality indicators and objectives especially for particulate matter sources. 42

FINDING 1: The Victorian Government has not released the Air Quality Strategy that was due to release in 2019. 51

RECOMMENDATION 3: That the Victorian Government expedite the completion and subsequent release of its Air Quality Strategy. 51

RECOMMENDATION 4: That the Victorian Government consider a review of the scheme upon which conditional licences are issued to heavy industry and to assess the opportunity for tangible, localised air quality improvements, not only to reduce the incidences of exceedances if and when they occur, but to encourage emission reductions by industry to be lower than permitted levels requiring industry to publicly, self-report on an annual basis in addition to formal EPA monitoring. Further improvements in this area should also be designed to assist the EPA with further localised compliance and enforcement activities. 63

FINDING 2: The Environment Protection Authority and the Victorian Government are perceived to have not consulted adequately with communities impacted by air pollution. When consultation has occurred, the community have not been satisfied that their feedback has been considered and adopted meaningfully. 67

RECOMMENDATION 5: That the Victorian Government, the Environment Protection Authority and all relevant regulatory agencies undertake meaningful, participatory consultation with affected communities for all future significant projects and activities that impact the air quality of communities. 67

4 Inner West

RECOMMENDATION 6: The Committee notes the Victorian Government initiative of planting 500,000 trees in Melbourne’s west and recommends half yearly progress updates be provided to the community for the next 3 years. Tree planting should include local species indigenous and appropriate to local areas. Local First Nations People to be included in the development of any expansion of this policy initiative. **70**

FINDING 3: The Committee has concerns about the ongoing exposure of local residents in and around the Brooklyn Industrial Precinct due to poor air quality and the detrimental health impacts that this may cause for sensitive populations and the broader community more generally. **74**

RECOMMENDATION 7: That the Victorian Government ensures that the West Gate Tunnel contractors comply with the provisions of the Environment Effects Statement to ensure that the ventilation is consistent with international best practice in tunnel ventilation systems. **83**

RECOMMENDATION 8: That the Victorian Government implement the recommendations put forward by the Inner West Air Quality Community Reference Group and continue to work on improving air quality for residents in Melbourne’s inner west, western and northern suburbs as a matter of priority. **84**

FINDING 4: The Legislative Council Environment and Planning Committee endorses the key findings made by the previous parliamentary *Inquiry into recycling and waste management* in regard to the toxic fires in Melbourne’s northern and western suburbs contained in its interim report. **91**

RECOMMENDATION 9: That the Victorian Government improves communications with communities to provide timely and/or real time communications on any events that may have adverse health impacts when and where practicable. **91**

RECOMMENDATION 10: That the Victorian Government supports local communities by providing localised health responses following toxic fire events that have occurred in Melbourne’s western and northern suburbs. This support should be tailored to address the adverse health and/or mental health impacts that are identified. **91**

5 Latrobe Valley

RECOMMENDATION 11: That the Victorian Government consider conducting an assessment and monitoring of heavy metals emissions in the Latrobe Valley if it is not already doing so. 113

RECOMMENDATION 12: That the Victorian Government consider developing effective community consultation guidelines and/or practice notes to assist project proponents in meeting community expectations, especially where heavy industry is in operation or likely be in operation. 115

FINDING 5: Community members in the Latrobe Valley experienced significant frustration as a result of the Minister for Planning's approval, under the *Planning and Environment Act 1987 (Vic)*, of an application for a used lead acid battery secondary smelter about which increased concerns about air quality were held by the local community. 117

RECOMMENDATION 13: That the Victorian Government conduct an environment effects statement on the proposed used lead acid battery secondary smelter in Hazelwood North. 117

6 Wood smoke

RECOMMENDATION 14: That the Victorian Government continue to develop and strengthen partnerships with First Nations People to make greater use of Traditional Owner land management practices. 139

RECOMMENDATION 15: The Victorian Government consider the introduction of a scheme to assist people from a low socioeconomic background to:

- evaluate houses for poor air quality and/or air flow containment issues, and
- provide rebates, prioritising those with chronic lung and/or breathing conditions, to assist with improvements to the indoor air quality of their homes. 141

RECOMMENDATION 16: The Victorian Government consider the introduction of a rebate scheme to subsidise the purchase of HEPA filters for people from low socioeconomic background, prioritising those with chronic lung conditions. 141

RECOMMENDATION 17: The Victorian Government investigate the feasibility of establishing community clean air shelters in various locations across Victoria in partnership with local government authorities if and where appropriate. **142**

FINDING 6: Wood smoke from domestic heating is a significant contributor to air pollution in built-up areas across Victoria, particularly in cooler months. **144**

RECOMMENDATION 18: The Environment Protection Authority Victoria work with local councils to develop more practical approaches to the management and enforcement of local laws that govern air pollution impacts caused by domestic wood smoke, including consideration of recommendations made by Banyule City Council to provide for:

- the issue of infringement penalties where continual visible smoke was present
- the ability to issue a smoke abatement order to an occupier of a residence from which excessive wood heater smoke is emitted
- the implementation of guidelines for enforcement agencies
- additional funding support to assist enforcement or education activities.

158

RECOMMENDATION 19: The Victorian Government develop and implement a public community education and awareness campaign to actively inform the community about the dangers of wood heaters and adverse health impacts caused by exposure to smoke, especially in built-up areas, including targeted education for households with a wood heater. **161**

RECOMMENDATION 20: The Victorian Government consider a targeted rebate scheme to assist people from a low socioeconomic background to transition away from reliance on domestic wood heaters as their only source heating to more modern and efficient reverse cycle air conditioning. The scheme should be extended to people who live in a rental property and who do not have a choice of heating options. **161**

RECOMMENDATION 21: The Victorian Government consider the development of and implement a supported rebate program to assist with the progressive phase-out and removal of wood heaters from dwellings in urban and built-up areas by vendors at the point of sale of a property. **161**

RECOMMENDATION 22: The Victorian Government consider the creation of a taskforce to monitor and evaluate impacts of and issues relating to woodsmoke, including provision for ongoing monitoring and evaluation of the effectiveness of woodsmoke reduction measures, and associated improvements to air quality and human health.

162

7 Vehicle emissions

RECOMMENDATION 23: That the Victorian Government work with industry to ensure that heavy vehicles, such as trucks are brought up to modern standards. Industry is actively encouraged and assisted to transition their fleets to modern, green, zero emission heavy vehicles. This work should commence as soon as possible with the development of clear targets for industry to achieve. The Victorian Government is encouraged to liaise and work with the Commonwealth Government to achieve this goal.

171

FINDING 7: Placement of sensitive facilities such as schools and childcare centres in high traffic areas represents a risk to both the short- and long-term health outcomes for children.

174

RECOMMENDATION 24: The Victorian Government consider amending the *Planning and Environment Act 1987* (Vic) to require the risks posed by traffic-related air pollution to be included as a key criterion in any planning decision (including by relevant planning authorities and the Victorian Civil and Administrative Appeals Tribunal where relevant) related to the location of childcare centres and schools and that all Planning Schemes be amended to ensure that the impacts of air pollution are considered in any relevant applications.

174

RECOMMENDATION 25: That the Victorian Government develop and introduce clean air zones around facilities such as schools and childcare centres.

174

FINDING 8: Despite a lack of local empirical data quantifying the negative health impacts of discretionary idling, particularly around schools and facilities catering for vulnerable populations, the Committee considers that it is highly likely that the practice has the potential to cause harm, both in the short and long term.

178

RECOMMENDATION 26: That the Victorian Government develop and deliver a public education program raising awareness of the potential harm of idling, particularly when dropping-off and picking-up children from schools.

178

RECOMMENDATION 27: That the Victorian Government explore other interventions, including but not limited to the reduction of vehicle idling when stationary, including regulatory options. 178

RECOMMENDATION 28: That the Victorian Government continues to advocate with the Commonwealth Government to stop importation of vehicles that do not have idling cut-off technology. 178

FINDING 9: The transition to zero and low emission vehicles is an essential step in the reduction of air pollution and greenhouse gas emissions and the rapid development of electric vehicle technology. The consequent proliferation of electric vehicles in the worldwide market is removing many of the obstacles to the take-up of electric vehicles in Australia. 181

FINDING 10: The development of a network of fast charging stations needs to be a priority and will lead to a naturally faster uptake of zero emissions vehicles. 181

FINDING 11: Government has a significant role to play in encouraging greater take-up of electric and low-emissions vehicles in Victoria, both in the purchase of vehicles and in the development of supporting infrastructure, including charging points. 183

FINDING 12: *Victoria's Zero Emissions Vehicle Roadmap*, announced in 2021, will offset some concerns about the road user charge and initiatives announced in the Roadmap will encourage greater take-up of electric and low emission vehicles. 183

FINDING 13: The further expansion of a zero emission public transport system represents a significant step in reducing air pollution and supports the transition to a 100% zero emission vehicle public transport fleet. 187

8 Air quality monitoring in Victoria

RECOMMENDATION 29: That the Victorian Government completes the implementation of the recommendations in the Victorian Auditor-General's report *Improving Victoria's Air Quality* (March 2018) as a matter of priority. 205

RECOMMENDATION 30: That the Victorian Government consider upgrades and improvements to the Victorian air quality monitoring network and AirWatch. Considerations should include:

- providing more monitoring stations across Victoria, particularly in more densely populated areas that have been identified as air quality problem hot spots
- siting of monitoring stations near priority communities and locations, such as childcare centres, kindergartens, and schools, in particularly where they are in close proximity to main roads (500–800 metres)
- investigating the viability of implementing technology which provides live and localised air quality information, like the Latrobe Valley Information Network
- providing continuously updated air quality data on AirWatch in real-time
- enabling current and historical air monitoring data to accessible for download from AirWatch.

205

RECOMMENDATION 31: That the Victorian Government reconsider its response to recommendation 4 of the Victorian *State of the Environment 2018* report and implement a contemporary pollen monitoring network.

206

9 Public communication and education

FINDING 14: Due to poor geographical coverage of air quality monitoring stations, AirWatch may not provide the most up to the minute, reliable picture of air quality in some areas around Victoria.

213

FINDING 15: The VicEmergency app is an important communication tool which allows Victorians to access real-time information on emergencies and what actions should be taken, including bushfires. However, the app does not include a warning symbol for air pollution.

216

RECOMMENDATION 32: That the Victorian Government consider the inclusion of a symbol for air pollution on its VicEmergency app to warn affected residents when there is significant air pollution due to an emergency event, controlled/planned burns, pollen and dust events.

216

RECOMMENDATION 33: That the Victorian Government investigate the need for creating a fit for purpose air quality app which provides real-time air quality information in conjunction with upgrading the Air Quality monitoring network. The app should also be used to relay important health and safety announcements during poor air quality days. The app should include:

- the ability for users to input personal health information
- access to real-time air quality data
- public health messaging that can be personalised based on the information a user has inputted
- health alerts/warnings about bushfire or other significant air pollution events, such as industrial fires.

217

RECOMMENDATION 34: The Victorian Government provide better co-ordination across available platforms for people to ascertain real-time information about smoke and fire-related events, and to harmonise across the Vic Emergency App to include information about planned burns via Forest Fire Management Victoria.

217

FINDING 16: Accessible and real-time air quality information during major air pollution events, such as bushfires, is an important public communication tool. It allows people to:

- make informed decisions on how to best prevent exposure to smoke or air pollutant materials
- better mitigate the health risks by increasing their understanding of the real risks posed to health during an air pollution event, such as bushfires.

222

RECOMMENDATION 35: That the Victorian Government implements a state-wide education campaign around the risks of air pollution which includes relevant health information and best practice advice on mitigating exposure. In developing this campaign, the Government should look at ways to:

- tailor this information so that it targets specific at-risk cohorts
- offer materials in a variety of formats, including in ways that are culturally appropriate and accessibility friendly
- focus parts of the campaign on specific issues or sources of pollution.

229

What happens next?

There are several stages to a parliamentary inquiry

The Committee conducts the Inquiry

This report on the Inquiry into the health impacts of air pollution in Victoria is the result of extensive research and consultation by the Legislative Council's Environment and Planning Committee at the Parliament of Victoria.

We received written submissions, spoke with people at public hearings, reviewed research evidence and deliberated over a number of meetings. Experts, government representatives and individuals expressed their views directly to us as Members of Parliament.

A Parliamentary Committee is not part of the Government. Our Committee is a group of members of different political parties (including independent members). Parliament has asked us to look closely at an issue and report back. This process helps Parliament do its work by encouraging public debate and involvement in issues. We also examine government policies and the actions of the public service.

You can learn more about the Committee's work, including all of its current and past inquiries, at: <https://www.parliament.vic.gov.au/epc-lc>

The report is presented to Parliament

This report was presented to Parliament and can be found at: <https://www.parliament.vic.gov.au/epc-lc/article/4450>

A response from the Government

The Government has six months to respond in writing to any recommendations we have made. The response is public and put on the inquiry page of Parliament's website when it is received at: <https://www.parliament.vic.gov.au/epc-lc/article/4451>

In its response, the Government indicates whether it supports the Committee's recommendations. It can also outline actions it may take.

1.1 Introduction

This Chapter introduces the *Inquiry into the Health Impacts of Air Pollution*. It includes the Inquiry's Terms of Reference and evidence gathering process, consisting of submissions, public hearings and research carried out by the Committee.

1.2 The Terms of Reference

On 19 February 2020 the Legislative Council agreed to the following motion:

That this House requires the Environment and Planning Committee to inquire into, consider and report, by 29 October 2020, on actions to minimise the health impacts of air pollution, including, but not limited to

- (a) state-wide practical, real-time, cost-effective mitigation strategies;
- (b) ensuring that Victorian air quality continues to track towards meeting or exceeding current international best practice standards and is enforced;
- (c) the impact of economic and population growth on air pollution and health outcomes;
- (d) strengthening commitments across all Victorian Government portfolios to reduce air pollution and minimise the impact on health; and
- (e) any other related matters.

On 2 June 2020, under temporary orders of the Legislative Council, the Committee advised the House that the tabling deadline for the Inquiry was changed to 31 August 2021. As a result of other inquiries being undertaken by the Committee at the time, the Committee did not commence this Inquiry until February 2021, with submissions being received until April 2021.

Due to the impact of COVID-19 on this and other inquiries, some delays in evidence gathering led to a further delay and on 7 September 2021 the Legislative Council resolved that the reporting date be further extended until 28 October 2021. The motion extending the tabling date was delayed beyond the agreed date due to the unexpected adjournment of the House due to the COVID-19 outbreak in August. On 26 October 2021, the Legislative Council granted a further extension of the reporting date to 18 November 2021.

1.3 Submissions

The Committee advertised the Inquiry and called for submissions through advertisements in *The Age* newspaper, the Parliament's News Alert Service, the Parliament of Victoria website, and social media. The Committee sent out over 140 letters to various stakeholders inviting them to prepare a submission for the Inquiry. Stakeholders included government agencies and departments, industry groups, environmental groups, medical professionals, academics, advocacy organisations and others.

The Committee received 145 submissions. All submissions, except those regarded as confidential, were posted onto the Committee's website at:

<https://www.parliament.vic.gov.au/epc-lc/article/4448>

1.4 Public hearings

The Committee held public hearings on the following dates:

- 28 June 2021
- 29 June 2021
- 10 August 2021
- 11 August 2021

All public hearings were held via video-link and the Committee heard from 45 witnesses, including representatives of 23 organisations and individuals.

Transcripts for public hearings held throughout this Inquiry can be found at:

<https://www.parliament.vic.gov.au/epc-lc/article/4449>

1.5 Scope of the Inquiry

It should be noted from the outset that the Committee has not attempted to undertake an epidemiological study into the health impacts of air pollution in Victoria. Such a study is both outside of the Committee's expertise and would require substantially more time than is available. Such studies are left to organisations with the relevant expertise and mandates.

Instead, the focus of the Committee's Inquiry is based on the submissions received and evidence given in public hearings and represents a starting point for further consideration on issues of air quality in Victoria, their causes and some of the mitigation strategies available. It became clear to the Committee through the inquiry that although Victoria's overall air quality is considered good by international standards, there are severe impacts of air pollution on the health of many Victorians in certain areas and during certain events, as well as due to certain activities and practices. For example, residents of the inner west of Melbourne and those living in the Latrobe Valley told the Inquiry that they suffer from poorer air quality than most Victorians. Issues

of traffic-related air pollution and the pollutants from coal-fired power generation contribute largely to poor air quality in those locations. The Committee also heard from a number of witnesses that the burning of wood for heating in built-up areas has a profound effect on access to clean air and can lead to health issues for a number of Victorians, especially those from vulnerable populations. Poor air quality has also impacted many people during the bushfires of 2019–2020 and during planned burns. These issues are all discussed in the Report.

Part One of the report provides an overview of the issues related to air pollution. Based on the evidence received during the inquiry, the Committee has considered what it saw as some of the key drivers for air pollution in Victoria in the first half of Chapter 2. These drivers include vehicles and transport, industrial emissions and coal-fired power stations, domestic wood heaters and bushfires and planned burns.

In the second half of Chapter 2, the Committee provides an overview of some of the key health impacts that are identified as being caused by or exacerbated by poor air quality and the pollutants that cause it. While this is not intended to be a comprehensive epidemiological analysis of all health impacts, it is included to provide context for much of the evidence received by the Committee.

Chapter 3 covers governance and the legislative framework related to the management of air pollution in Victoria. It should be noted that a very significant legislative change occurred on 1 July 2021 when the *Environment Protection Act 2017* (Vic) came into effect. The 2017 Act significantly overhauled Victoria's environmental protection framework, repealing the *Environment Protection Act 1970* (Vic). Although the Committee heard some evidence regarding the new legislation, the Committee was unable to make any findings about its implementation or impact of the reforms as they only took effect towards the end of the Inquiry.

In Part Two, the Committee looks at some of the specific areas of concern in Victoria and considers in more detail some of the causes of the air pollution. Chapter 4 focuses on the inner west suburbs of Melbourne, which suffer from some of the poorest air quality in Victoria. It presents specific challenges, given the proximity of the Port of Melbourne and major industrial facilities, and transport routes that serve these areas. In Chapter 5, some of the issues being confronted by people in the Latrobe Valley are considered, including the historical context of power generation and other heavy industry in the region. Chapter 6 outlines one of the major issues raised during the Inquiry, namely that of concerns about the impacts of wood smoke pollution caused by the use of wood heaters in homes. The chapter also considers the impacts of bushfires and planned burns on air quality. Chapter 7 rounds out the second part of the Report with a review of the evidence received regarding traffic-related air pollution, which represents one of the key causes of poor air quality globally, and which is particularly of concern in Melbourne's inner west and around major roads.

Finally, in Part Three, the Committee considers some of the mitigation strategies that may be available and the gaps currently identified in those strategies. The need for improved air quality monitoring generally is discussed in Chapter 8 of the Report.

1

Communications infrastructure and practice are considered in Chapter 9, particularly on days of poor air quality and during major air quality events, such as bushfires or dust storms. This chapter also looks at the issue of broad-based public education on air pollution which would make the Victorian community aware of both the risks to their health of poor air quality and of what steps they can take to mitigate those risks.

PART ONE

2 Key drivers and the health impacts of air pollution

2

2.1 What is air pollution?

Air pollution is the mix of particles and/or gases—air pollutants—in the ambient air, whether indoors or outdoors, which occur at concentrations that are harmful to human and animal health, plant life and other parts of the environment. Air pollutants can be classified as either primary or secondary. They are generated from a range of natural and anthropogenic activities and sources and occur in gaseous, liquid or solid particle form (see Table 2.1 below).¹

- **Primary pollutants** are emitted directly into the air from the source, for example through combustion processes such as motor vehicle emissions, bushfire smoke or sulfur dioxide produced from burning coal. Primary pollutants can have direct impacts or be precursors for secondary air pollutants.
- **Secondary pollutants** are not emitted directly, rather they result from the chemical reactions of primary pollutants. Ground level ozone² is an example of this.³

1 Environment Protection Authority Victoria, *Air pollution in Victoria – a summary of the state of knowledge*, August 2018, p. 14; Encyclopaedia Britannica, *air pollution*, n.d., <<https://www.britannica.com/science/air-pollution>> accessed 31 August 2021.

2 Ground level ozone is the main component of smog. It forms when heat and sunlight interact with two other pollutants: nitrogen oxides and volatile organic compounds, from sources such as industrial plants, vehicle emissions power stations and wood smoke. Ozone can travel long distances and accumulate to high concentrations far away from the sources of the original pollutants (Climate Central, *Explainer: How Ground-Level Ozone Is Formed*, July 2019, <<https://www.climatecentral.org/gallery/graphics/explainer-how-ground-level-ozone-is-formed>> accessed 30 August 2021).

3 Australia State of the Environment 2016, 'Pollution types', *Ambient air quality (2016)*, 2016, <<https://soe.environment.gov.au/theme/ambient-air-quality/topic/2016/pollution-types>> accessed 30 August 2021.

Table 2.1 Major sources of air pollutants and particulate matter (PM)

Type of pollutant	Pollutant	Major sources
Primary pollutants	Carbon monoxide	Combustion, including biomass (vegetation) burning in domestic wood heaters, prescribed burns and bushfires, motor vehicles and metal manufacturing
	Lead	Road dust, metal manufacturing and metal ore mining
	Nitrogen dioxide (NO ₂) and nitric oxide (NO), generalised as NO _x	Combination of nitrogen and oxygen during high-temperature combustion of fossil fuels Motor vehicle exhaust (responsible for about 80% of urban NO ₂) Electricity generation in fossil-fuelled power stations, petrol and metal refining, food processing and other manufacturing industries
	Sulfur dioxide	Electricity generation in coal-fired power stations; metal smelting of sulfurous ores, including lead, copper, zinc, aluminium and iron
	PM ₁₀ (particulate matter with a diameter smaller than 10 microns)	In non-urban areas: biomass (vegetation) burning in domestic wood heaters; prescribed burns and bushfires; windblown dust from agriculture, mining, other land uses and the natural environment; road dust In urban areas: motor vehicles, domestic wood heaters (in winter), construction activities and secondary particles
	PM _{2.5} (particulate matter with a diameter smaller than 2 microns)	Contains both primary and secondary pollutants Combustion sources, secondary nitrates and sulfates, secondary organic aerosol and natural-origin dust
Secondary pollutants	Ozone	Atmospheric photochemical reactions of primary pollutants, NO _x and hydrocarbons (volatile organic carbons) from motor vehicles and industry Naturally occurring background ozone

Source: Australia State of the Environment 2016, 'Pollution types', *Ambient air quality (2016)*.

The Australian Department of Agriculture, Water and the Environment divides air pollutants into three groups:

1. **Criteria pollutants** is the term used internationally to describe air pollutants that are regulated and used as indicators to assess air quality. Australia has established national standards for six ambient air criteria pollutants: carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter and sulfur dioxide (summarised below).⁴

According to Victoria's Environment Protection Agency (EPA), particulate matter and ozone are criteria pollutants of greatest concern in Victoria 'due to the frequency of their occurrence, the concentrations they can sometimes reach in ambient air, and their potential for health and environmental impacts'.⁵

Criteria pollutants are regulated in accordance with the National Environment Protection (Ambient Air Quality) Measure, which is covered in Chapter 3.

2. **Air toxics** or 'hazardous air pollutants' are defined as 'gaseous, aerosol or particulate pollutants that are present in the air in low concentrations with

⁴ Department of Agriculture, Water and the Environment (Cth), *Air pollutants*, (n.d.), <<https://www.environment.gov.au/protection/air-quality/air-pollutants>> accessed 30 August 2021.

⁵ Environment Protection Authority Victoria, *Air pollution in Victoria – a summary of the state of knowledge*, p. 14.

characteristics such as toxicity or persistence so as to be hazard to human, plant or animal life'.⁶

While Air toxics usually occur in relatively low concentrations, they have characteristics such as toxicity or persistence that make them hazardous to human, plant or animal health. Air toxics can be products of combustion, volatile emissions from paints and adhesives, and form from various industrial processes.⁷ They include a diverse range of pollutants, including substances such as benzene, toluene, ethyl-benzene, xylene (BTEX) and formaldehyde.⁸

Air toxics are regulated in accordance with the National Environmental Protection (Air Toxics) Measure. An initial group of pollutants—formaldehyde, toluene, xylene and polycyclic aromatic hydrocarbons—was covered with the establishment of the Measure in 2004. A mid-term review reported in 2011 that most pollutants were below monitoring investigation levels. Since then, air toxics have been monitored by the States and Territories as needed, for example the EPA measures air toxics at the Tullamarine closed landfill. Monitoring has focused on locations with significant sources of air toxics, such as high-volume road traffic, clustered small to medium enterprises, high levels of wood heater use, and the presence of multiple sources, including major industry.⁹

The regulatory framework covering air pollution, including the National Environment Protection (Ambient Air Quality) Measure, is covered in Chapter 3.

3. **Biological pollutants** are a class of pollutants that arise from sources such as microbiological contamination, e.g. moulds, human or animal skin, and the remains or droppings from pests such as cockroaches. Biological pollutants can be airborne and have significant impact on indoor air quality.¹⁰ Biological pollutants are not covered in this report.

2.1.1 Overview of criteria pollutants

Particle pollution: PM₁₀ and PM₂

Particle pollutants are a mixture of solid particles and liquid droplets, commonly referred to as aerosols. They can be produced both naturally and by people. Natural sources include bushfires, dust storms, pollens and sea spray. Anthropogenic sources include motor vehicle emissions, industrial processes, unpaved roads and wood heaters. Particulate matter (PM) is classified by size, varying from ultrafine particles that are smaller than 0.1 µm (micrometres, also known as microns) in diameter to

6 Department of Agriculture, Water and the Environment (Cth), *Air pollutants*.

7 Australia State of the Environment 2016, 'Air toxics', *Ambient air quality (2016)*, 2016, <<https://soe.environment.gov.au/theme/ambient-air-quality/topic/2016/air-toxics>> accessed 30 August 2021.

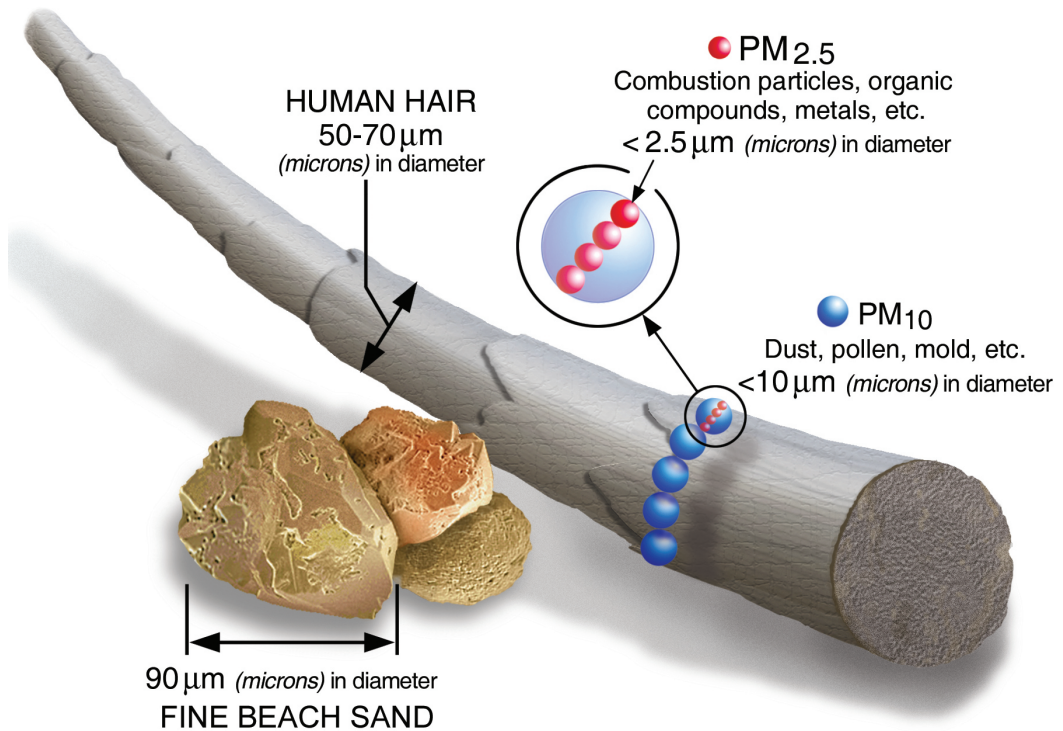
8 Environment Protection Authority Victoria, *Air pollution in Victoria – a summary of the state of knowledge*, p. 14.

9 Australia State of the Environment 2016, 'Air toxics', *Ambient air quality (2016)* (with sources).

10 Department of Agriculture, Water and the Environment (Cth), *Air pollutants*.

coarse particles of 2.5–10 μm in diameter (see Figure 2.1 below). The toxicity of PM is dependent on its size and chemical composition.¹¹

Figure 2.1 Comparison between fine beach sand (90 μm), human hair (50–70 μm), PM₁₀ and PM_{2.5}



Source: United States Environment Protection Agency, *Particulate Matter (PM) Basics*, n.d., <<https://www.epa.gov/pm-pollution/particulate-matter-pm-basics>> accessed 31 August 2021.

Ozone

Ozone is a colourless gas with strong oxidising properties that occurs in both the stratosphere (10–50 km above sea level) and in the troposphere (0–10 km above sea level). While ozone in the stratosphere is beneficial and reduces ultraviolet radiation, tropospheric ozone, commonly referred to as ground level ozone, is considered a pollutant.¹²

Ground level ozone is a secondary pollutant and the main component of photochemical smog. It is formed by a chemical reaction between nitrous oxides and volatile organic compounds. The reaction is temperature dependent, which tends to result in higher ozone levels in Victoria during summer months.¹³

¹¹ Environment Protection Authority Victoria, *Air pollution in Victoria – a summary of the state of knowledge*, pp. 16–17; Department of Agriculture, Water and the Environment (Cth), *Particles – Air quality fact sheet*, retrieved 7 June 2020, <<https://webarchive.nla.gov.au/awa/20200606194406/http://www.environment.gov.au/resource/particles>> accessed 26 August 2021.

¹² Environment Protection Authority Victoria, *Air pollution in Victoria – a summary of the state of knowledge*, p. 17.

¹³ Ibid.

The chemistry of ozone also depends on precursor emissions, which can occur over a wide area and are generated from various natural and anthropogenic processes. The generation of the precursor emissions can also vary over the course of the day, for example due to increased vehicle emissions during peak traffic times.¹⁴

Carbon monoxide, nitrogen dioxide and sulfur dioxide

Carbon monoxide is a colourless, odourless and tasteless gas that can be flammable in air. It is dangerous in high concentrations as it reduces the body's ability to absorb oxygen. Carbon monoxide is generally formed from combustion, with higher levels occurring from incomplete or inefficient combustion processes, such as inefficient domestic wood heaters.¹⁵

Nitrogen dioxide is also commonly formed from combustion processes, as well as during nitric acid manufacturing processes.¹⁶ Nitrogen dioxide an irritant gas which, together with and volatile organic compounds, plays a part in the formation of ozone.¹⁷

Sulfur dioxide is a colourless gas with a strong characteristic pungent odour that can be an irritant at low concentrations. It generally forms from the combustion of fuels which contain sulfur, such as diesel and coal. Sulfur dioxide can also be a significant contributor to the formation of secondary particles.¹⁸

Lead

Lead is a naturally occurring heavy metal found in the Earth's crust. It can be released into soil, air and water through soil erosion, volcanic eruptions, sea spray and bushfires. The natural concentration of lead in the air is less than 0.1 micrograms per cubic metre.¹⁹

Mining and metal manufacturing are the largest sources of lead emissions in Australia. Other sources include waste incinerators, battery recycling, production of lead fishing sinkers, manufacture of cement, plaster and concrete, and others.²⁰

Concentration of lead in the air has decreased significantly since the introduction of unleaded petrol in 1986, with levels now less than 10% of the national annual standard. However, high lead levels remain in some regional towns with large industrial point

¹⁴ Ibid.

¹⁵ Ibid (with sources).

¹⁶ Nitric acid is primarily used in the production of fertilisers; it is also used to produce explosives and other materials including synthetic fibres and plastics. Production occurs via a catalytic oxidation of nitric oxide using a method called the 'Ostwald process' (World of Chemicals, *Manufacturing of nitric acid by Ostwald process*, (n.d.), <<https://www.worldofchemicals.com/449/chemistry-articles/manufacturing-of-nitric-acid-by-ostwald-process.html>> accessed 6 September 2021).

¹⁷ Environment Protection Authority Victoria, *Air pollution in Victoria – a summary of the state of knowledge*, August 2018, p. 17 (with sources).

¹⁸ Ibid.

¹⁹ Department of Agriculture, Water and the Environment (Cth), *Lead*, (n.d.), <<https://www.environment.gov.au/protection/chemicals-management/lead>> accessed 31 August 2021.

²⁰ Ibid.

sources (such as lead smelters), and levels may exceed the national standards in these areas.²¹

2.2 Sources of air pollution in Victoria

Air pollution is generated from three main sources:

- anthropogenic (human-made)
- biogenic (natural and living)
- geogenic (natural and non-living).

Of these, most air pollution is from anthropogenic sources such as fossil fuel combustion (motor vehicles and energy production in particular), agricultural and industrial emissions, and waste.

In terms of air quality, anthropogenic sources are the biggest concern for policymakers and environmental scientists because, unlike biogenic or geogenic sources, they can be controlled and limited in order to reduce harmful effects.²²

The *Australia State of the Environment 2016* report (*ASoE 2016*) states the three most important sources of anthropogenic air pollution are:

- motor vehicles
- industry
- some commercial and domestic activities, particularly domestic wood heaters.²³

Anthropogenic air pollutant sources are documented in the form of emission inventories, spanning local, regional and global domains.²⁴ In Australia, the National Pollutant Inventory (NPI)—a collaborative program between the Commonwealth, States and Territories—provides estimates and reports on emissions of 93 toxic substances to air, land and water, including the source and location of these emissions.²⁵ The NPI includes data on PM₁₀ and PM_{2.5}, but not ozone as it is a secondary pollutant (although precursors such as nitrogen dioxide and volatile organic compounds are reported and can be used to predict ozone formation).²⁶

Emissions data comes from facilities including mines, power stations and factories, and from other sources such as households and transport. Business and industry determine

21 Ibid.

22 Australia State of the Environment 2016, 'Pollution sources', *Ambient air quality (2016)*, 2016, <<https://soe.environment.gov.au/theme/ambient-air-quality/topic/2016/pollution-sources>> accessed 3 June 2020.

23 Ibid.

24 C Mallik, *Air pollution: sources, impacts and controls*, 2019, Chapter 1, online, <<https://www.cabi.org/environmentalimpact/ebook/20183387926>> p. 6, accessed 13 September 2021.

25 Department of Agriculture, Water and the Environment (Cth), *About the NPI*, (n.d.), <<http://www.npi.gov.au/about-npi>> accessed 2 September 2021.

26 Environment Protection Authority Victoria, *Air pollution in Victoria – a summary of the state of knowledge*, p. 18.

and report their own emissions and transfers, while diffuse emissions from households, motor vehicles and other sources are estimated by government agencies.²⁷

According to Victoria's Environment Protection Authority (EPA), data from the NPI indicates changes to industrial sources of pollution over the past few years, including reductions of some pollutants due to the end of motor vehicle manufacturing, and changes associated with the closure of the Anglesea power station.²⁸

While anthropogenic pollutants are of primary concern, biogenic (natural and living) and geogenic (natural and non-living) pollutants can also affect air quality. Many poor air quality events occur as a result of intense, high particulate pollution episodes, over relatively short time scales, for example due to bushfires, dust storms or thunderstorm asthma events.²⁹

The distinction between human-made and natural pollution sources is not always clear-cut. Biogenic sources such as plants, soil and microorganisms emit volatile organic compounds that play an important role in atmospheric chemistry. Changes over time to land use, deforestation, climate change increase biogenic emissions with a corresponding impact on regional air quality and frequency or intensity of natural air pollution events such as bushfires.³⁰

Biogenic and geogenic sources of air pollution include:

- ozone
- bushfire
- windblown dust and pollen
- salt spray from ocean waves
- volcanic eruption
- gaseous and particulate emissions from plants, soil and microorganisms.³¹

Across Victoria, significant sources of air pollution include vehicle traffic, power generation, and wood smoke episodes from bushfires. On a more local scale, planned burns, wood heaters and industrial emissions from local industry and commercial businesses can result in increased exposures of nearby communities to air pollution.

According to *ASoE 2016*, Australia's air pollution drivers have remained consistent since the previous *ASoE* report in 2011. *ASoE 2016* states:

²⁷ Department of Agriculture, Water and the Environment (Cth), *About the NPI*.

²⁸ Environment Protection Authority Victoria, *Air pollution in Victoria – a summary of the state of knowledge*, p. 18.

²⁹ Enviropedia, *Natural Air Pollution*, (n.d.), <http://www.enviropedia.org.uk/Air_Quality/Natural_Air_Pollution.php> accessed 10 March 2021.

³⁰ Australia State of the Environment 2016, 'Pollution sources', *Ambient air quality (2016)*.

³¹ Environment Protection Authority NSW, *Air Emissions Inventory for the Greater Metropolitan Region in New South Wales*, 2008, <<https://www.epa.nsw.gov.au/-/media/EPA/Corporate%20Site/resources/air/120046AEITR2Biogenic.ashx>> accessed 11 March 2021.

Overall, the pressures on air quality remain very similar to those present in 2011: a growing population, greater urban density and increasing car travel, but a slowing in the growth of public transport patronage. For most of the population, air quality remains 'good' to 'very good', but there are ongoing issues in a number of locations, as well as impacts from bushfires and dust storms.³²

The Victorian *State of the Environment 2018* report (*VSoE 2018*) found that motor vehicles and large industry are estimated to account for the majority of carbon monoxide, oxides of nitrogen, and sulfur dioxide emissions.³³

2.2.1 Key drivers of air pollutants

According to the EPA's 2018 report; *Air pollution in Victoria – a summary of the state of knowledge*, the main sources of air pollution in Victoria are motor-vehicles, industrial emissions (including from power stations), and smoke from wood heaters, bushfires and planned burns.³⁴

Victoria does not have an up-to-date air pollution inventory (last updated in 2006, the EPA is currently undertaking an update of its emissions inventory)³⁵ and so NPI data must be relied-on to some extent in order to identify significant air pollution sources.³⁶

Vehicles and transport

Vehicle emissions are one of the largest sources of air pollutants in Victoria and across the world; the impact of vehicle emissions is likely to grow as populations increase, particularly in urban and urban-growth areas where vehicle usage is higher. According to *ASoE 2016*:

As at 31 October 2014, the annual vehicle kilometres travelled for all road vehicles in Australia were estimated at 244 billion kilometres. Of this, 179 billion occurred in capital city and urban areas. Furthermore, total metropolitan vehicle kilometres travelled are projected to increase by 41 per cent from 2015 to 2030.³⁷

In Victoria, the transport sector (road, diesel rail, air and shipping) contributes around one third of total ambient air pollution, primarily through the combustion of fossil fuels in motor vehicles.³⁸

³² Australia State of the Environment 2016, 'Ambient air quality: 2011–16 in context,' *Ambient air quality (2016)*, 2016, <<https://soe.environment.gov.au/theme/ambient-air-quality/topic/2016/ambient-air-quality-2011-16-context>> accessed 10 March 2021.

³³ Commissioner for Environmental Sustainability Victoria, 'Emissions of major air pollutants by sector', *State of the Environment 2018*, 2018, <<https://www.ces.vic.gov.au/reports/state-environment-2018/air/emissions-major-air-pollutants-sector>> accessed 3 June 2020.

³⁴ Environment Protection Authority Victoria, *Air pollution in Victoria – a summary of the state of knowledge*, p. 18.

³⁵ Ibid.

³⁶ It should be noted that not all emissions are included in the NPI as discrete air pollutant sources: many small and medium enterprises don't meet the threshold for NPI reporting and emissions from commercial premises and non-industrial sources such as motor vehicles and domestic emissions are also not included.

³⁷ Australia State of the Environment 2016, 'Motor vehicles', *Ambient air quality (2016)*, 2016, <<https://soe.environment.gov.au/theme/ambient-air-quality/topic/2016/motor-vehicles>> accessed 10 March 2021 (with sources).

³⁸ Victorian Government, *Submission 113*, p. 19.

Motor vehicle and transport air pollution can be generally divided into exhaust and non-exhaust emissions. Pollutants of concern include:

- **Exhaust emissions:** PM_{2.5} emissions (which comprise the predominant portion of PM₁₀ vehicle exhaust), nitrogen dioxide, sulfur dioxide (which is directly related to the amount of sulfur in the fuel), and volatile organic compounds.
- **Non-exhaust emissions:** PM₁₀ emissions mostly resulting from engine clutch wear as well as tyre, road and brake wear. Road maintenance and repair is also a source of emissions, including volatile organic compounds from bitumen.³⁹

Transport sector pollution often occurs in close proximity to people and is widely distributed. Air pollution at busy intersections and in congested traffic areas can be significantly higher than background levels.⁴⁰

In *ASoE 2016*, motor vehicle emissions in metropolitan areas were graded ‘high impact’⁴¹ (see Figure 2.2 below) with the accompanying observation that increasing vehicle traffic and greater congestion was a pressure unless counterbalanced by reduced emissions per vehicle, and non-tailpipe emissions such as tyre and brake dust were continuing to increase.⁴² While the Department of Environment, Land, Water and Planning (DELWP) submitted:

Without action, transport generated air pollution is expected to increase with projected population and economic growth; increased urbanisation, and increased transport use. Opportunities to mitigate the potential growth include greater adoption of low/ zero emission vehicle technology and increasing transport mode shift to active and public transport.⁴³

Figure 2.2 Motor vehicles (metropolitan centres), Grade ‘High Impact’



Source: Australia State of the Environment 2016, ‘Pressures affecting ambient air quality’, *Ambient air quality (2016, 2011)*.

Further, the impact on human health has been highlighted in a range of studies that have demonstrated increased risk and increased occurrence of various adverse health outcomes associated with exposure to traffic pollution.⁴⁴

Health impacts of air pollution are covered in the Section 2.3 below, and air pollution from motor vehicles is discussed in Chapter 7.

³⁹ Environment Protection Authority Victoria, *Air pollution in Victoria – a summary of the state of knowledge*, pp. 18–20.

⁴⁰ Victorian Government, *Submission 113*, p. 19.

⁴¹ On a 4-part scale ranging from very low impact to very high impact. ‘High impact’ indicates significant impacts on values such as health and aesthetics have been observed, mainly affecting more sensitive members of the community. High impact was the highest grade assigned to any of the categories in the ‘Pressures affecting ambient air quality’ assessment summaries.

⁴² Australia State of the Environment 2016, ‘Pressures affecting ambient air quality’, *Ambient air quality (2016, 2011)*, 2016, <<https://soe.environment.gov.au/assessment-summary/ambient-air-quality/pressures-affecting-ambient-air-quality>> accessed 10 March 2021.

⁴³ Victorian Government, *Submission 113*, p. 19.

⁴⁴ Public Transport Users Association, *Submission 107*, pp. 3–4.

Industrial emissions and coal-fired power stations

Industrial emissions are another leading source of air pollution in Victoria and globally. Covering a wide-ranging array of industries and sources, 'industrial emissions' refer to activities such as:

- burning of coal and other fossil fuels
- intensive farming
- mining and natural resources extraction
- manufacturing emissions.

ASoE 2016 noted that 'traditional major industry is in decline in Australia, and this has produced a corresponding decrease in many emissions to air.'⁴⁵ However, PM₁₀ and PM_{2.5} emissions from mining activities had increased by 9% from 2009–10 to 2014–15.⁴⁶ *ASoE 2016* graded industrial emissions in two categories:⁴⁷

1. Industry adjacent to regional populations (principally extractive industries such as mining, coal-seam gas) (Figure 2.3 below)
2. Industrial point sources (metropolitan and regional cities) (Figure 2.4 below).

Figure 2.3 Industry adjacent to regional populations (principally extractive industries such as mining, coal-seam gas), Grade 'High Impact'



Source: Australia State of the Environment 2016, 'Pressures affecting ambient air quality', *Ambient air quality (2016, 2011)*.

Figure 2.4 Industrial point sources (metropolitan and regional cities), Grade 'Low Impact'⁴⁸



Source: Australia State of the Environment 2016, 'Pressures affecting ambient air quality', *Ambient air quality (2016, 2011)*.

Some stakeholders claimed that unfiltered brown coal fired power stations in the Latrobe Valley are the single largest source of Victoria's anthropogenic air pollution and are among the worst polluting power stations per kilowatt hour of electricity produced in the world.

In addition to day-to-day point source pollution, the impact of industrial emissions is compounded by emergency events, such as industrial fires, which can have a large

⁴⁵ Australia State of the Environment 2016, 'Pressures affecting ambient air quality', *Ambient air quality (2016, 2011)*.

⁴⁶ Ibid.

⁴⁷ Neither category was graded in *ASoE 2011* so there was no clear historical comparison.

⁴⁸ On a 4-part scale ranging from very low impact to very high impact. 'Low impact' indicates impacts on values such as health and aesthetics have been observed, most often localised. High impact was the highest grade assigned to any of the categories in the 'Pressures affecting ambient air quality' assessment summaries.

impact on local communities and has the potential to cause impacts over a broad geographical region. Emissions from events such as peat fires or industrial fires at recycling plants and tyre stockpiles contain significant concentrations of PM₁₀, PM_{2.5}, carbon monoxide, nitrogen dioxide and sulfur dioxide.⁴⁹ Recent examples include:

- Campbellfield Industrial Fire (April 2019)
- West Footscray Industrial Fire (August–September 2018)
- Hazelwood Mine Fire (2014).

Emissions from industrial activity and coal-fired power stations with particular focus on the Inner West and Latrobe Valley regions are discussed in Chapters 4 and 5, respectively.

Domestic wood heaters

According to the World Health Organization (WHO), one of the largest sources of air pollution in homes is combustion fuels in households with poor ventilation or inefficient equipment:

The greatest source of polluting fuels in open hearths or poorly vented, inefficient stoves or space heaters. In addition to household activities like cooking, space heating, and lighting, other activities can be important sources of particulate matter pollution in the home environment, such as preparing animal fodder, heating water for bathing and brewing beverages.⁵⁰

During cooler months, domestic wood heaters put increased pressure on air quality and contribute to air pollution by emitting smoke and volatile organic compounds. *ASoE 2016* report discussed the impact of domestic wood heaters on air quality:

Approximately 10 per cent Australian dwellings (900,000) used wood as the main source of heating in 2014, with 70 per cent of these users located outside the capital cities. The proportion of dwellings using wood as their main source of heating had been trending down in the first decade of the century from 16 per cent to 10 per cent, but has remained stable since 2011, despite concerns that increasing electricity and gas prices would lead to an upsurge in the use of domestic wood heaters.

On a winter weekend day, wood smoke from domestic wood heaters... contributes as much as 48 and 60 per cent of PM₁₀ and PM_{2.5} particle pollution, respectively.⁵¹

ASoE 2016 graded domestic wood heaters as a 'high impact' air pollutant (see Figure 2.5 below).

⁴⁹ Environment Protection Authority Victoria, *Air pollution in Victoria – a summary of the state of knowledge*, p. 23.

⁵⁰ World Health Organization, 'Common pollutants from household heating, cooking and lighting', 2018, <<https://www.who.int/airpollution/household/pollutants/combustion/en/>> accessed 11 March 2021.

⁵¹ Australia State of the Environment 2016, 'Domestic wood heaters', *Ambient air quality (2016)*, 2016, <<https://soe.environment.gov.au/theme/ambient-air-quality/topic/2016/domestic-wood-heaters>> accessed 11 March 2021.

Figure 2.5 Domestic wood heaters, Grade 'High Impact'

Source: Australia State of the Environment 2016, 'Pressures affecting ambient air quality', *Ambient air quality (2016, 2011)*.

In addition to domestic wood heater emissions, combustion activities in commercial premises, such as the restaurant and catering sectors, also contribute to PM_{2.5} pollution. The EPA notes that while these premises tend to have lower individual discharges compared to industrial emission sources, emissions are generally closer to sensitive receptors (i.e. proximate to locations where people reside, work and undertake recreation activities), which increases their potential impact.⁵²

Commercial and other domestic emissions were graded 'low impact' in *ASoE 2016* (see Figure 2.6 below).

Figure 2.6 Commercial and other domestic, Grade 'Low Impact'

Source: Australia State of the Environment 2016, 'Pressures affecting ambient air quality', *Ambient air quality (2016, 2011)*.

A significant amount of concern regarding the impact of smoke from domestic wood heaters was expressed by a large number of stakeholders to this Inquiry. This issue is addressed in detail in Chapter 6.

Bushfires and planned burns

Bushfire smoke is a key contributor to air pollution in Victoria, particularly during the warmer months. Smoke plumes emitted from bushfire and controlled burns are the product of incomplete combustion. Visible smoke contains PM that can last as a pollutant in the air from hours to days and can travel long distances. Smoke from bushfires can:

- reduce air quality and visibility
- cause several health issues, ranging from irritation to the nose and eyes to serious lung and heart damage from smoke inhalation.⁵³

Air pollution from bushfires is a 'sporadic, major source of air pollution in regional and urban areas.'⁵⁴ In Victoria, smoke from bushfires is often the cause of air pollution levels exceeding the four-hour average ozone standard for safe air quality.⁵⁵ Bushfires can

⁵² Environment Protection Authority Victoria, *Air pollution in Victoria – a summary of the state of knowledge*, p. 22.

⁵³ Australia State of the Environment 2016, 'Prescribed burning and bushfires', *Ambient air quality (2016)*, 2016, <<https://soe.environment.gov.au/theme/ambient-air-quality/topic/2016/prescribed-burning-and-bushfires>> accessed 11 March 2021.

⁵⁴ Ibid.

⁵⁵ Commissioner for Environmental Sustainability Victoria, 'AIR (A)', *Scientific Assessment Part III*, 2018, p. 9 <https://www.ces.vic.gov.au/sites/default/files/SoE2018ScientificAssessment_A.pdf>.

create intense, protracted and far-reaching smoke events. The 2019/2020 bushfires impacted over 1.5 million hectares of land in Victoria, and smoke significantly impacted Victorian communities and reduced air quality for prolonged periods.⁵⁶

Smoke also arises from planned burning, which involves lighting fires under carefully managed conditions in order to reduce fuel load and lessen the risk of bushfire. DELWP has a legal obligation to manage fire risk in State forests, national parks and on protected public land. Planned burning is a key activity undertaken to meet this obligation and reduce the potential risk, intensity and impact of bushfires.⁵⁷

Several factors influence the potential impact of smoke from bushfires and controlled land burning on communities, including:

- type of combustion and fuel loading in the area
- moisture content of the fuel
- size of the area consumed
- meteorology, dispersion and proximity of the community to the area.⁵⁸

ASoE 2016 graded emissions from prescribed burning and bushfires as 'high impact' (see Figure 2.7 below).⁵⁹ It noted:

Australian weekly bushfire frequencies increased by 40 per cent in the 5 years to 2013, particularly during the summer months. The increasing threat from bushfires has increased pressure for more prescribed burning...The emissions from these fires have increased pressure on air quality both close to the areas burned and in much larger urban areas affected by the smoke. Climate change is expected to increase these pressures.⁶⁰

Figure 2.7 Prescribed burning and bushfires, Grade 'High Impact'



Source: Australia State of the Environment 2016, 'Pressures affecting ambient air quality', *Ambient air quality (2016, 2011)*.

Bushfires and prescribed burns are further discussed in Chapter 6.

2.3 Health impacts of air pollution

Many air pollutants can have harmful environmental and human health effects, not only in areas in the immediate vicinity to the source but those further away. The primary

⁵⁶ Victorian Government, *Submission 113*, p. 16.

⁵⁷ Ibid.

⁵⁸ Environment Protection Authority Victoria, *Air pollution in Victoria – a summary of the state of knowledge*, p. 22.

⁵⁹ Australia State of the Environment 2016, 'Pressures affecting ambient air quality', *Ambient air quality (2016, 2011)*.

⁶⁰ Australia State of the Environment 2016, 'Prescribed burning and bushfires', *Ambient air quality (2016)*.

sources of harmful pollutants are space heating combustion, power generation or motor vehicle emissions; all of which emit harmful substances in the air and atmosphere. The impact on human and environmental health can vary depending on the quantity of a pollutive substance and its compound.

There is now a strong evidence base that air pollution is associated with adverse health effects, even at concentrations below the current air quality standards. Air pollution can also affect the natural environment by impairing vegetation growth, acidifying soils and freshwater, and causing chronic health impacts in wildlife. Poor air quality can also have significant impacts on local amenity, reducing people's desire to engage in outdoor and community activities.⁶¹

According to the WHO, certain groups may be more at risk, and may develop more severe health effects more quickly when exposed to air pollution. These groups include:

- older adults
- children
- pregnant women
- people with an underlying disease, such as asthma.

In addition, certain groups may be exposed to higher levels of outdoor air pollution, e.g. people living near busy traffic routes or those in specific occupational or socioeconomic groups.⁶²

In a submission to the Inquiry, Doctors for the Environment Australia (DEA) summarised the significance of air pollution's impact on health:

Air pollution in Australia contributes to more than 3000 premature and preventable deaths per year and generates health costs of \$11–24 billion annually. It is a major risk factor for a range of chronic diseases including asthma, lung disease, heart disease, cancer, and diabetes. In children, air pollution has been associated with asthma and poor lung development. It also increases risk of pre-term birth and low birth weight, which has lifelong adverse health consequences. Air pollution appears to be an important although not yet quantified risk factor for neurodevelopmental disorders in children and neurodegenerative diseases in adults.⁶³

Further, DEA suggested that for a number of pollutants, there is no 'safe' level of exposure.

The Committee recognises that a significant element of the impact of air pollution is the financial costs to the health system, industry and the community. The Australian Medical Association (Victoria) told the Committee in its submission that despite improvements

⁶¹ Victorian Government, *Submission 113*, p. 30.

⁶² World Health Organization Regional Office for Europe, *Health risk assessment of air pollution – general principles*, Copenhagen, 2016, p. 1, <https://www.euro.who.int/_data/assets/pdf_file/0006/298482/Health-risk-assessment-air-pollution-General-principles-en.pdf>.

⁶³ Doctors for the Environment Australia, *Submission 68*, p. 3.

in air quality in Australia in recent decades, the health costs arising from air pollution remain considerable and has been estimated that, each year, urban air pollution accounts for significantly more deaths than the nation's road toll.⁶⁴

The submission stated that the Australian Institute of Health and Welfare's Australian Burden of Disease Study for 2015 found that 4.6% of disease burden from cardiovascular disease and 1.6% of disease burden for respiratory disease was attributable to air pollution.⁶⁵ It said that:

Long-term exposure to urban air pollution accounts for 1.5% of all deaths in Australia and short-term exposure accounts for a further 0.8%. The health cost of air pollution in Sydney alone is estimated to be between \$1 billion and \$8.4 billion each year. Air pollution from motor vehicles and coal-fired power generation are estimated to carry annual health costs of AU\$2.772 and \$2.673 billion respectively.⁶⁶

While acknowledging these substantial financial costs, detailed analyses have been done elsewhere and the Committee does not intend to focus on these financial costs but the actual health impacts.

In this Chapter, the Committee provides an overview of some of the key health impacts of air pollution. This is not intended to be a comprehensive epidemiological analysis of all health impacts but seeks to provide a snapshot of some of the serious concerns raised during the Inquiry. This chapter also focuses only on the health impacts of certain pollutants, rather than the source of those pollutants. The primary causes or drivers of the pollution are addressed in Sections 2.1 and 2.2 above.

2.3.1 Health impacts of criteria pollutants

Table 2.2 (below) summarises the sources, maximum acceptable concentrations in Australia, and human and environmental health impacts of the six the criteria air pollutants.

⁶⁴ Australian Medical Association (Victoria), *Submission 76*, p. 2.

⁶⁵ *Ibid.*

⁶⁶ *Ibid.*

Table 2.2 Overview of criteria air pollutants and their effects

Pollutant	Common sources	Acceptable concentration	Environmental hazards	Human health hazards
Carbon monoxide	Motor vehicle emissions, fires, industrial processes	9.0 ppm ^a (8hr period)	Contributes to smog.	Exacerbates heart disease, impede vision, reductions in physical and mental capabilities.
Lead	Fossil-fuel combustion, waste incineration, metal processing	0.5 µg/m ^{3b} (1yr period)	Loss of biodiversity, decreased reproduction, neurological problems in wildlife.	Cardiovascular complications, linked to learning disabilities in children, can harm multiple bodily systems.
Nitrogen dioxide	Motor vehicle emissions, electricity generation, fires	0.12 ppm (1hr period)	Contributes to fog, damages foliage.	Inflammation/ irritation of breathing passages.
Ozone	Reactions between nitrogen dioxide and pollutants from motor vehicle emissions, chemical solvents, electrical utilities	0.10 ppm (1hr period)	Can increase occurrence of other environmental stressors (i.e. disease, harsh weather, climatic changes).	Reduced lung capacity, irritation/ inflammation of breathing passages.
Particles	Fires, smokestacks, construction sites, roads, power plants, motor vehicle exhausts	PM ₁₀ : 50 µg/m ³ (24 hr period) PM _{2.5} : 25 µg/m ³ (1-day period)	Contributes to haze, causes acid rain, changes pH balance in waterways, damages foliage.	Aggravated asthma, irregular heartbeat, irritation/ inflammation of breathing passages.
Sulfur dioxide	Electricity generation, fossil-fuel, industrial processes, motor vehicle emissions	0.08 ppm (24 hr period)	Major cause of haze, causes acid rain, can form particles, damages foliage.	Breathing difficulties, aggravated asthma.

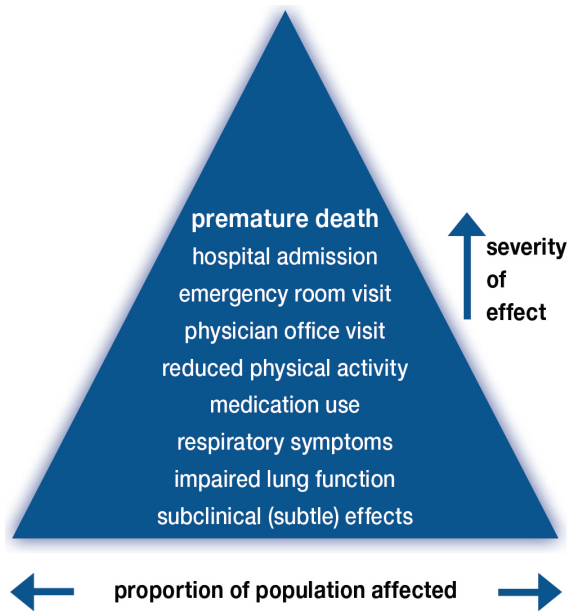
a. ppm = parts per million

b. µm/m³ = micrograms per metres cubed

Source: Legislative Council Environment and Planning Committee. Please note, acceptable concentrations are taken from the National Air Quality Standards for Criteria Pollutants.

Many policymakers, including the WHO, use the 'air pollution health pyramid' to explain the varying impacts air pollution can have on human health. Figure 2.8 below is the pyramid as shown in the WHO's health risk assessment of air pollution report. Those considered more at risk, such as the elderly or individuals with pre-existing lung or heart conditions, are most likely to represent those experiencing severe effects at the top of the pyramid. Risk also increases as exposure increases, therefore people in closer proximity to pollution sources may be more susceptible to more severe health consequences.

Figure 2.8 Air pollution health pyramid



Source: World Health Organization Regional Office for Europe, *Health risk assessment of air pollution – general principles*, p. 1.

As illustrated above, different pollutants are responsible for different health impacts. Table 2.3 below provides an overview of the types of impacts that could be expected from common pollutants.

Table 2.3 Types of health effects experienced by most common pollutants at elevated levels

Pollutant	Health effects at very high levels
Nitrogen dioxide, sulphur dioxide, ozone	These gases irritate the airways of the lungs, increasing the symptoms of those suffering from lung diseases.
Particles	Fine particles can be carried deep into the lungs where they can cause inflammation and a worsening of heart and lung diseases.
Carbon monoxide	This gas prevents the uptake of oxygen by the blood. This can lead to a significant reduction in the supply of oxygen to the heart, particularly in people suffering from heart disease.

Source: Department for Environment Food & Rural Affairs (UK), UK AIR (Air Information Resource), 'Effects of Air Pollution', (n.d.), <<https://uk-air.defra.gov.uk/air-pollution/effects>> accessed 23 April 2020.

Notwithstanding the international data, the Commissioner for Environmental Sustainability told the Committee in her submission that studies investigating the long-term health effects of air pollution have been conducted in Australia, but 'there is no comprehensive understanding of the impacts on human health.' The submission stated:

As at 2018, few long-term studies that document the association between mortality and air pollution exposure had been carried out in Australia.⁶⁷

⁶⁷ Commissioner for Environmental Sustainability, *Submission 28*, p. 14.

The Commissioner suggested that because of a natural lag between the publication of long-term studies and policy development:

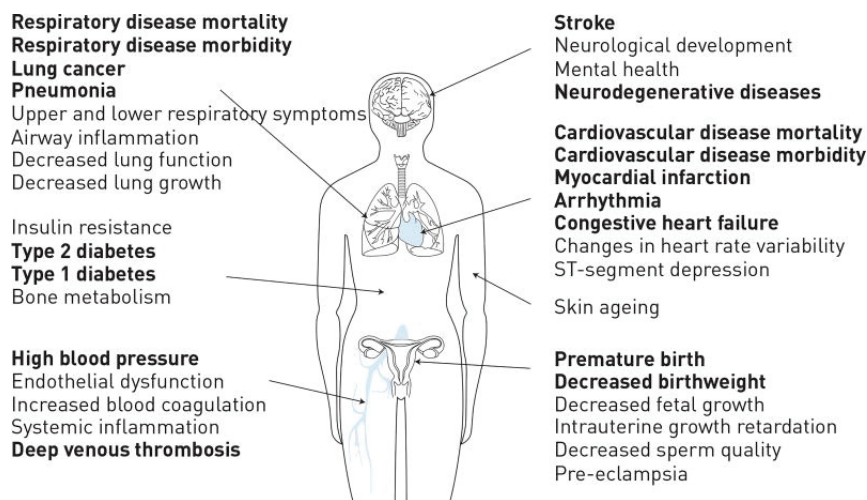
it is important to complement longer analyses with epidemiological studies that generate useful associations between air pollution and health impacts from just a few years of data.⁶⁸

Further, the Commissioner submitted that even at concentrations below the current air quality standards air pollution is associated with adverse health effects and that the strongest evidence relates to premature mortality and effects on the respiratory and cardiovascular system.⁶⁹

Despite a lack of such long-term studies like those conducted elsewhere, a number of submitters and witnesses to the Inquiry considered that the long-term impacts of air pollution are clear. This long-term measurable impact of air pollution was illustrated by Professor Gary Anderson, Director of the Lung Health Research Centre at Melbourne University, who told the Committee:

we used to think of things like COPD [chronic obstructive pulmonary disease], emphysema, as being a cigarette-smoking disease—but now with poor air quality, more than 30 per cent of that is due to early life exposures that set you up for low lung growth, and then as you age you become critically ill as your lungs fail. That will be a huge problem. In Professor Irving’s clinic, he was telling me last week, 30 per cent of the patients now with lung cancer were never smokers, and that is air quality.⁷⁰

Figure 2.9 Overview of diseases, conditions and biomarkers affected by outdoor air pollution



Source: The Lung Health Research Centre (University of Melbourne), *Submission 100*, p. 6 (with sources).

68 Ibid.

69 Ibid.

70 Professor Gary Anderson, Director, Lung Health Research Centre, public hearing, Melbourne, 28 June 2021, *Transcript of evidence*, p. 47.

The Australian Institute of Health and Welfare has stated that air pollution, in particular PM_{2.5}, can have short-term adverse impacts on human health. However, it has also noted that more research into potential longer-term impacts of PM_{2.5} from bushfire smoke is needed. The Institute has found that particulates can decrease lung function, increase respiratory symptoms, chronic obstructive pulmonary disease, cardiovascular and cardiopulmonary disease and mortality, and generally decrease life expectancy. It estimated:

In 2015, nearly 2,600 (1.6%) deaths and 0.8% of the burden of disease in Australia was attributed to PM_{2.5} air pollution.⁷¹

Particulate matter is produced by man-made (anthropogenic) combustion processes, including:

- vehicle emissions
- coal-fired power stations
- wood heaters.

As well as the man-made sources, particulate matter can also be produced by natural sources such as dust, pollen, and bushfires.

The Committee received a substantial amount of evidence, both in submissions and during the public hearings, regarding the negative and often debilitating health impacts of particulate matter. Section 2.1.1 provides an overview of what particulate matter is and its main sources.

Exposure to such particles can affect both the lungs and the heart. Numerous scientific studies have linked particle pollution exposure to a variety of problems, including:

- premature death in people with heart or lung disease
- nonfatal heart attacks
- irregular heartbeat
- aggravated asthma
- decreased lung function
- increased respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing.

People with heart or lung diseases, children, and older adults are the most likely to be affected by particle pollution exposure.

⁷¹ Australian Institute of Health and Welfare, 'Natural environment and health', 23 July 2020, <<https://www.aihw.gov.au/reports/australias-health/natural-environment-and-health>> accessed 2 September 2021.

In its submission to the Inquiry, the Australasian College of Emergency Medicine (ACEM) highlighted the health impacts, particularly, of small particulate matter:

Exposure to small particulate matter (PM) less than 2.5µm (PM_{2.5}), photochemical oxidants (measured as ozone) are a major concern as they have been associated with increased risk of premature death and acute and chronic morbidity. Long-term and short-term exposure to these pollutants is associated with increased mortality. PM_{2.5} has particularly been associated with increased cardiopulmonary mortality as it can penetrate deep into the respiratory system and translocate into the bloodstream, causing oxidative stress and inflammation.⁷²

Some of the specific impacts were detailed at a public hearing by Dr Lai Heng Foong, Chair of ACEM's Public Health and Disaster Committee. Dr Foong told the Committee:

coarse particulate matter like PM₁₀ can cause some changes in the upper airways, but particulate matter 2.5 goes further down into the lower airways. It can increase rates of pneumonia, and actually studies have shown that it can increase your susceptibility to COVID-19 infections. In terms of asthma, short-term exposure to particulate matter 2.5, ozone and nitrous dioxide were associated with a decrease in lung capacity—and obviously it also increases your risk of exacerbation of asthma—and long-term exposure to some of the pollutants in the air can cause a decrease in lung function.⁷³

In addition to direct health impacts of exposure to air pollution and especially particulate matter, Dr Foong also suggested that it has been linked to poor birth outcomes, such as lower birth weight of children, stillbirth and spontaneous abortion, and early childhood exposure has been linked to effects on asthma, childhood leukaemia, obesity and attention disorder. Air pollution has also been linked to diabetes and renal disease.⁷⁴

A recent analysis estimated an annual 2,616 premature deaths in Australia were attributable to the man-made fraction of fine particulate matter.⁷⁵

While particulate matter, and especially PM_{2.5}, is a major health risk in Victoria, it is not the only form of pollutant that poses a threat. Ozone and other gases present in air pollution have significant detrimental impacts on human health. Section 2.1 summarises the sources of other types of air pollution, including ozone.

According to the Lung Health Research Centre, ground-level ozone is deemed the second-most detrimental pollutant to human health. Ozone is harmful to breathe and aggressively attacks lung tissue by reacting chemically with it. When ozone is present, there are other harmful pollutants created by the same processes that make ozone.⁷⁶

⁷² Australasian College for Emergency Medicine, *Submission 26*, p. 1.

⁷³ Dr Lai Heng Foong, Chair, Public Health and Disaster Committee, Australasian College for Emergency Medicine, public hearing, Melbourne, 28 June 2021, *Transcript of evidence*, p. 30.

⁷⁴ Ibid.

⁷⁵ The Lung Health Research Centre (University of Melbourne), *Submission 100*, p. 5.

⁷⁶ American Lung Association, 'Ozone', 20 April 2020, <<https://www.lung.org/clean-air/outdoors/what-makes-air-unhealthy/ozone>> accessed 25 August 2021.

The American Lung Association has identified four groups of people who are especially vulnerable to the effects of breathing ozone:

- children and teens
- anyone aged 65 and older
- people with existing lung diseases, such as asthma and chronic obstructive pulmonary disease (also known as COPD, which includes emphysema and chronic bronchitis)
- people who work or exercise outdoors.⁷⁷

In the Victorian context, according to the Centre for Air Pollution, Energy and Health Research, the Environment Protection Standard for ozone (under review and not updated since 1998) is 80 ppb⁷⁸ in a 4-hour period, which was exceeded 26 times between January 2000 and November 2019. However, the WHO guideline for ozone is a more stringent 50 ppb over 8-hour averages. This was exceeded 349 times since 2000, averaged across all Melbourne EPA air quality monitoring sites.⁷⁹

According to the American Lung Association, breathing ozone has both short- and long-term impacts on human health and several major studies in the United States (US), Europe and Asia have shown that it can shorten life.⁸⁰

In addition to the long term and deadly effects of ozone pollution, it can also have significant short term and immediate impacts, including:

- shortness of breath, wheezing and coughing
- asthma attacks
- increased risk of respiratory infections
- increased susceptibility to pulmonary inflammation
- increased need for people with lung diseases, like asthma or COPD, to receive medical treatment and to go to the hospital.

The cumulative and long-term impacts are of even greater concern, with scientists suggesting that long-term exposure—that is, for periods longer than eight hours, including days, months or years—may increase the risk of early death. Specifically, US studies have found:

- Examining the records from a long-term national database, researchers found a higher risk of death from respiratory diseases associated with increases in ozone.
- New York researchers looking at hospital records for children's asthma found that the risk of admission to hospitals for asthma increased with chronic exposure to

⁷⁷ Ibid.

⁷⁸ Parts per billion.

⁷⁹ Centre for Air Pollution, Energy and Health Research, *Submission 65*, p. 4.

⁸⁰ American Lung Association, 'Ozone'.

ozone. Younger children and children from low-income families were more likely than other children to need hospital admissions even during the same time periods.

- California researchers analysing data from their long-term Southern California Children's Health Study found that some children with certain genes were more likely to develop asthma as adolescents in response to the variations in ozone levels in their communities.
- Studies link lower birth weight and decreased lung function in newborns to ozone levels in their community. This research provides increasing evidence that ozone may harm newborns.⁸¹

2.3.2 Common illnesses caused or exacerbated by air pollution

Asthma and respiratory illness

During this Inquiry, probably the most commonly discussed specific condition exacerbated by air pollution has been asthma.

According to Asthma Australia, asthma is an inflammatory condition of the airways, which restricts airflow and can be fatal. It affects one in nine Australians, or 2.7 million people, and has various degrees of severity (mild to severe).

Asthma affects people of all ages, from childhood to adulthood. Asthma can appear at all ages and stages of life.⁸² Michele Goldman, Chief Executive Officer of Asthma Australia, told the Committee:

Asthma is such a complex disease and there are so many things that can trigger it. Whether it is pet dander, pollen, dust, tobacco smoke or viruses, there are a whole range of things. But what we do know in relation to deaths is 70 per cent them are avoidable. So in this day and age we should not have the number of Australians dying from asthma as there are.⁸³

Asthma Australia estimates that the condition affects 11.4% of Victorians, or more than 714,000 people. Asthma prevalence is higher in regional Victoria (14.2%) compared with the Greater Melbourne Region (11.2%). Areas with the highest asthma prevalence in Victoria include Barwon West (15.9%), Bendigo (15.3%) and the Latrobe Valley (15.2%).

In its submission, Asthma Australia told the Committee that asthma places a significant burden on Victorian hospitals:

There were 11,628 hospital admissions for asthma in Victoria in 2016/17. Approximately 4,000 of these hospitalisations were due to the thunderstorm asthma event in

⁸¹ Ibid.

⁸² Asthma Australia, *Submission 39*, p. 1.

⁸³ Ms Michele Goldman, Chief Executive Officer, Asthma Australia, public hearing, Melbourne, 11 August 2021, *Transcript of evidence*, p. 7.

November that year, which tragically caused 10 deaths. Almost half of all hospital admissions were for children aged 0-14 years.⁸⁴

Asthma Australia submitted that asthma was the diagnosis on admission to Victorian emergency departments for 22,970 people in 2016–17. In addition to the human cost, this comes at a significant financial cost, with Asthma Australia estimating that each emergency department presentation for asthma costs \$443 on average, and repeated asthma-related presentations to emergency departments is associated with an increased risk of hospitalisation. They suggested that 40% of adults and 62% of children re-present to emergency departments within one year of initial presentation. It is estimated that one third of emergency department presentations for asthma are avoidable. Asthma was the cause of death for 117 Victorians in 2019, at a rate of 1.3 per 100,000.⁸⁵

However, the Committee notes there is no way of knowing whether the asthma attack that caused each of those deaths was itself caused by active or passive smoking, vaping, high pollen count, vehicle fumes, wood heater smoke or bushfires.

In addition to the statistical significance of asthma, the Committee heard some disturbing evidence about the impact asthma has on people in the community and how these impacts are made worse by different forms of air pollution. Some of these sources are discussed in detail throughout later chapters of this Report; this section is intended to highlight the impact that air pollution has on individuals.

Much of the submissions and evidence to the Inquiry discussed health impacts in the context of the causes of air pollution, such as the use of wood heaters, motor vehicles or coal-fired power generation, which was noted earlier in this chapter. The next section focuses on the actual impacts on people's lives and health.

While there has been statistical and scientific evidence presented to the Committee during the Inquiry, it is also recognised that the statistics only tell a part of the story. The personal impacts on people's lives are very real and, regardless of the overall air quality in Victoria, many Victorians suffer very real health concerns.

Liz Poole, in her submission, told the Committee of the impact on her family of the pollution caused by the use of wood heaters around her home. She said that the air pollution around her home makes it difficult for her family to use their backyard as both of her children have asthma. Ms Poole suggested that the pollution caused by the wood heaters had caused long term damage to her children's health:

Our eldest child began experiencing respiratory symptoms when she was just six months old. In her early years she was diagnosed with asthma and had four operations: grommets for recurrent ear infections, and to remove her adenoids and tonsils. Our younger child also began to experience respiratory symptoms such as bronchiolitis.

⁸⁴ Asthma Australia, *Submission 39*, p. 2.

⁸⁵ Ibid.

We have no history of asthma or childhood respiratory problems on either side of the family.⁸⁶

Thomas Ellis, in his submission, described the impact of smoke caused by the 2019/2020 bushfires, and subsequent actions by both ‘farmers and loggers’ which added to the ambient smoke:

As one drove down from Melbourne, one could look down on this sheet of smoke which covered the whole valley. Eventually I could no longer afford to live away from home, so was obliged to re-enter this mix of toxic gasses and particulate matter. When I entered my house, the smell of smoke and of the toxic gasses was everywhere. The situation was a nightmare. Naturally, I could not go outside to “get a breath of fresh air”, and had no way of getting rid of the smoke inside the house either as the gasses and smoke seep through the tiniest apertures.⁸⁷

This was not simply about the unpleasantness or inconvenience of living in such an environment. Mr Ellis told the Committee:

Eventually, at great expense, I bought a special electric-powered filter which could filter the air for just one room (which was my bedroom). This filtered out the particulate matter, but not the gasses, in particular ozone, the various oxides of nitrogen (usually designated NOx), and the various oxides of sulphur (usually designated SOx). All of these gasses are highly toxic and have enormously adverse effects on human (not to mention animal) health. In particular, they affect the cardiovascular system.⁸⁸

He said breathing in the gases had two significant effects on him, namely:

it left a continuous taste of acid in my mouth, and the second was that it caused a blockage of the Eustachian tubes, which was extremely uncomfortable.⁸⁹

Mr Ellis told the Committee that when he went to the doctor he was told that there was nothing that could be done medically and the only solution for him was to leave the area to avoid the pollutants.

At a public hearing, Asthma Australia presented testimony from an asthma sufferer named Karen who was diagnosed with asthma when she was eight and who had become increasingly sensitive to wood smoke over the past five years:

Although COVID, lockdown and the resulting lack of freedom and fear caused some distress in the community, for me having the very air I breathe taken away was way worse. I would be happy to live in lockdown for some years at a time, rather than have such polluted air to breathe. In lockdown I had my house and I could go for a walk. During the bushfires, even my bedroom was unsafe and brought no relief.⁹⁰

⁸⁶ Liz Poole, *Submission 91*, p. 1.

⁸⁷ Thomas Ellis, *Submission 15*, p. 1.

⁸⁸ Ibid.

⁸⁹ Ibid.

⁹⁰ Ms Michele Goldman, *Transcript of evidence*, p. 2.

Karen was further quoted in the hearing:

On a bad night at home, when there is a lot of smoke in the air, if I step out of my sealed bedroom (with an air purifier and double-glazed windows) I instantly feel my lungs seize up, it feels suddenly tight and as though someone is sitting and crushing my chest. I need to quickly take medication and go back to the bedroom. It is scary to feel like this in my own home...

For me it has led to reduced lung function, more attacks, more cortisone (and unfortunately osteoporosis possibly because of the cortisone) and it has also had a significant cost to my mental health.⁹¹

In addition to the direct health impacts, the Committee heard repeatedly that the impact of air pollution extended beyond the symptoms suffered to the loss of amenity and enjoyment of life caused by high levels of pollution. Ms Arabella Daniel of Clean Air Communities told the Committee, with regard to the impact of air pollution from woodsmoke heaters, that what was not fully recognised was:

the silent, daily suffering and anguish of not being able to breathe clean air inside and outside your home, being unable to enjoy one's garden, hang washing outside, exercise and walk the neighbourhoods, throw open doors and windows for fresh air... People are living in daily distress. It ruins neighbourhood relations and people even resort to moving house only to find the same problems plaguing daily life.⁹²

Cardiovascular disease

As indicated earlier in this chapter, there is a strong correlation between air pollution, particularly PM_{2.5} and PM₁₀, and cardiovascular disease. This is a long-established link.

Studies have shown that there was a significant increase in cardiovascular disease, from 0.5% to 1.5%, for every ~5–6 µg/m³ increase in PM_{2.5}. They have shown a 69% increase in cardiovascular deaths after acute exposure to particulate air pollution. In fact, 'acute exposure to PM_{2.5} resulted in a higher rate of death due to cardiovascular [disease] than respiratory disease (69% cardiovascular versus 28% respiratory)'.⁹³

Another long-term study, which included 500,000 teens and adults with a 16-year follow-up revealed that risk of ischemic heart disease, heart failure, arrhythmias, and cardiac arrest increased ~8–18% for every 10.5 µg/m³ in PM_{2.5}.⁹⁴

In 2016, medical journal *The Lancet* published the results of a seminal study which found that 'long-term exposure to particulate matter and nitrogen oxides at levels close to the

⁹¹ Ibid.

⁹² Ms Arabella Daniel, Clean Air Communities, public hearing, Melbourne, 29 June 2021, *Transcript of evidence*, p. 22.

⁹³ Byeong-Jae Lee, Bumseok Kim and Kyuhong Lee, 'Air Pollution Exposure and Cardiovascular Disease', *Toxicology Research*, vol. 30, no. 2, 2014, pp. 71–75, doi: 10.5487/TR.2014.30.2.071

⁹⁴ Ibid.

National Ambient Air Quality Standards (NAAQS) can prematurely age blood vessels and contribute to a more rapid build-up of calcium in the coronary artery'.⁹⁵

The build-up of calcium can restrict blood flow to the heart and other major blood vessels, increasing the likelihood of cardiovascular events like heart attack and stroke. *The Lancet* article suggested that while previous studies have linked air pollution and heart disease, this study provides 'a finer degree of evidence that air pollution accelerates the process of atherosclerosis'.⁹⁶

Another study of the association between air pollution and cardiovascular diseases, carried-out in the US, analysed the concentration of fine particulate matter and the rate of cardiovascular disease in 50 million people living in the 20 largest American cities. This study revealed that a 0.68% increase in cardiopulmonary mortality was associated with a 10 µg/m³ increase in PM₁₀ on the day before death.

A European study, the *Air Pollution and Health European Approach (APHEA-2) study*, analysed 43 million people in 29 major European cities. It also showed that air pollution and cardiovascular diseases were closely related with PM₁₀. Specifically, the study found that 'for every 10 µg/m³ rise in PM₁₀, the risk for cardiovascular death increased 0.76%, which was a higher rate than respiratory disease'.⁹⁷

The findings of these and many other studies were reflective of a number of submissions received by the Committee and in public hearings.

Dr Foong advised the Committee that particulates not only affect the lungs but they have wider serious health impacts, including significant impact on the cardiovascular system. She stated:

there are also air pollution and cardiovascular diseases, so it causes changes in your blood, your blood vessels and the heart. It can cause an increased rate of death from myocardial infarction, or heart attack, and also increases presentations for heart failure and arrhythmias. In terms of strokes, it is also been shown to actually increase your risk of getting strokes, and interestingly new research has shown that it can increase your risk of dementia.⁹⁸

These health impacts are also felt in Australia. The Australian Institute of Health and Welfare's Australian Burden of Disease Study for 2015 found that 4.6% of disease burden from cardiovascular disease and 1.6% of disease burden for respiratory disease was attributable to air pollution.

⁹⁵ United States Environmental Protection Agency, *Linking Air Pollution and Heart Disease*, (n.d.), <<https://www.epa.gov/sciencematters/linking-air-pollution-and-heart-disease>> accessed 2 September 2021.

⁹⁶ Ibid.

⁹⁷ Lee, 'Air Pollution Exposure and Cardiovascular Disease', pp. 71-75.

⁹⁸ Dr Lai Heng Foong, *Transcript of evidence*, p. 30.

In its submission, the Maribyrnong Truck Action Group quoted figures from the Australian Institute of Health and Welfare's Australian Burden of Disease Study, which estimate:

Air pollution is the primary contributory factor to 5.9 per cent of deaths from coronary heart disease, 4.8 per cent of deaths from stroke, 0.7 per cent of deaths from lung cancer and 0.3 per cent of deaths from chronic obstructive pulmonary disease ... with many of these conditions having their origin in childhood.⁹⁹

⁹⁹ Maribyrnong Truck Action Group, *Submission 42*, p. 51.

3 Governance and compliance

3.1 Introduction

This Chapter provides an overview of the governance and regulatory framework which informs Victoria's approach to air quality. It examines the key laws, regulations, agreements and frameworks in place at the national and state level. The roles and responsibilities of the key government agencies involved in air quality management are also canvassed.

3.2 Commonwealth

The Commonwealth Government is responsible for taking a lead role on national air quality issues, such as fuel quality and vehicle emissions. It is also responsible for implementing Australia's international obligations.

The Commonwealth Department of Agriculture, Water and the Environment is the principal government body for air quality management at the national level. The Department plays a role in:

- working with states and territories on maintaining air quality through the National Clean Air Agreement
- administering legislation related to air quality management and reporting
- providing policy advice on air quality matters
- seek to improve science around air quality through the National Environment Science Programme.¹

The Commonwealth Government has legislative and other obligations under the:

- National Clean Air Agreement
- *Product Emissions Standards Act 2017* (Cth)
- Product Emissions Standards Rules 2017
- National Environment Protection (Ambient Air Quality) Measure
- National Environment Protection (National Pollutant Inventory) Measure
- *Fuel Quality Standards Act 2000* (Cth) and other fuel quality standards.²

¹ Water and the Environment (Australian Government) Department of Agriculture, *Air quality*, <<https://www.environment.gov.au/protection/air-quality>> accessed 9 August 2021.

² Ibid.

Other Commonwealth agencies that have a responsibility in managing air quality are:

- **Department of Infrastructure, Transport, Regional Development and Communications:** responsible for managing emissions from vehicles and meeting international obligations for shipping emissions.³
- **National Environment Protection Council:** make and administer national environment protection measures, including the Ambient Air Quality Measure and National Pollutant Inventory Measure.⁴

3.2.1 Agreements informing Victoria's approach to air pollution

Several treaties and agreements underscore Victoria's regulatory approach to air pollution. These agreements and treaties have informed Australia's, and Victoria's, air quality objectives and domestic commitments. Some of the international commitments, such as the Paris Agreement, have been ratified in Australian law meaning they inform national air quality and environmental objectives. Table 3.1 below is a summary of the key international and national agreements which inform Victoria's approach to air pollution and quality management.

Table 3.1 Key international and national agreements informing Victoria's approach to air quality management

International	
United Nations Framework Convention on Climate Change (UNFCCC)	<p>The UNFCCC entered into force on 21 March 1994. It sets non-binding limits on greenhouse gas emissions for each member-state and contains no enforcement mechanisms; therefore, it is largely a non-binding treaty which outlines how other international treaties, for example protocols or Agreements, should be negotiated to further the objectives of the UNFCCC.</p> <p>After signing the UNFCCC, its member-states have regularly met for Conferences of the Parties to discuss how the treaty's objectives should be achieved. From these conferences two landmark international treaties have been ratified:</p> <ul style="list-style-type: none"> • Kyoto Protocol operationalises the UNFCCC through committing, through binding targets, industrialized countries to reduce GHG emissions in accordance with individual targets of a member-state • In December 2015, the Parliament of Australia announced it will ratify the second commitment term of the Kyoto Protocol (2013–2020). Australia's new Kyoto target is to reduce emissions by 5% below 2000 levels by 2020. • Paris Agreement aims to keep the increase of global average temperature below 2°C above pre-industrial levels and to pursue efforts to limit the increase to 1.5°C.
1985 Vienna Convention for the Protection of the Ozone Layer	<p>In 1987, Australia accessioned the Vienna Convention for the Protection of the Ozone Layer which was adopted in 1985 by the United Nations. The convention is a multilateral environmental agreement which provides a framework for international reductions in the production of chlorofluorocarbons (CFC) which contribute to ozone depletion.</p>

³ Transport Department of Infrastructure, Regional Development and Communications (Australian Government), *Vehicle safety & the environment*, 2020, <<https://www.infrastructure.gov.au/vehicles/environment>> accessed 9 August 2021.

⁴ National Environment Protection Council, *About NEPC*, <<http://www.nepc.gov.au/about-us>> accessed 9 August 2021.

International	
1987 Montreal Protocol on Substances that Deplete the Ozone Layer	The Protocol sits under the Vienna Convention and is designed to stop the production and import of ozone depleting substances and reduce their concentration levels in ozone layer.
National	
National Clean Air Agreement	<p>The National Clean Air Agreement is the principal Commonwealth agreement which deals explicitly with air quality. It was established in 2015 by Australia's Environment Ministers to address the impact of air pollution on human and environmental health. As part of the Agreement Ministers agreed to work plans to address the strategic priorities of the Agreement.</p> <p>The Agreement has two key objectives:</p> <ol style="list-style-type: none"> 1. provide a framework which identifies and prioritises specific air quality issues which require concentrated effort (<i>the work plan</i>) 2. formalise cooperative management of air quality standards at the national, state and local levels to develop effective and efficient policies. <p>The Agreement outlines four strategic approaches to be undertaken by each jurisdiction to strengthen existing air quality management:</p> <ul style="list-style-type: none"> • ensure a consistent approach to monitoring and reporting air quality (standards) • implement measures to reduce air pollution or population exposure to pollution (emissions reduction measures) • foster partnership opportunities aimed at promoting and sustaining improved air quality outcomes (partnerships and cooperation) • build community awareness and knowledge on air pollution to better equip policymakers (better knowledge, education and awareness).
2030 Climate Change Target	<p>Australia's 2030 climate change target is its intended nationally determined contribution under the Paris Agreement which it ratified in November 2016.</p> <p>Australia's target is to reduce greenhouse gas emission by 26–28% below 2005 levels by 2030.</p> <p>The target is a 50–52% reduction in emission per capita and 64–65% reduction in the emissions intensity of the economy between 2005 and 2030.</p>

Source: Legislative Council Environment and Planning Committee. Information compiled from various sources.

3.2.2 National Environment Protection (Ambient Air Quality) Measure

The National Environment Protection Council is established under the *National Environment Protection Council Act 1994* (Cth) and mirror legislation in other jurisdictions (Victoria's legislation is the *National Environment Protection Council (Victoria) Act 1995*). Under its Acts, the Council has two primary functions:

1. make National Environment Protection Measures (NEPMs)
2. assess and report on the implementations and effectiveness of NEPMs in participating jurisdictions.⁵

In 1998, the National Environment Protection Council implemented the National Environment Protection (Ambient Air Quality) Measure (NEPM Ambient Air Quality).

⁵ Ibid.

The NEPM Ambient Air Quality contains national environment protection standards for the six criteria air pollutants:

- carbon monoxide
- sulfur dioxide
- nitrogen dioxide
- lead
- ozone
- particles (PM₁₀ and PM_{2.5}).

The NEPM Ambient Air Quality outlines the maximum concentration standard for all pollutant as well as goal concentrations for PM_{2.5}.

According to the NEPM Ambient Air Quality, the purpose of a national environment protection standard is to provide 'quantifiable characteristics of the environment against which environmental quality can be assessed.'⁶ This allows governments to assess whether national (or state) environment protocol goals are on track.

The NEPM Ambient Air Quality also sets out processes for measuring air pollution concentration in every jurisdiction (i.e., the national environment protection protocol). Section 10 directs every participating jurisdiction to submit a monitoring plan consistent with the NEPM to the National Environment Protection Council.

The NEPM Ambient Air Quality outlines two methods for measuring and assessing concentration of pollutants:

1. measure at accredited⁷ performance monitoring stations
2. by other means that provide information equivalent to measurement that would otherwise occur at an accredited performance monitoring station.⁸

The Victorian Government has incorporated the NEPM Ambient Air Quality as an Environmental Reference Standard for ambient air. The Committee notes that the Environmental Reference Standard framework was introduced in July 2021 following the commencement of the 2017 Act. A fulsome discussion of the efficacy of this framework is not possible in the context of this Inquiry (see Box 3.3 below). However, the ambient air indicators and objectives incorporated into the ambient air environmental standard come from the NEPM Ambient Air Quality, which was discussed by stakeholders.

Table 3.2 shows the indicators and objectives for the ambient air environment which incorporates the measures set in the NEPM Ambient Air Quality. The Victorian

⁶ National Environment Protection (Ambient Air Quality) Measure (Cth) pt 1(2).

⁷ Accreditation is granted by the National Association of Testing Authorities.

⁸ National Environment Protection (Ambient Air Quality) Measure (Cth) s 12.

Government has incorporated the same indicators and objectives as the NEPM, except it has a lower maximum concentration for PM₁₀ for the 1-year averaging period.

Table 3.2 Victoria's indicators and objectives for the ambient air environment, Environment Reference Standard 2021

Indicators	Objectives	Averaging period	Maximum exceedances ^a
PM ₁₀ (maximum concentration)	50 µg/m ³	1 day	None
	20 µg/m ^{3b}	1 year	None
PM _{2.5} (maximum concentration)	25 µg/m ³	1 day	None
	8 µg/m ³	1 year	None
Carbon monoxide (CO) (maximum concentration)	9.00 ppm	8 hours	1 day a year
Nitrogen dioxide (NO ₂) (maximum concentration)	0.12 ppm	1 hour	1 day a year
	0.03 ppm	1 year	None
Ozone (O ₃) (maximum concentration)	0.10 ppm	1 hour	1 day a year
	0.08 ppm	4 hours	1 day a year
Sulfur dioxide (SO ₂) (maximum concentration)	0.20 ppm	1 hour	1 day a year
	0.08 ppm	1 day	1 day a year
	0.02 ppm	1 year	None
Lead (maximum concentration)	0.50 µg/m ³	1 year	None

a. The NEPM Ambient Air Quality has no maximum allowable exceedances.

b. In the NEPM Ambient Air Quality, the maximum concentration for PM₁₀ over a 1-year averaging period is 25 µg/m³.

Source: Victoria, *Victoria Government Gazette*, No. S 245, 26 May 2021, p. 9; National Environment Protection (Ambient Air Quality) Measure (Cth), sch 2, table 1.

The National Clean Air Agreement described the purpose of the NEPM Ambient Air Quality as the 'key existing air quality management framework in Australia', it explained:

Since 1998, the Measure has established a common national goal to aim for in order to best protect human health and well being from the adverse impacts of air pollution. By establishing and updating health-based standards for six common air pollutants, as well as mandatory monitoring and reporting requirements, the Measure helps to assess Australia's overall air quality, identify issues and drive policy development towards managing these issues. The Measure is implemented by state and territory governments through legislation, statutory instruments, policies and programmes in their own jurisdictions towards meeting the goal of the Measure.⁹

3.2.3 Stakeholder views of national and Victorian air quality measurements

A number of stakeholders expressed their view about Victoria's current air quality measurements and whether they were sufficient to prevent environmental and

⁹ Australian Government, *National Clean Air Agreement*, 2015, p. 7.

human health harms. Many of these stakeholders argued that Victoria's air quality measurements or objectives could be improved so that it better reflects the health risks of exposure to air pollution, particularly from industries which regularly cause air pollution and could expose people over long periods of time. The Committee was told that the NEPM Ambient Air Quality was not sufficient and there was nothing stopping Victoria from introducing stricter air quality measures or objectives.

At a public hearing, Professor Michael Abramson, Chief Investigator, Centre for Air Pollution, Energy and Health Research, stated:

my understanding is that we have these national environment protection measures, and then it is up to individual state jurisdictions to implement them. So there is not total uniformity around Australia. I note in fact the EPA's standard for, I think it was, $PM_{2.5}$ is slightly better than the national recommendation. But you can have the best standards in the world and they will not adequately protect the health of the public unless they are actually enforced.¹⁰

This was reiterated by Ms Bronya Lipski, Lawyer, Environmental Justice Australia, who explained that Victoria has previously strengthened its own air quality objectives against the NEPM:

So despite the fact that those ambient objectives are set at a national level, there is nothing in that legislative framework that prevents other jurisdictions from making those standards tighter in their own jurisdictions. And as you said, Victoria has absolutely done that before. We did that during the national review of the PM_{10} and $PM_{2.5}$ ambient air objectives. Victoria went above and beyond what the NEPC, or the National Environment Protection Council, eventually decided on for the ambient air national environment protection measure and made them stricter. So we have done it before and we can do it again.¹¹

The *National Environment Protection Council (Victoria) Act 1995* (Vic) provides provision for Victoria to introduce more stringent measures to protect its environment. Schedule 4 of the Act prescribes that states can introduce and maintain 'more stringent measures to reflect specific circumstances or to protect special environments or environmental values'.¹² However, the Act requires that any proposed variations to national measures can only be implemented by a state if it has consulted with the Environment Protection Authority. Section 17A(2) of the 1970 Act prescribed that any proposed variations to environmental measures which were more stringent than an NEPM can only be recommended after the Environment Protection Authority Victoria (EPA) had consulted with the National Environment Protection Council.¹³

¹⁰ Professor Michael Abramson, Chief Investigator, Centre for Air Pollution, Energy and Health Research, public hearing, Melbourne, 28 June 2021, *Transcript of evidence*, p. 38.

¹¹ Ms Bronya Lipski, Lawyer, Environmental Justice Australia, public hearing, Melbourne, 29 June 2021, *Transcript of evidence*, p. 5.

¹² *National Environment Protection Council (Victoria) 1995* (Vic), sch 4.

¹³ *Environment Protection Act 1970* (Vic) s 17A(2).

In 2016, Victoria amended the State Environment Protection Policy (Ambient Air Quality) to include a stricter air quality objective for PM_{2.5}. In 2021, the National Environment Protection Council amended the NEPM Ambient Air Quality to include the same air quality objective for PM_{2.5}. Table 3.3 below shows the air quality objective for PM_{2.5} first introduced in Victoria which is now included in the national measure.

Table 3.3 Goal for Particles as PM_{2.5} from 2025

Pollutant	Averaging period	Maximum concentration
Particles as PM _{2.5}	1 day	20 µg/m ³
	1 year	7 µg/m ³

Note: This air quality goal was first included in sch 2 of Victoria's State Environment Protection Policy (Ambient Air Quality).

Source: *National Environment Protection (Ambient Air Quality) Measure sch 2 tbl 2*.

Other stakeholders also noted that Victoria has previously strengthened its air quality objectives in the past beyond the NEPM.¹⁴

Several stakeholders expressed concern that current air quality objectives do not properly consider the actual level of pollution exposure needed to generate risks to human health and the environment. These stakeholders suggested that measures and objectives are too high and that risks to human health exist for exposure levels that do not exceed current measures. Therefore, it was recommended that Victoria introduce lower exceedance maximums for sources of air pollution, particularly for particulate matter (PM_{2.5} and PM₁₀).

Ms Lipski believed that the current ambient air quality objectives do not adequately protect human health:

Those objectives are not actually health-based standards, so if you have ambient air standards that are set at a national level, that are not protective of health, then we are going to have a whole range of issues when it comes down to the state obligations around controlling those point source emissions from those particular facilities or from vehicles or from wood-smoke heaters, for example.¹⁵

She contended that for air quality objectives to align better with health-based objectives there would need to be a consensus from jurisdictions around Australia. Ms Lipski explained that health-based ambient air objectives are 'quite strict':

Health-based ambient air objectives are quite strict, and setting those health-based standards does really require all the jurisdictions to come to the table and say, 'We are going to do whatever it is that we need to do'. Whether that is ensuring that pollution controls are installed in highly polluting facilities or fuel levels are made better or we phase out wood-burning heaters, we need to do those things in order to achieve those health-based objectives.¹⁶

¹⁴ For example, see: Environmental Justice Australia, *Submission 110*; Doctors for the Environment Australia, *Submission 68*.

¹⁵ Ms Bronya Lipski, *Transcript of evidence*, p. 3.

¹⁶ *Ibid.*, p. 8.

The Inner West Air Quality Community Reference Group in its report on *Air Quality in Melbourne's Inner West* also noted its concerns with the exceedance limits for air pollution in Victoria. It discussed recent findings from the National Environment Protection Council which resulted in Australia's Environment Ministers 'signal[ing] their intention to vary the Ambient Air Quality National Environment Protection Measures (NEPM) for O₃, NO₂ and SO₂, based on the latest scientific understanding of the health risks arising from these pollutants'.¹⁷

Another issue raised with the Committee was Victoria's air monitoring obligations under the NEPM. Section 10 of the NEPM Ambient Air Quality requires that every participating jurisdiction prepare a monitoring plan which sets out how it will monitor air quality to assess its performance under the NEPM.

In its submission, Environmental Justice Australia discussed that the EPA's air monitoring does not meet Victoria's obligations under the measure:

According to the Victorian Auditor General's Office (VAGO) audit of Environment Protection Authority (EPA) air monitoring obligations, the EPA does not currently produce a reliable or representative measure of ambient air quality across the state, hasn't implemented the requisite monitoring required under the NEPM, and does not collect information on air quality for most of the state despite being required to do so under air pollution law.

According to power station contractors who conducted air modelling for Latrobe Valley during the 2018 power station licence review, NEPM standards for SO₂, PM₁₀ and PM_{2.5} are routinely breached and/or routinely reaching the standard in Latrobe Valley. Yet, where exceedances are captured by industry-run monitors, nothing is done to reduce poor air quality by EPA.¹⁸

In its 2018 report on *Improving Victoria's Air Quality*, VAGO found:

The Monitoring Plan requires EPA to monitor ambient air quality at all urban centres with a population of at least 25 000. In 2001, using 1996 Australian Bureau of Statistics data, EPA identified eight regions in the state where ambient air monitors should be located. This has not occurred.

EPA does not measure ambient air quality in six of the eight regions it identified. EPA explained that, based on previous assessments of these regions, it expects pollution levels to be well below the standards outlined in the National Environment Protection (Ambient Air Quality) Measure (NEPM AAQ). However:

- EPA's assessments were done at least 10 years ago and do not necessarily reflect current conditions
- not all indicator pollutants were monitored, with Mildura and Shepparton monitored for only one pollutant (PM₁₀)

¹⁷ Inner West Air Quality Community Reference Group, *Air Pollution in Melbourne's Inner West: taking direct action to reduce our community's exposure*, 2020, p. 70.

¹⁸ Environmental Justice Australia, *Submission 110*, p. 6.

- all stations recorded exceedance levels for at least one of the indicator pollutants
- EPA has not monitored PM_{2.5} levels in any of these regions to date—the NEPM AAQ required assessment against PM_{2.5} standards from 2016.¹⁹

VAGO’s audit report is further discussed in Chapter 8.

As well as concerns that the NEPM’s exceedance limits are too high, some stakeholders criticised the use of the measure as a target, or goal, rather than a limit to avoid. Many of these stakeholders also noted that the exceedance limits do not reflect the risks posed to human health and the environment from air pollution exposure. In its submission, Environmental Justice Australia believed that it was inappropriate to use the NEPM as a target rather than a ‘worst-scenario measure to avoid’.²⁰ It stated:

Notably, Victoria is not bound to the national standards and can make Victorian air pollution standards stricter to better protect human and environmental health ... The adoption of strong ambient air standards is not the end of the process. The Victorian EPA currently regulates ambient air pollution levels up to the limit. The NEPM is used inappropriately as a target rather than a worst-case scenario measure to avoid. The prevailing attitude is: as long as the NEPM is not breached it is not incumbent on the EPA to reduce point-source air pollution. This actively prevents achievable air pollution reductions that would have significant health benefits.²¹

This was echoed by Maribyrnong Truck Action Group which argued that current standards do not reflect the health risks of air pollution and are seen as levels to pollute up to:

Standards also do not take into account those more vulnerable to the effects of air pollution and the cumulative effect of exposure over a long period of time, for example a child spending seven years at a primary school on a major truck route.

Standards should not be seen as a level that can be ‘polluted up to’. The only way to protect human health in susceptible communities and air pollution hot spots is to adopt an exposure reduction framework with specific reduction targets.²²

In response to VAGO’s audit report, the Department of Environment, Land, Water and Planning (DELWP) and the EPA accepted all the recommendations of the audit. Its response to the audit included proposed actions to address VAGO’s recommendations, actions included:

- review and update existing air quality monitoring processes
- deliver a renewed data storage platform to manage air monitoring data which streamlines data collection, analysis and storage while simplifying data sharing

¹⁹ Victorian Auditor-General’s Office, *Improving Victoria’s Air Quality*, Independent assurance report to Parliament, 2018, pp. 8–9.

²⁰ Environmental Justice Australia, *Submission 110*, p. 10.

²¹ Ibid.

²² Maribyrnong Truck Action Group, *Submission 42*, p. 13.

- update its air emissions inventory for major and diffuse sources, including identify major point sources of air pollution
- update its ambient air monitoring plan, including consideration for problem sites such as the Brooklyn Industrial Precinct (see Chapter 4 for more information on the Precinct).

In its response to the audit, DELWP outlined its proposed action to address the recommendation from VAGO and its intention to support the EPA in addressing its recommendations. VAGO's recommendations relating to air quality monitoring are also covered in Chapter 8.

As discussed in Chapter 2, there are significant health impacts associated with air pollution exposure. The introduction of stricter indicators could play an important role in ensuring that Victoria's air quality performance is better aligned with international best practice standards and is informed by a health-based approach. The Committee has not recommended specific air quality indicators or objectives to replace existing ones; instead, it believes that the Victorian Government should investigate where exceedance limits could be reduced and to implement them as appropriate.

RECOMMENDATION 1: That the Victorian Government investigate the viability and consider the introduction of stricter air quality enforcement measures and to appropriately resource enforcement agencies such as the EPA to enforce clean air standards.

RECOMMENDATION 2: That the Victorian Government advocate to the National Environment Protection Council for the introduction of stricter air quality indicators and objectives especially for particulate matter sources.

3.3 Victoria

3.3.1 A note about Victoria's new environment protection laws

On 1 July 2021, the *Environment Protection Act 2017* (Vic) (the 2017 Act) came into effect. The 2017 Act significantly overhauled Victoria's environmental protection framework, repealing the *Environment Protection Act 1970* (Vic). According to the EPA website, the 2017 Act has equipped the EPA with 'enhanced powers' to 'prevent risks to the environment and human health', including stronger sanctions and penalties for environmental polluters.²³

²³ Environment Protection Authority Victoria, *New laws to better protect the environment*, 2021, <<https://www.epa.vic.gov.au/about-epa/laws/new-laws>> accessed 13 August 2021.

A key feature of Victoria's new environment protection laws is the 'general environmental duty' (GED). The GED applies to all Victorians, including businesses, and establishes an expectation that you are responsible for reducing the risk of harm from activities:

- to human health and the environment
- from pollution and waste.²⁴

Businesses are expected to manage their own risks under the GED. Box 3.1 below explains the GED.

BOX 3.1: General environmental duty

Section 25 of the *Environment Protection Act 2017* (Vic) establishes a 'general environmental duty' which applies to all Victorians. It creates an expectation that every Victorian, whether it is an individual or business, is responsible for managing their activities to avoid the risk of environmental damage or create potential harms to human health.

The Act prescribes that any person engaging in activity which may pose risks to human health or the environment from pollution or waste must minimise those risks as much as 'reasonably practicable'. The Act also prescribes certain actions a business must undertake whilst fulfilling its general environmental duty.

Section 25(2)–(3) of the Act prescribes that a person commits an indictable offence if it contravenes the requirements of their general environmental duty. The Act also prescribes stronger penalties for aggravated contraventions of a duty.

Source: *Environment Protection Act 2017* (Vic) pt 3.2; Environment Protection Authority Victoria, General environmental duty, 2021, <<https://www.epa.vic.gov.au/for-business/new-laws-and-your-business/general-environmental-duty>> accessed 13 August 2021.

At a public hearing, Mr Lee Miezi, Chief Executive Officer of the EPA, explained to the Committee the role of the GED which he described as the 'cornerstone of the new legislation':

the new Act transforms both environment protection in Victoria and the EPA as we seek to become a modern and world-class regulator. The new Act fundamentally changes our approach to harms caused by pollution and waste, shifting the focus from managing impacts on communities and the environment after they have occurred to preventing impacts from occurring in the first place. And the cornerstone of the new legislation is the general environmental duty. A world first, the GED applies to all Victorians, not just industry, and requires people to undertake reasonably practicable steps to eliminate or

²⁴ Environment Protection Authority Victoria, *General environmental duty*, 2021, <<https://www.epa.vic.gov.au/for-business/new-laws-and-your-business/general-environmental-duty>> accessed 13 August 2021.

otherwise reduce risks to human health and the environment from pollution and waste. The GED provides a significant shift in the way air quality will be managed in Victoria. It will require duty holders to take proactive steps to assess the risks posed by emissions from their activities and to implement actions to minimise those risks.²⁵

Both the EPA and DELWP noted that the GED will be supported by higher penalties and a new permissions framework.²⁶ Mr Miezis noted that the 2017 Act:

includes a tiered system of EPA permissions to support risk-based and proportionate regulatory oversight, it makes significant reforms to contaminated land and waste management and it modernises and strengthens EPA's compliance and enforcement powers.²⁷

In relation to air pollution, Victoria's new environment protection laws and regulations has incorporated many of the obligations that existed in state environment protection policies and waste management policies, including:

- controlling emissions of class-three substances²⁸
- maintaining supply and manufacturing standards for solid wood heaters
- managing and containing ozone-depleting substances
- continuing to report emissions under the National Pollutant Inventory.²⁹

Air pollution objectives and standards are now contained in the Environment Reference Standard (ERS). The ERS is established under pt 5.2 of the 2017 Act. A Standard identifies environment values to be achieved and maintained in Victoria, including indicators or objectives which can be used to measure whether an environmental standard is being achieved. Section 96 of the 2017 Act allows for a National Environment Protection Measure (NEPM) to be incorporated into an ERS.

Part B of the Victorian Government's submission was provided by the EPA which explained the purpose of the ERS in Victoria's new environmental protection framework:

The ERS describes environmental values which are qualities of the environment that are of value to the community, and also contains indicators and objectives to measure whether those environmental values are being met for different parts of the environment (ambient air, land, ambient sound and water environments).

²⁵ Mr Lee Miezis, Chief Executive Officer, Environment Protection Authority Victoria, public hearing, Melbourne, 10 August 2021, *Transcript of evidence*, p. 4.

²⁶ Ms Carolyn Jackson, Acting Deputy Secretary, Environment and Climate Change, Department of Environment, Land, Water and Planning, public hearing, Melbourne, 10 August 2021, *Transcript of evidence*, p. 3; Mr Lee Miezis, *Transcript of evidence*.

²⁷ Mr Lee Miezis, *Transcript of evidence*, p. 4.

²⁸ Class-three substances are extremely hazardous substances that are carcinogenic, mutagenic, teratogenic, highly toxic, or highly persistent, and which may threaten the beneficial uses of the air environment.

²⁹ Environment Protection Authority Victoria, *Summary of air and water Regulations*, 2021, <<https://www.epa.vic.gov.au/about-epa/laws/new-laws/summary-of-regulations/summary-of-air-and-water-regulations>> accessed 17 August 2021.

The ERS is a reference standard, not a compliance standard for businesses. However, some government decision-makers must take the ERS into account when making certain decisions. EPA must consider the ERS when assessing development, operating or pilot licence applications, and may when making other decisions.

The ERS adopts all the environmental values, indicators and objectives from the SEPP AAQ³⁰. It also includes the additional environmental value for climate systems that is included in SEPP AQM^{31,32}.

Box 3.2 explains the purpose of the ERS within Victoria's environmental protection framework.

BOX 3.2: Environmental Reference Standard

The Environment Reference Standard (ERS) is a new legislative instrument established under the *Environment Protection Act 2017* (Vic). It is an 'environmental benchmark' that combines environmental values, indicators and objectives to explain the environmental and human health outcomes to be achieved or maintained.

The ERS addresses four elements of Victoria's environment:

- ambient air
- ambient sound
- land
- water (surface water and groundwater).

These elements are addressed through four components:

- **Environmental values:** a statement about the desired outcomes for human health and the environment. It relates to the uses, attributes or functions of the environment Victoria wants to achieve or maintain.
- **Indicators:** parameters or markers to assess whether environmental values are being achieved.
- **Objectives:** assessment benchmarks to determine whether an environmental value is being achieved, maintained or threatened.
- **Areas of application:** defines the area or areas to which the environmental value, or specific indicators and objectives, apply.

(Continued)

³⁰ State Environment Protection Policy (Ambient Air Quality)

³¹ State Environment Protection Policy (Air Quality Management)

³² Victorian Government, *Submission 113*, p. 23.

BOX 3.2: Continued

It is an assessment and reporting benchmark that will be used to monitor environmental conditions by assessing:

- whether environmental values are being achieved
- changes over time
- potential threats to environmental values.

The ERS is a reference point to support the 'general environmental duty' by acting as a benchmark for assessing human health and environmental impacts from proposed general environmental duty compliance measures.

Source: Environment Protection Authority Victoria, *Guide to the Environment Reference Standard*, 2021.

Victoria's new environment protection laws came into effect as this Inquiry was already underway and had received its submissions. Therefore, the breadth of evidence received by the Committee relates to Victoria's previous environmental protection framework established under the *Environment Protection Act 1970* (Vic). Much of the regulations and policies related to air quality management which existed under the previous framework have been incorporated into the new protection framework. However, there are several differences which will affect the management of air quality in Victoria, including the obligations of businesses and individuals under the GED and the powers of the EPA to sanction non-compliance.

The focus of this report will be on the regulatory framework that was in place prior to the new laws being introduced in July 2021. The Committee is unable to make any specific findings on the effectiveness of Victoria's new environmental protection framework. It has however made findings and recommendations throughout this report which should be considered in the context of the new framework. Stakeholders throughout the Inquiry identified several issues with air quality management in Victoria which the Committee believes need to be addressed.

3.3.2 Overview of Victoria's legislative framework (prior to July 2021)

Environment Protection Act 1970 (Vic)

BOX 3.3: Note from the Committee about the *Environment Protection Act 1970 (Vic)*

On 1 July 2021, the *Environment Protection Act 2017 (Vic)* (the 2017 Act) came into effect. The 2017 Act repealed the *Environment Protection Act 1970 (Vic)* (the 1970 Act). The new environment protection powers enacted in July 2021 also changed the legislative framework for environment protection in Victoria. Under the 2017 Act, State Environment Protection Policies and Waste Management Policies no longer have a formal legal role.

The 2017 Act has replaced this policy framework with new subordinate instruments and new duties, such as the general environmental duty. From 1 July 2021, these policies no longer had a formal legal status. At the time of writing many of these policies were still publicly available, particularly where new information or guidance was not yet available. An outline of the key features of the 2017 Act in relation to air pollution is discussed above in Section 1.4.

The focus of the Committee's Inquiry and the evidence received was on regulatory governance frameworks in place prior to the commencement of the 2017 Act. Therefore, much of the commentary from stakeholders was informed by legislative practices and requirements of the 1970 Act.

Where appropriate in this report, the Committee will note where new measures, duties or legislative responsibilities have been introduced in its discussion on the governance and compliance approach to air pollution in Victoria. It will also make recommendations on issues the Committee feels may not be addressed by the new protection laws or where there is particular importance to ensure proper regulatory oversight is in place.

The *Environment Protection Act 1970 (Vic)* (the 1970 Act) was the second piece of legislation in the world to deal with the environment and its protection in a systematic and integrated way. The Act set out environmental quality objectives and programs aimed at preventing pollution and environmental damage.³³ The 1970 Act established the powers, duties and functions of the EPA, including:

- administration of the Act and related regulations and orders
- recommending State Environment Protection Policies and Industrial Waste Management Policies

³³ Environment Protection Authority Victoria, 'Acts administered by EPA', April 2020, <<https://ref.epa.vic.gov.au/about-us/legislation/acts-administered-by-epa>> accessed 8 May 2020.

- issuing work approvals, licenses, permits, pollution abatement notices
- implementing the National Environment Protection Measures (NEPMs).³⁴

The 1970 Act also prescribed 'principles of environment protection'. Section 1A of the 1970 Act prescribed that the administration of the Act needs to give regard to the principles of environment protection. Many of the principles have been retained in the 2017 Act. Table 3.4 below outlines the environment protection principles.

Table 3.4 Principles of Environment Protection

	Environment protection principle
Principles in the <i>Environment Protection Act 2017</i> (Vic) that were retained from the <i>Environment Protection Act 1970</i> (Vic)	Principle of integration of economic, social and environmental considerations
	Principle of intergenerational equity (now <i>Principle of equity</i>)
	Principle of shared responsibility
	Principle of improved valuation, pricing and incentive mechanisms (now <i>Principle of polluter pays</i>)
	Precautionary principle
	Principle of conservation of biological diversity and ecological integrity (now <i>Principle of conservation</i>)
	Principle of wastes management (now <i>Principle of waste management hierarchy</i>)
Principles from the <i>Environment Protection Act 1970</i> (Vic) that were repealed by the <i>Environment Protection Act 2017</i> (Vic)	Principle of accountability
	Principle of product stewardship
	Principle of integrated environmental management Principle of enforcement
Principles in the <i>Environment Protection Act 2017</i> (Vic) that were not included in the <i>Environment Protection Act 1970</i> (Vic)	Principle of proportionality
	Principle of evidence-based decision making
	Principle of primacy of prevention

Source: *Environment Protection Act 1970* (Vic) ss 1B – 1L; *Environment Protection Act 2017* (Vic) pt 2.3.

The 1970 Act established State Environment Protection Policies' (SEPPs) as subordinate legislation used to prescribe specific policy requirements based on the principal Act. Section 16A of the Act prescribed that SEPPs could define the uses and environmental values to be protected in Victoria and environmental quality objectives needed to protect beneficial use. Section 18(1) of the Act allowed SEPPs to prescribe more detailed requirements and standards in relation to environmental protection.

A SEPP could include:

- boundaries of a specific area
- identification of beneficial uses to be protected

³⁴ Ibid.

- environmental indicators to be employed for measuring and defining environmental quality
- a statement of environmental quality objectives.³⁵

Table 3.5 Summary of State Environment Protection and Industrial Waste Management policies related to air pollution—subordinate legislation under the 1970 Act

Policy	Summary
<i>State Environment Protection Policy (Ambient Air Quality)</i>	<p>Adopted the requirements of the National Environment Protection Council (Ambient Air Quality) Measure by setting air quality objectives and goals for the State of Victoria.</p> <p>Included a separate objective for visibility reducing particles which is not included in the national Measure.</p> <p>Prescribed a monitoring and reporting protocol to assess pollution concentrations.</p>
<i>State Environment Protection Policy (Air Quality Management)</i>	<p>Established a framework for managing emissions from all sources of air pollution in Victoria.</p> <p>Aimed to ensure that the SEPP (Ambient Air Quality) was met without unduly affecting Victoria's economic and social development.</p> <p>Scheduled classes of air quality indicators, emission limits and design criteria for assessing new sources of emissions and air quality regions.</p>
<i>Industrial Waste Management Policy (Protection of the Ozone Layer)</i>	<p>Aimed to prevent the depletion of stratospheric ozone by minimising the release of ozone-depleting substances in the atmosphere.</p> <p>Objectives included:</p> <ul style="list-style-type: none"> • protection of human health and the environment • promotion of stratospheric ozone layer recover • enable Victoria to meet national obligations under the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer.

Source: Legislative Council Environment and Planning Committee. Information obtained from various pages on the Environment Protection Authority Victoria's website, <https://www.epa.vic.gov.au>.

3.4 Government agencies involved in air quality monitoring

There are many agencies that contribute to the protection of Victoria's air quality. In addition to the EPA's central role, other key agencies include DELWP, local government, the Commissioner for Environmental Sustainability, VicRoads, WorkSafe Victoria, the Victorian Planning Authority, emergency services and a host of others agencies which also extend to Commonwealth Government agencies.

But for the purposes of this report, the Committee's focus was on the two Victorian State Government agencies who play an integral role, being DELWP and the EPA.

³⁵ *Environment Protection Act 1970* (Vic) s 18(1)(a)-(d).

3.5 Department of Environment, Land, Water and Planning

DELWP leads policy and legislative reform for environment protection, pollution and waste in Victoria. It is responsible for developing processes, strategies, and actions to lead the Victorian Government's response to environment protection and to address air pollution in Victoria. Alongside its legislative reform role, DELWP also works with other departments, such as the Department of Health and the Department of Transport, to develop air quality policies and strategies.³⁶

According to its submission, DELWP roles and responsibilities related to air pollution involve 'bring[ing] together actions, policies and programs' through its *One-DELWP Strategic Framework 2019-23* for the following areas:

- climate change
- environmental management
- water
- energy
- land management
- local government
- emergency management
- planning.³⁷

At a public hearing, Ms Carolyn Jackson, Acting Deputy Secretary, Environment and Climate Change, Department of Environment, Land, Water and Planning, explained to the Committee DELWP's responsibilities in Victoria's air quality management. These included:

- responsibilities under several portfolios, including the environment, climate change, fire and planning
- risk-based fire management through activities such as DELWP's fuel management program
- working with other departments and agencies on initiatives in portfolios like energy and transport to works towards clean and efficient future
- engaging with local communities to address local environmental issues.³⁸

The Government has committed to releasing a Victorian Air Quality Strategy, which will:

- articulate clear, sustainable and cost-effective clean air policies and programs

³⁶ Ms Carolyn Jackson, *Transcript of evidence*, p. 2.

³⁷ Victorian Government, *Submission 113*, p. 8.

³⁸ Ms Carolyn Jackson, *Transcript of evidence*, p. 3.

- empower Victorians to reduce air pollution and exposure
- address emerging air quality challenges.³⁹

Some stakeholders expressed frustration that the Victorian Air Quality Strategy still had not been released by the Government.⁴⁰ The Committee asked the Government why the strategy had been delayed at a public hearing. In response, Ms Jackson explained:

So in terms of the air quality strategy ... there was a commitment to releasing a strategy in 2019, but the government wanted to ensure that it was well integrated with other major policy reforms that were under development at the same time—so for example, the climate change strategy that has now been released—and then subsequently the events of the last 18 months have resulted in some deferral and reprioritisation of government's effort and resources, given the COVID pandemic, the bushfires et cetera. I can confirm that the government is still committed to releasing an air quality strategy and it is currently under development.⁴¹

While in its submission, Latrobe City Council told the Committee:

The Victorian government initiated the development of an Air Quality Strategy in 2018 - Clean Air for All Victorians. The release of Victoria's Air Quality Statement saw the commencement of engagement about future air quality management and included some ideas on what could be done to protect air quality over the coming decades...

It is understood that consultations commenced from May 2018 and included public forums being held in Melbourne, Ballarat and the Yarra Valley. No similar events were held within the Latrobe City or Gippsland Region.

The release of the Victorian Air Quality Strategy was anticipated during 2019, however no policy has yet been released.⁴²

Air quality in the Latrobe Valley is covered in greater detail in Chapter 5.

FINDING 1: The Victorian Government has not released the Air Quality Strategy that was due to release in 2019.

RECOMMENDATION 3: That the Victorian Government expedite the completion and subsequent release of its Air Quality Strategy.

³⁹ Department of Environment, Land, Water and Planning, *Victorian Air Quality Strategy*, 2020, <<https://www.environment.vic.gov.au/sustainability/clean-air-for-all-victorians>> accessed 4 October 2021.

⁴⁰ For example, see: Ms Kate Forster, public hearing, Melbourne, 29 June 2021, *Transcript of evidence*; Keith Loveridge, *Submission 40*; Communities for Clean Air Network, *Submission 82*.

⁴¹ Ms Carolyn Jackson, *Transcript of evidence*, p. 9.

⁴² Latrobe City Council, *Submission 57*, p. 4.

3.6 Department of Health and the Chief Health Officer

The Department of Health has a role in protecting the health of Victorians from the potential health effects of environmental hazards. The Department has a responsibility to:

- raise awareness of environmental hazards in the community, including providing health advice and tips
- provide technical guidance and advice
- inform state and national policy.

The Department is responsible for managing environmental health queries that are not related to pollution or waste. This includes radiation safety, food safety, drinking water safety, communicable diseases, extreme heat, and climate change health impacts.

The Chief Health Officer is a statutory role within the Department of Health. The Chief Health Officer undertakes a variety of statutory functions and provides expert clinical and scientific advice and leadership on issues impacting public health. Their responsibilities include:

- provision of expert advice on matters relating to the health and wellbeing of the people of Victoria
- issuing of health alerts and advisories to inform Victorians about health issues that may affect their health and safety
- performing the functions or powers specified in the *Public Health and Wellbeing Act 2008* (Vic) or any regulations made under that Act
- being the spokesperson for the Victorian Government on matters related to health protection, including public health incidents and emergencies
- engaging with the community on public health matters
- publishing a comprehensive report on public health and wellbeing in Victoria every two years.

At a public hearing, Victoria's Chief Health Officer Professor Brett Sutton described his role in assisting Victoria's air quality management efforts as a 'supportive and collaborative role, especially with the [EPA]'. Professor Sutton explained that the Chief Health Officer's role is to:

provide public health input to state and national policies relating to air quality, and Department of Health in particular supports EPA on public health risk communication. So when there are prolonged smoke events, either from a fire or from bushfire or other air quality events, then with the Chief Environmental Scientist there is communication to the general public about both the nature of the risk but also how to best protect themselves and what the implications are for those particular hazards, and I can support the EPA in those health protection measures.

...

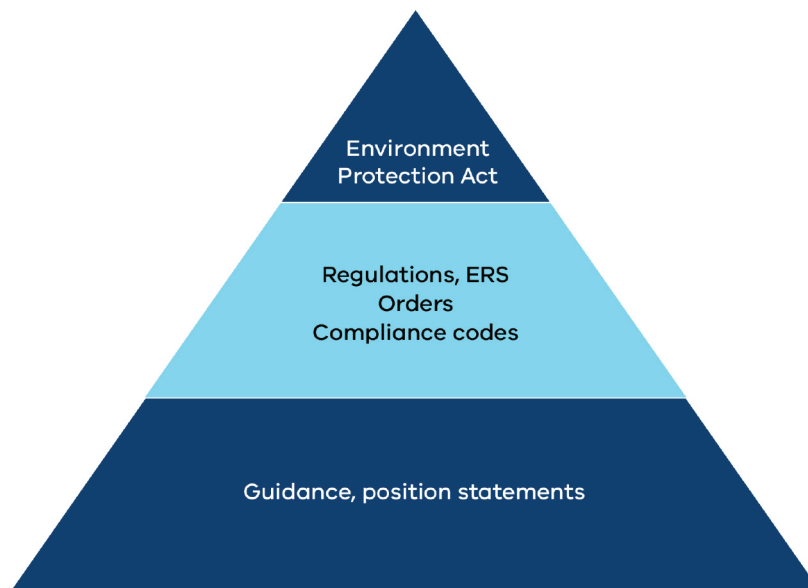
We have worked on guidance for local government in tackling climate change and its impacts on health through municipal public health and wellbeing planning, and we are very cognisant of the health co-benefits that can be obtained with increased use of public transport and with increased use of walking and cycling, which both reduce CO₂-equivalent carbon outputs but also impact on particulate matter generation. There is also guidance for local government, supporting people when air quality is heavily impacted by bushfire smoke, that has really arisen out of those 2019–20 bushfires, that supports local councils to create cooler and cleaner air spaces for individuals to get respite during some of those heavily impacted times with bushfire smoke in particular.⁴³

3.7 Environment Protection Authority Victoria

The EPA is the principal government agency responsible for regulating, monitoring and assessing air pollution in Victoria. It is an independent statutory authority established in 1971 under the 1970 Act (this was repealed by the 2017 Act). It is Victoria's leading environmental regulatory agency whose objective is to prevent and reduce the harmful effects of pollution and waste on Victorians and the environment. The EPA is accountable to the Minister for Energy, Environment and Climate Change.

The EPA is responsible for monitoring and enforcing legislation and regulations according to its legal framework. Figure 3.1 below explains the hierarchy of the EPA's legal framework.

Figure 3.1 Environment Protection Authority Victoria's legal framework



Source: Environment Protection Authority Victoria, *Guide to the Environment Reference Standard*, 2021, p. 9.

⁴³ Professor Brett Sutton, Chief Health Officer, Department of Health, public hearing, Melbourne, 10 August 2021, *Transcript of evidence*, pp. 6–7.

The 2017 Act reinforces the statutory authority and objectives of the EPA, including its powers, duties and functions. Part 12.1 of the 2017 Act prescribes the EPA's objectives, functions and powers, these are summarised in Table 3.6 below.

Table 3.6 Summary of the objectives, functions and powers of the Environment Protection Authority Victoria

Objectives	<ul style="list-style-type: none"> • protect human health and the environment by reducing the harmful effects of pollution and waste • the EPA must exercise its powers for the purposes of achieving its objectives to the extent that it is practicable to do so
Functions	<ul style="list-style-type: none"> • monitor and assess environmental quality • identify, assess and monitor risks • respond to harm and risks of harm • identify and respond to opportunities to — <ul style="list-style-type: none"> • eliminate or reduce risks of harm • improve environmental quality • provide advice and recommendations to the Minister in relation to human health and the environment • liaise with governments in other jurisdictions for the purpose of achieving the EPA's objectives • provide information and education to the Victorian community • promote the prevention, reduction and elimination of harm • administer the 2017 Act's permissions scheme and regulation • promote, monitor and enforce compliance • perform other duties conferred on the EPA
Powers	<ul style="list-style-type: none"> • alongside the powers conferred to the EPA under the Act, it has power to do all things necessary or convenient to perform its functions and duties and achieve its objectives • give advice to any person who has a duty or obligation under the Act

Source: *Environment Protection Act 2017 (Vic)* ss 357–359.

Amongst other things, the EPA has responsibility for monitoring, assessing and reporting on air quality in Victoria as required by NEPM AAQ. The EPA has developed a Monitoring Plan, which has been approved by the Commonwealth, state and territory environment ministers. The purpose of air quality monitoring is to 'measure and assess the impact of air pollutants on human health and the environment'.⁴⁴ The EPA undertakes three types of air quality monitoring in Victoria:

- ambient air (external air environment) quality monitoring
- short term local-issue based (campaign) monitoring
- incident air monitoring.⁴⁵

The EPA's approach to air quality monitoring is discussed in more detail in Chapter 8.

⁴⁴ Victorian Government, *Submission 113*, p. 30.

⁴⁵ *Ibid.*

The following sections examine two key issues identified with Victoria's approach to air quality regulation in Victoria: the EPA's approach to compliance and approaches to community engagement.

The Committee would like to reiterate that most of evidence received related to the environmental protection framework in place before the 2017 Act commenced in July 2021. Some of the evidence discussed below may relate to policies, systems and processes in place under the 1970 Act which may no longer be in place.

3.7.1 Compliance and enforcement

The EPA has a leading role in regulating air quality in Victoria and is responsible for ensuring that any person with obligations complies. According to its Compliance and Enforcement Policy, the EPA employed an 'escalated and responsive approach' to enforcement. Figure 3.2 below shows the wide-ranging and escalating regulatory tools the EPA can use to address non-compliance. The EPA approaches enforcement by increasing its regulatory response, and any associated penalties, if a duty holder resists, ignores, or fails to account for its own pollution and waste risk management.

Figure 3.2 Environment Protection Authority Victoria's approach to enforcement



Source: Environment Protection Authority Victoria, *Compliance and enforcement policy*, 2021, p. 7.

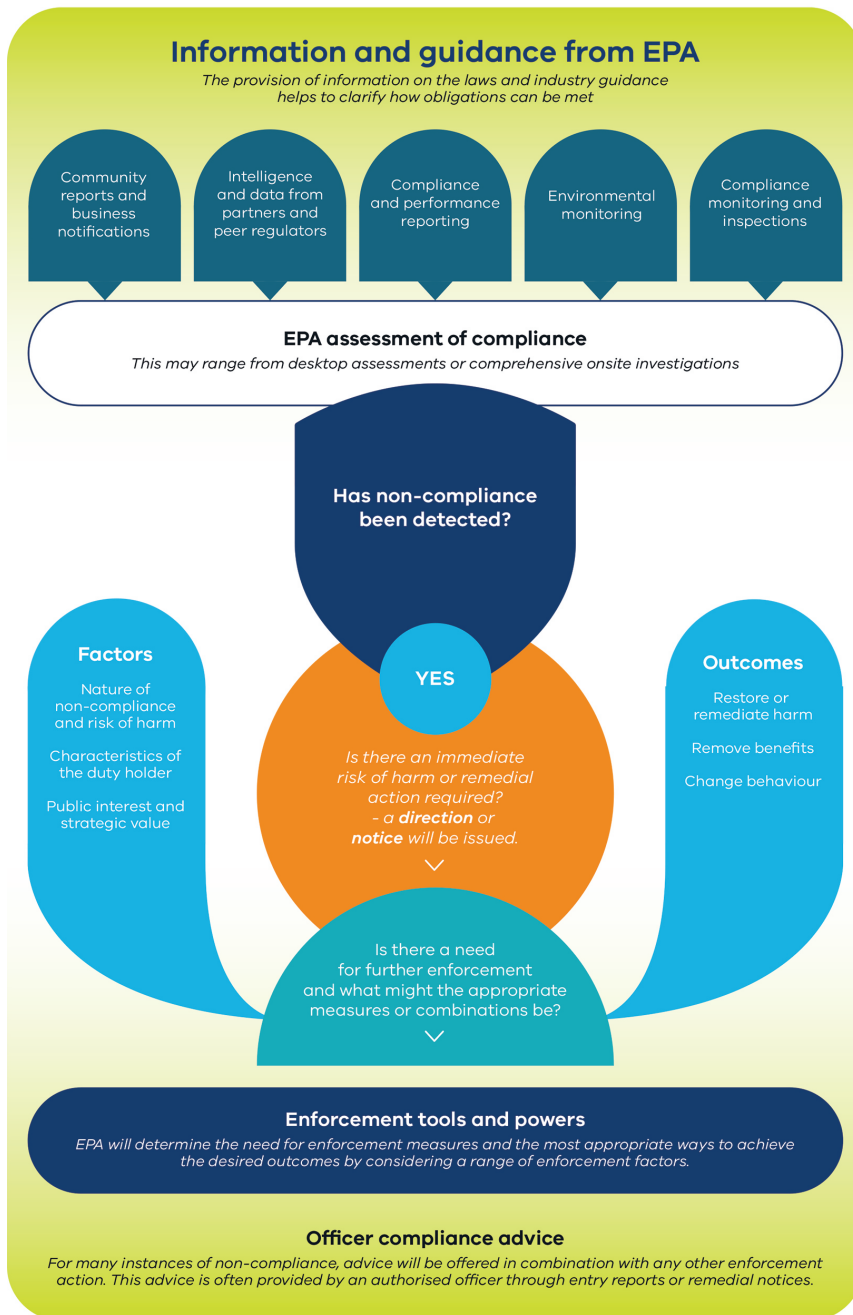
The EPA considers a range of factors to determine if and to what extent non-compliance has occurred. Relevant factors include:

- seriousness of alleged non-compliance, assessed through—
 - degree of commercial advantage
 - impact of the omission or provision of any false or misleading information
 - the extent to which existing controls fail to meet expected standards of management

- scale and extent of the risk of harm to the environment and human health
- level of public interest
- prevalence of alleged non-compliance
- attitudes, behaviour and actions of the duty holder
- any deterrent impacts from the enforcement response.

Figure 3.3 below shows the enforcement decision-making process of the EPA.

Figure 3.3 Environment Protection Authority Victoria’s enforcement decision-making process



Source: Environment Protection Authority Victoria, *Compliance and enforcement policy*, 2021, p. 9.

Numerous stakeholders to the Inquiry discussed the efficacy of the EPA's approach to enforcing actions against non-compliance. There was general concern that sanctions, and other regulatory powers, were not being used often enough or not being applied until a situation was critical. Several of these stakeholders believed that the EPA needed to more strictly control compliance measures and obligations to prevent air quality breaches from occurring, especially where they stemmed from commercial or domestic activities.

Ms Geraldine McClure, Latrobe Valley Organiser for Healthy Futures, an organisation of healthcare workers and community members advocating to reduce pollution, argued that the EPA has failed to enforce air quality standards:

There is a consistent failure of the EPA to enforce standards which would protect us ... in the recent review of the coal-fired power stations they had an opportunity to implement the same standards as the European Union enjoys in terms of emissions limits, and yet they chose not to ... The EPA have already failed, and they have failed to protect our health not just on this occasion but on many occasions. The state government needs to step up and fill that gap and mandate appropriate emissions limits and put other legislation, such as the health innovation zone, which I am sure you have heard about from other sources, in place to make sure our health is protected, because the EPA are not doing it, and it has a real impact on the lives of people who live here.⁴⁶

Ms Bronya Lipski, Lawyer at Environmental Justice Australia, believed:

the fact that the ambient air objectives are breached in certain areas is suggestive of the fact that the point sources are not being controlled as strictly as they can be, and that is absolutely the case. It is used as a benchmark for—you know, if you can get below it, that is excellent, but if you get up to it, that is okay. Actually there is no such thing as a safe exposure to air pollution ... And so it is concerning that we are not implementing those international best practice standards now, and without an EPA that is willing to do so or does not feel like it is resourced enough to be able to do so—because I always say that there are a lot of very good people in the EPA who want to ensure that the right thing is happening—there is a blockage somewhere between ensuring that Australia is consistent with international best practice and actually making it happen.⁴⁷

Furthermore, Ms Lipski contended that recent reviews of air quality objectives in Victoria have shown that the cost impacts for industry outweighs cost benefits for community health, she stated:

The current position, however, is one where the question of cost-effectiveness for protecting health is used as a caveat for reducing air pollution, but the question is cost-effective for who? One example, during the review of the ambient sulphur dioxide, oxides of nitrogen and ozone standards led by the Victorian EPA, was that the cost-effectiveness of reducing power station pollution, for example, did not outweigh the cost benefits of community health outcomes in the Latrobe Valley. This puts the

⁴⁶ Ms Geraldine McClure, Latrobe Valley Organiser, Healthy Futures, public hearing, Melbourne, 28 June 2021, *Transcript of evidence*, p. 56.

⁴⁷ *Ibid.*

Victorian EPA directly in contrast with international best practice compared to places like the United States, where the law requires the cost to the community to outweigh the cost to industry.⁴⁸

The emphasis on industry or economic outcomes in enforcing, and setting, air quality obligations was also noted in a report on *Air Pollution in Melbourne's Inner West*. The report stated:

Air quality management requirements are difficult to effectively apply through planning permits and conditions and the planning system is biased towards economic outcomes. When air quality compliance issues arise, they have historically been difficult to enforce through planning permit compliance processes, with the onus being on councils to prove that there have been breaches.⁴⁹

Ms Lipski also discussed the recent brown coal licence review in Victoria (see Box 3.4 below) as an example of how the EPA has shied away from enforcing best practice air quality standards. She told the Committee that:

The most recent example of the EPA not putting into practice best practice standards was during the Victorian brown coal licence review. You will probably hear people talk about this quite a bit because it is an example of, firstly, the glacial rate at which change can be made, because it was a process that went on for three years, and, secondly, despite knowing that the stack emissions limits for coal-fired power stations are not as strict as they could be and certainly not as strict as what they are in other jurisdictions and despite being presented with expert evidence demonstrating that the air modelling that the power stations had done and the engineering responses to this whole brown-versus-black-coal furphy was just that, they had an opportunity to implement international best practice standards into the licences of the power stations and did not do it.⁵⁰

Stakeholders' views of Victoria's air quality standards and objectives are discussed in more detail in Section 3.2.3. The brown coal licence review is discussed in more detail in Chapter 5.

The Inner West Air Quality Community Reference Group, which produced a report assessing air pollution in the Inner West, highlighted some of the issues it perceived with the EPA's current approach to enforcing air quality obligations. It noted:

- pollution issues persist despite the EPA carrying out inspections to assess compliance with licence requirements and in response to community complaints
- onus for reporting and proving pollution is often inappropriately placed on the community rather than the EPA or industry
- it often takes multiple complaints before the EPA acts.⁵¹

⁴⁸ Ibid., p. 2.

⁴⁹ Inner West Air Quality Community Reference Group, *Air Pollution in Melbourne's Inner West*, p. 70.

⁵⁰ Ms Bronya Lipski, *Transcript of evidence*, p. 6.

⁵¹ Inner West Air Quality Community Reference Group, *Air Pollution in Melbourne's Inner West*, p. 62.

The Group recommended several changes to improve the EPA's approach to enforcing compliance:

The EPA needs to be able to increase the number of its compliance inspections and general site visits and improve its responsiveness to community complaints. Current approaches and processes are demonstrably not meeting the Inner West community's expectations.

Compliance efforts need to be streamlined and made more transparent. The following are examples:

- EPA licences and local council planning permits often contain similar requirements for site management, but often neither body takes responsibility for ensuring conformity. This anomaly needs to be resolved: responsibility should be assigned to one authority only.
- EPA, council and/or WorkSafe actions to ensure that companies comply with their legal obligations are not always made known to the community.⁵²

A report commissioned by the City of Kraków (Poland) on air pollution in the region emphasised the importance of enforcing regulations so that air quality objectives are met. The report stated:

regulations and actions alone are insufficient to assure that clean air goals are met. These actions must be enforced, consistently, routinely and with imposition of penalties proportional to the seriousness or recurrences of any violations.⁵³

Permissions scheme

The EPA is responsible for implementing Victoria's permissions scheme which includes licences, permits and registrations. Its power to issue permissions to businesses is prescribed by the *Environment Protection Regulations 2021* (Vic) (previously *Environment Protection (Scheduled Premises and Exemptions) Regulations 2017* (Vic)). The EPA has established a 'permissions scheme policy' which sets out its approach to implementing the new permissions scheme created under the 2017 Act.

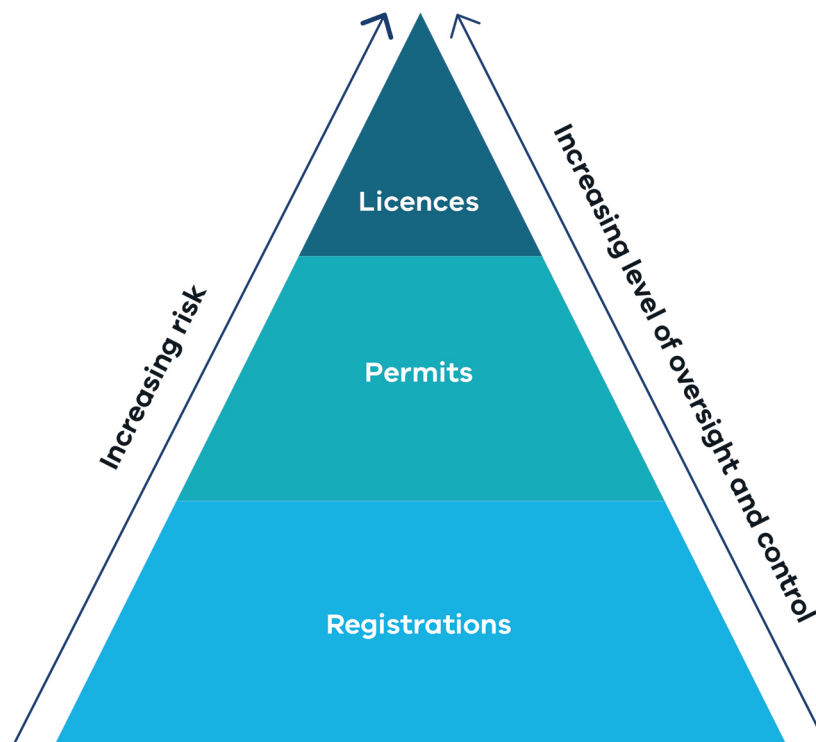
According to the EPA's permissions policy, the purpose of the policy is to:

- support the GED and waste duties by ensuring that key risks are being managed properly
- prohibit persons from engaging in specified activities without appropriate permission.

The EPA's policy sets out a tiered-approach for issuing permissions. Figure 3.4 below shows the hierarchy of the Authority's permission scheme.

⁵² Ibid.

⁵³ Regulatory Assistance Project, *Report to the City of Kraków and the Małopolska Regional Environmental Protection Department*, report for City of Kraków, 2013, p. 20. Provided in Christopher James, *Submission 67, Attachment 3*.

Figure 3.4 Tiers of the Environment Protection Authority Victoria's permissions scheme

Source: Environment Protection Authority Victoria, *Permissions scheme policy*, 2021, p. 7.

In Part B of the Victorian Government's submission, the EPA explained the tiers of its permissions framework:

The new laws introduce a new three-tiered permissions framework allowing proportionate controls to be applied based on the nature of the risks. The tiers consist of:

- Registrations, which will be automatically granted and are suited to organisations posing moderate to low risks but where standard controls can be applied across a sector.
- Permits, which will have a largely standardised assessment processes by EPA and are suited to moderate or high-risk activities with low complexity.
- Licences, to apply customised conditions to manage those complex activities that need the highest level of regulatory control to manage their significant risks to human health and the environment. Development Licences, required before an Operating Licence or Permit is received, allow EPA to influence the design of works or a facility. Operating licences will be required for certain ongoing operational activities include customised conditions to consider the site-specific risks from that activity and may contain maximum emission limits for specified pollutants.⁵⁴

It also explained what factors are considered by the EPA when assessing permission applications, which include:

⁵⁴ Victorian Government, *Submission 113*, p. 22.

- how the applicant will comply with the GED and any other relevant duties
- degree to which activities may impact environmental values identified in the ERS
- principles of environment protection
- state of knowledge of best available technology and techniques for managing risk and how they are being used in the activities
- the applicant's stakeholder engagement
- whether the person is deemed a fit and proper person.⁵⁵

Some stakeholders⁵⁶ believed that permitting requirements could be better used to facilitate compliance and lead to better environmental outcomes. This was discussed in a report on *Air emissions source permitting programs in the United States and European Union*:

Permitting requirements and procedures can be designed to facilitate compliance and enforcement by requiring enterprises to monitor operating conditions, maintain equipment within specified ranges and precision, maintain detailed records, make records available for inspectors, and regularly report data to the permitting authority. The obligations for monitoring, recordkeeping, and reporting must be sufficient to determine when the facility is and is not in compliance with all regulatory requirements and emissions limits.⁵⁷

Ms Marianne Robinson, Secretary for Voices of the Valley, a Latrobe Valley community and advocacy group formed during the Hazelwood Mine Fire in 2014, explained that 'licences specify how much pollution they can emit; they do not prohibit pollution'.⁵⁸

In its submission, Environmental Justice Australia argued that under the 2017 Act the EPA has the power to ensure that licence limits enforce health-based ambient air standards. It stated:

The EP Act 2017 and the GED provides the EPA with authority to ensure that licence limits for facilities such as coal-burning power stations are imposed to achieve health-based ambient air standards. If the EPA uses its authority, it will ensure that Victoria tracks towards achieving international best practise standards and that those standards will be enforced.⁵⁹

Other stakeholders⁶⁰ also considered that licence requirements could be used to better enforce health standards and objectives if the EPA introduced stricter conditions. Many of these stakeholders discussed this in the context of the EPA's recent brown coal

⁵⁵ Ibid.

⁵⁶ For example, see: Christopher James, *Submission 67*; Ms Marianne Robinson, Secretary, Voices of the Valley, public hearing, Melbourne, 29 June 2021, *Transcript of evidence*; Environmental Justice Australia, *Submission 110*.

⁵⁷ Christopher James, *Submission 67, Attachment 1*, p. 24.

⁵⁸ Ms Marianne Robinson, Secretary, Voices of the Valley, public hearing, Melbourne, 29 June 2021, *Transcript of evidence*, p. 46.

⁵⁹ Environmental Justice Australia, *Submission 110*, pp. 11-12.

⁶⁰ For example, see: Doctors for the Environment Australia, *Submission 68*; The Lung Health Research Centre, University of Melbourne, *Submission 100*; Environmental Justice Australia, *Submission 110*.

licence review which they felt was a missed opportunity to introduce more stringent air pollution standards. Box 3.4 below provides a summary of the brown coal licence review, it is also discussed in more detail in Chapter 5.

BOX 3.4: Brown coal licence review

In 2017, the Environment Protection Authority Victoria commenced a licence review for three brown coal power stations located in Latrobe Valley: AGL Loy Yang A, IPM Loy Yang B and Yallourn. The EPA undertakes licence reviews of brown coal power stations approximately every 5 years to ensure that licence conditions remain consistent with current environmental legislation and regulations. This was the first systemic review of the licences for the three Latrobe Valley power stations. The review was completed in March 2021.

The EPA had the authority to review the licences under s 20(9) of the *Environment Protection Act 1970* (Vic) which prescribed that the EPA can amend or add conditions to licences already issued. The EPA's review was focused on:

- determining if all three power stations were compliant with relevant State Environment Protection Policies
- monitoring, reporting and pollutant emission limits
- engaging the community on their views in relation to the specific licence conditions for the three power stations
 - including by facilitating an independently chaired community conference under s 20B of the 1970 Act to better understand community concerns and to identify potential solutions.

Some of the key outcomes of the licence review were:

- the addition of monitoring requirements for PM_{2.5}, PM₁₀ and mercury
- requirements for each power station to develop a monitoring program to establish the distribution of particles
- reduction of air discharge limits.

Source: Environment Protection Authority Victoria, *Brown coal-fired power stations licence review: public report*, 2021.

Some of the concerns related to the licence review, which are also discussed in Chapter 5, were:

- that the EPA only made 'minor changes' to license conditions which will not adequately reduce emissions and protect environmental and human health
- the outcome of the review did not result in the introduction of measures that aligned with best practice international standards

- the EPA did not impose requirements for licensees to install basic pollution controls, such as filters (this is covered in more detail in Chapter 5).⁶¹

RECOMMENDATION 4: That the Victorian Government consider a review of the scheme upon which conditional licences are issued to heavy industry and to assess the opportunity for tangible, localised air quality improvements, not only to reduce the incidences of exceedances if and when they occur, but to encourage emission reductions by industry to be lower than permitted levels requiring industry to publicly, self-report on an annual basis in addition to formal EPA monitoring. Further improvements in this area should also be designed to assist the EPA with further localised compliance and enforcement activities.

3.7.2 Community consultation

Community consultation is an important component of Victoria’s environmental framework, it allows the public to understand and provide direct input on any projects, proposals or events where there may be environmental impacts. Both the 2017 and 1970 Acts prescribe ‘accountability’ as one of the principles of environmental protection, which affirms that members of the public should:

- have access to reliable and relevant information to facilitate their understanding of—
 - any issues of harm or risk to human health or the environment
 - how decisions are made under the environment protection Act
- be engaged and given opportunities to participate in decisions
- have their interests considered in decisions.⁶²

The EPA undertakes a variety of community consultation or engagement activities as part of its educative and consultative function. Under s 53 of the 2017 Act, the EPA is required to develop a Charter of Consultation (see Box 3.5 below).⁶³ The Charter sets out the EPA’s consultation commitments and approach for:

- developing legislative standards
- permissions applications assessment.⁶⁴

⁶¹ For example, see: Doctors for the Environment Australia, *Submission 68*; The Lung Health Research Centre, University of Melbourne, *Submission 100*.

⁶² *Environment Protection Act 2017* (Vic) s 22; *Environment Protection Act 1970* (Vic) s 1L.

⁶³ *Environment Protection Act 2017* (Vic) s 53.

⁶⁴ Environment Protection Authority Victoria, *Charter of Consultation*, 2021.

BOX 3.5: Charter of Consultation

The Charter of Consultation outlines the Environment Protection Authority (EPA) Victoria's commitment to consultation prescribed under s 53 of the *Environment Protection Act 2017* (Vic). It outlines two key areas of the EPA's activities which would benefit from consultation and how the EPA may undertake consultation.

The key activities addressed in the Charter are permissions applications assessment and developing legislative standards.

The EPA's consultation approach for **permissions applications assessment** involves community input to determine whether applications meet the relevant environmental standards and assessment criteria.

The consultation approach for **developing legislative standards** involves seeking community input to set appropriate standards.

Some of the activities the EPA undertakes for as part of its consultation strategy includes:

- public notification
- permissions applications profile assessments
- information sessions
- conference of interested persons
- advisory panels.

Source: Environment Protection Authority Victoria, *Charter of Consultation*, 2021.

Prior to the implementation of the 2017 Act, community consultation and engagement were already core elements of the EPA's activities. Stakeholders to the Inquiry discussed the approach that has been taken historically by the EPA and other relevant agencies, including local council and project components, towards consultation. The Committee notes that the evidence it received related to the environmental protection framework in place prior to July 2021. Therefore, it cannot comment on the efficacy or performance of the EPA's consultation approach following the commencement of the 2017 Act or the Charter of Consultation.

Majority of stakeholders who raised the issue of public engagement around air quality issues believed that consultation activities were only treated as a regulatory formality. There was a perception that the concerns and recommendations of communities were not adequately considered in decisions around air quality standards or specific project proposals.

It is important that community concerns, particularly around health issues, are appropriately considered by relevant authorities or agencies in its decision-making process. Some stakeholders believed that community concerns were not given equal weight and community members often felt disregarded in the outcomes following consultation. This was discussed by Healthy Futures in its submission, which stated:

We reviewed the submissions made to EPA Victoria as part of the community consultation process around Chunxing's application for a works approval. There seemed to be about 130 submissions, out of which about four were in favour of the proposal, while the majority opposed it. Despite Chunxing's health assessment which predicted no significant health impacts from the project, many community members remain deeply concerned about possible health impacts, based in part on reports of a similar facility in California polluting surrounding areas even after the installation of wet electrostatic precipitators. The ongoing protests against the facility demonstrate continuing local community opposition to the project as it is currently proposed. When substantial community sentiments about potential health issues are expressed in this way they should be respected and appropriately addressed rather than overruled.⁶⁵

Ms Colleen Hartland, Chair of the Anti-Toxic Waste Alliance discussed the community engagement undertaken following the start of the 2019 Barro landfill fire in Kealba:

Only in November last year—a year after the fire started—a community engagement program has begun. I have actually listened in to a recording of the last meeting of the community reference group, and there were nice words from the EPA and the company, but no action. And that is clearly a real problem for the residents. The residents feel these meetings are being run by Barro and are a joint act between the EPA and the company with both parties heavily supporting each other but not the community. The residents tell me that the EPA would dispute this and they are told by the EPA they are taking matters seriously, but this has not been proven in action.⁶⁶

When asked about recent engagement with the community, Ms Hartland did not believe it had improved. She stated:

I have not found any improvement. I am still getting nice words—'We'll do it', 'We want to do it', 'We're really concerned', 'We're listening to you'—but I do not see any action, and that is the problem. Then, repeatedly, processes and projects that are approved that should not be approved just add to that burden. So I do not think the relationship with the EPA has improved, and that is one of the things that the EPA really has to do. Their engagement process is not good. You cannot keep giving people nice words and not actually be doing anything about it.⁶⁷

At a public hearing, Mr Steven Piasente, Chief Executive Officer at Latrobe City Council explained to the Committee the approach taken by the Council to community engagement. He contended that the EPA could take a similar approach where initial

⁶⁵ Healthy Futures, *Submission 70*, pp. 2–3.

⁶⁶ Ms Colleen Hartland, Chair, Anti-Toxic Waste Alliance, public hearing, Melbourne, 29 June 2021, *Transcript of evidence*, p. 66.

⁶⁷ *Ibid.*, p. 67.

public engagement is focused on education so that people understand potential air quality issues, he stated:

the approach we take is to educate the community first, negotiate for the right outcome, and then enforcement is obviously something that we have to do. I suppose that approach you do not apply to everything—you cannot educate and negotiate with somebody who is parked illegally in a parking space—but you can in a whole range of other areas in terms of compliance. From my perspective, in terms of being in local government—and traditionally that is where the EPA have been—I suppose where I would like to see them is more in that space. So initially helping with education of the community, understanding the standards, having modern and up-to-date standards, which we have touched on there in our submission, as well as real-time monitoring I think would help in terms of the community's understanding of what it is, the challenge that the EPA face, in terms of having to deal with particularly in this instance air quality, as an example.⁶⁸

Mr Piasente believed that projects are more likely to get community support where a high-level of community engagement has been sought about the proposal.⁶⁹ He recommended that community engagement guidelines could be improved:

there might be some better guidelines about some standards or an approach to how you would actually best engage with the community around those proposals. You need to meet minimum requirements to lodge a planning application, but that is really the technical aspect. It is not actually helping the community, from my perspective, fully understand what the proposal is and what the standards might be and engaging with them around that. You often get applications from technical experts. They might know their field and they might know their application, but they are not necessarily experts in that community engagement, helping the community to understand their proposal.⁷⁰

The Lung Health Research Centre (University of Melbourne) recommended that:

Rather than designing a project and then justifying it in its current format to the community, consultation should be front loaded with every consideration on the board from the start and include a team whose express focus is not on how the assessments can be arranged so the air pollutants fall under 'acceptable levels of risk' but rather on whether every possible mitigation strategy was being considered and how the project could be made as healthy as possible.⁷¹

Advocating for the Latrobe Valley (ALiVe) believed that community liaison and establishing social licence should be embedded into all planning and environmental licence decisions.⁷² In its view, this would 'ensure that community sentiment is heard in all planning processes and decisions'.⁷³ A social licence, sometimes referred to as

⁶⁸ Mr Steven Piasente, Chief Executive Officer, Latrobe City Council, public hearing, Melbourne, 28 June 2021, *Transcript of evidence*, pp. 4–5.

⁶⁹ *Ibid.*, p. 9.

⁷⁰ *Ibid.*, pp. 9–10.

⁷¹ The Lung Health Research Centre (University of Melbourne), *Submission 100*, p. 25.

⁷² Advocating for the Latrobe Valley (ALiVe), *Submission 105*, pp. 16–17.

⁷³ *Ibid.*, p. 16.

a 'social licence to operate', refers to the level of approval or acceptance granted to an organisation's activities by its employees, stakeholders and the general public; especially host communities directly impacted by said activities.⁷⁴

FINDING 2: The Environment Protection Authority and the Victorian Government are perceived to have not consulted adequately with communities impacted by air pollution. When consultation has occurred, the community have not been satisfied that their feedback has been considered and adopted meaningfully.

RECOMMENDATION 5: That the Victorian Government, the Environment Protection Authority and all relevant regulatory agencies undertake meaningful, participatory consultation with affected communities for all future significant projects and activities that impact the air quality of communities.

⁷⁴ Parliament of Victoria, Legislative Council Environment and Planning Committee, *Inquiry into Nuclear Prohibition*, November 2020, p. 181.

PART TWO

4 Inner West

4.1 Introduction

Inner West communities of Melbourne have been exposed to high levels of air pollution, including particulate matter, dust and odour. Sources of air pollution in the Inner West community are a mix of industrial, transport and other sources. The Inner West has also experienced hazardous air pollution from significant events, such as industrial fires.

The Inner West has historically performed poorly in air quality rankings, containing two air pollution hotspots—Yarraville and Brooklyn.¹ The poor air quality in the inner west of Melbourne has been a problem for decades as the industrial facilities are long-standing and there have always been people living around them. For these populations, the air quality has been an on-going issue. The issue is being exacerbated because many of the inner western suburbs are now being developed as prime residential areas and more people are seeking to move there. This is increasing the population density and is making even more stark the need to address the problems of industrial and traffic-related air pollution.

As well as being an important industrial area for the State, the Inner West is also a residential area with a rapidly growing population. Residents are often located near transport or industrial emissions, exposing them to air pollution. Furthermore, urban infill has meant that Inner West residential areas are becoming closer to industrial zones and transport corridors.²

As a consequence of being close to sources of industrial and transportation pollution, residents are exposed to the health risks associated with air pollution. The health impacts of air pollution are discussed further in Chapter 2.

In May 2021, the Victorian Government announced that had invested \$5 million to build green canopies using 500,000 trees in Melbourne's western suburbs. The purpose of these green canopies is to create cooler spaces for residents of the West across six councils. These spaces will provide more shade and assist with:

- driving down air pollution and improving air quality

1 Inner West Air Quality Community Reference Group, *Air Pollution in Melbourne's Inner West: taking direct action to reduce our community's exposure*, 2020, pp. 2-3.

2 Inner West Air Quality Community Reference Group, *Submission 14, Attachment 1*, p. 5.

- reduce the urban heat island effect which leads to higher temperatures and low air quality.³

The Government indicated that the development of the canopies will involve consultations with experts to ensure that ‘the right trees, ranging from saplings to more mature trees, are being planted in the right spots’.⁴

RECOMMENDATION 6: The Committee notes the Victorian Government initiative of planting 500,000 trees in Melbourne’s west and recommends half yearly progress updates be provided to the community for the next 3 years. Tree planting should include local species indigenous and appropriate to local areas. Local First Nations People to be included in the development of any expansion of this policy initiative.

4.2 Air pollutant sources in the Inner West

The key sources of air pollution in the Inner West come from industrial and transportation sources. The Inner West is a major industrial area for Victoria, including:

- industrial sites and associated transport hubs
- funnel routes for vehicles, creating access points through the Inner West, the CBD, Port of Melbourne, and the eastern, northern and southern suburbs
 - traffic in the area includes many trucks.⁵

Other sources of pollution in the Inner West include:

- unsealed land and roads, which can create dust pollution
- industrial and waste stockpiles, which are a risk of causing an industrial fire and releasing harmful emissions into the air.

The following sections consider some key sources of air pollution in the Inner West in recent years:

- the Brooklyn Industrial Precinct
- the West Gate tunnel project
- the 2018 West Footscray industrial fire.

³ Premier of Victoria, *500,000 Trees for a Cooler Greener West*, Media Release, 13 May 2021, <<https://www.premier.vic.gov.au/500000-trees-cooler-greener-west>> accessed 4 October 2021.

⁴ Ibid.

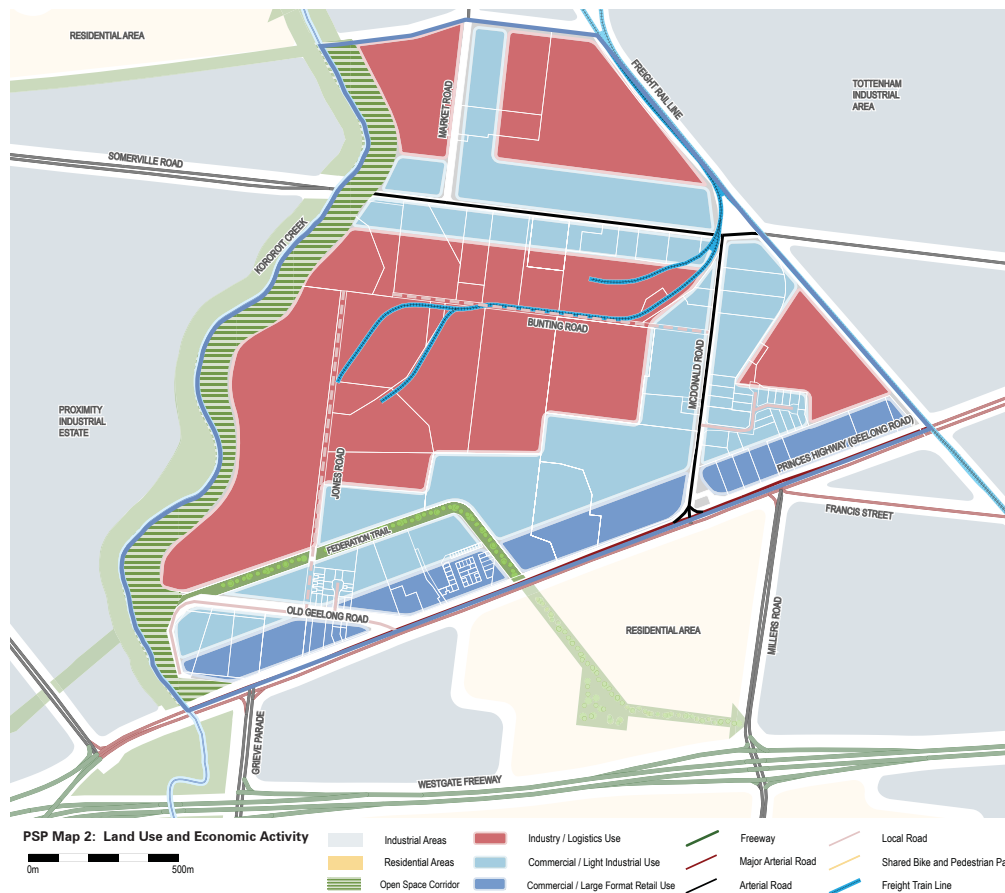
⁵ Inner West Air Quality Community Reference Group, *Submission 14, Attachment 1*, p. 5.

4.3 Brooklyn Industrial Precinct

The Brooklyn Industrial Precinct, in Melbourne's west, is an example of an ongoing air quality issue in Victoria. The Environment Protection Authority Victoria (EPA) has been monitoring odour and particulate matter (including dust) pollution in the area since 2008 because of the numerous industrial sites in the area which regularly produce emissions or pollutants.⁶ According to the Commissioner for Environmental Sustainability, Brooklyn 'continues to be the location in Victoria where EPA most frequently records poor air quality'.⁷

The precinct contains more than 60 industries including landfill, waste, recycling sites, abattoirs, and tallow producers. According to its website, the EPA receives numerous complaints about odours and the presence of small airborne particulate matter.⁸ Figure 4.1 below is a map of the Brooklyn Industrial Precinct.

Figure 4.1 Brooklyn Industrial Precinct



Source: Meinhardt Infrastructure and Environment, *Brooklyn Industrial Precinct: Structure Plan and Urban Design Framework*, report for Brimbank City Council, 2016, p. 20.

⁶ Environment Protection Authority Victoria, *Brooklyn Industrial Precinct: environmental monitoring and protecting your health*, 2020, <<https://www.epa.vic.gov.au/for-community/current-projects-issues/preventing-pollution-brooklyn/brooklyn-and-health>> accessed 12 July 2021.

⁷ Commissioner for Environmental Sustainability, *Submission 28*, p. 7.

⁸ Ibid.

Part B of the Victorian Government's submission was provided by the EPA who explained some of the actions it has undertaken to address air pollution in the Brooklyn Industrial Precinct:

- monitoring PM₁₀ and odour pollution in the area
- sealing roads which were major sources of particulate matter, such as Jones Road and Bunting Road
- use of air quality forecasting to predict high-risk days for odour and dust in Brooklyn; when a high-risk day has been identified, the Authority
 - issues warnings to schools and businesses
 - requires businesses to undertake dust suppression measures
 - rapidly deploys officers to respond to pollution reports
- employed an Officer for the Protection of Local Environment who covers the Brimbank and Hobson Bay catchment who is responsible for identifying and responding to dust and odour reports
- supports the Brooklyn Community Representative Group, which discusses environmental issues related to the Brooklyn community.⁹

In its submission, the Inner West Air Quality Community Reference Group provided a copy of its summary report into *Air Pollution in Melbourne's Inner West*. The report stated that air pollution is common in the Brooklyn Industrial Precinct and Altona North area, explaining that:

In 2018–19 there were 22 days when dust levels in Brooklyn exceeded Victorian air quality objectives. In 2019, EPA and West Gate Tunnel project monitoring stations near Brooklyn showed exceedances of PM₁₀ objectives for between 26 and 41 days. This has been a long-term problem: for example, the standard was exceeded 40 times in 2009–10.

As well as being a pollutant that has health impacts, dust has major deleterious impacts on amenity; for example, cement dust from rock-crushing plants can clog guttering and cause structural damage to homes and vehicles.

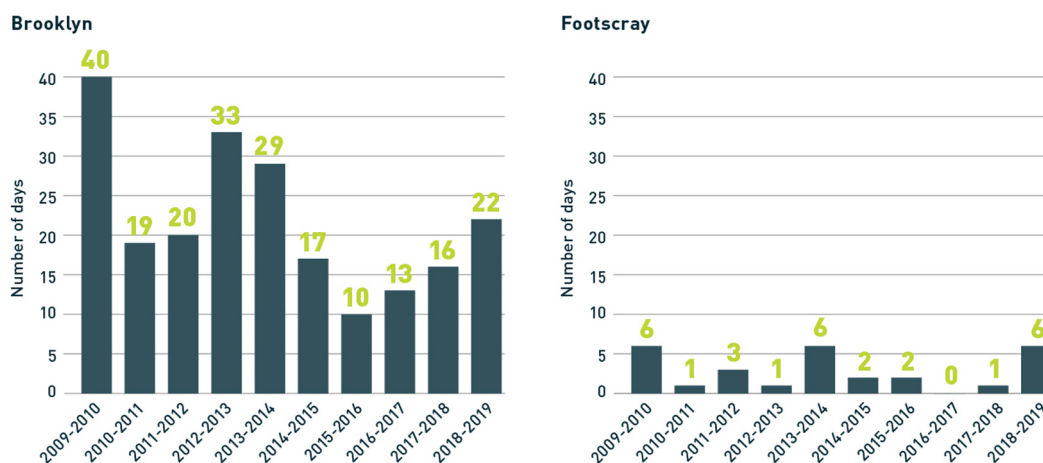
Industrial sites can also cause odour problems, which have serious impacts on community amenity. Residents of Brooklyn, Altona North, Yarraville and South Kingsville are severely affected by odour from the Brooklyn Industrial Precinct. Constant exposure affects people's health, wellbeing and lifestyle, restricting outdoor activity and generally creating an unpleasant environment.¹⁰

⁹ Victorian Government, *Submission 113*, pp. 24–25.

¹⁰ Inner West Air Quality Community Reference Group, *Submission 14, Attachment 1*, pp. 8–9.

Figure 4.2 below shows PM₁₀ air quality standard exceedances from 2009–10 to 2018–19 for Brooklyn and Footscray.

Figure 4.2 PM₁₀ air quality standard exceedances, Brooklyn versus Footscray, 2009–10 to 2018–19



Source: Environment Protection Authority, *Brooklyn Community Reference Group Community Forum May 2019*, 2019, <http://www.brooklynip.com.au/wp-content/uploads/2019/07/Att1_BCRG-May-2019-EPA-Update-Daniel-Hunt.pdf> cited in Inner West Air Quality Community Reference Group, *Air Pollution in Melbourne's Inner West: taking direct action to reduce our community's exposure*, 2020, p. 62.

Sites adjacent to the Brooklyn Industrial Precinct have also recorded air pollution levels exceeding current objectives. In 2019, adjacent sites to the Precinct recorded PM₁₀ levels 26–49% above the current standard. The full report into *Air Pollution in Melbourne's Inner West* referenced several instances where sites adjacent to the Precinct exceeded objectives:

There were between seven and 41 days during 2019 on which concentrations exceeded the daily objective of 50 µg/m³ at every Inner West monitoring station. Instances of objectives being exceeded at sites adjacent to the Brooklyn Industrial Precinct were particularly numerous:

- 30 exceedances at the EPA's Brooklyn station
- 26 exceedances at the WGTP's¹¹ Millers Road station
- 41 exceedances at the WGTP's Primula Avenue station.¹²

The report noted that the number of industrial sites within the Precinct has 'often made it difficult for the EPA to pinpoint precise air pollution sources. Instances of exceeding licence conditions appear common: the EPA receives multiple reports every year about pollution emanating from the precinct.'¹³

¹¹ West Gate Tunnel Project

¹² Inner West Air Quality Community Reference Group, *Air Pollution in Melbourne's Inner West*, p. 19.

¹³ *Ibid.*, p. 55.

The issue of PM₁₀ emissions in the Brooklyn Industrial Precinct was also discussed by the Victorian Auditor-General in its report on *Improving Victoria's Air Quality* (2018). The report stated that the EPA advised the Auditor-General that up to 10 operators in the Precinct 'continue to be sources of inappropriate air emissions and noxious odours'. It acknowledged that some improvements had been made in the area but there were still poor air quality ratings with numerous PM₁₀ emission exceedances.¹⁴

The EPA acknowledged that, 'Air quality in the area doesn't meet Australia's national air quality standards. The levels of PM₁₀ ... regularly exceeds the standard'.¹⁵

In its submission, the Commissioner for Environmental Sustainability advocated for the development of real-time mitigation strategies for managing areas with high air pollution levels such as Brooklyn. It contended that effective mitigation strategies should combine real-time management of air pollution issues with a considered analysis of the contributing factors to pollution. The submission noted that, where it has been deployed, strategies blending real-time response and detailed analysis, have been successful, particularly in the Brooklyn Industrial Precinct:

EPA Victoria developed a tool to forecast poor air quality in Brooklyn and worked with local industry, councils, schools and the community to communicate those forecasts and arrange for preventative activities to be carried out to mitigate air pollution during high-risk periods. This technique improved the local air quality and led to infrastructure improvements (that is, sealing two unsealed roads within the industrial precinct that were contributing to the dust concentrations measured in neighbouring residential areas).¹⁶

However, the Commissioner noted that dust pollution is an ongoing concern.¹⁷

Carmen Largaiolli, a submitter to the Inquiry, believed that despite community advocacy there has been little progress in addressing air pollution in Brooklyn, particularly around the accountability of industries contributing to the pollution. She also expressed concern that the West Gate tunnel project has exacerbated air pollution in the area, 'adding further to health concerns involving PM_{2.5} and PM₁₀ pollution'.¹⁸

FINDING 3: The Committee has concerns about the ongoing exposure of local residents in and around the Brooklyn Industrial Precinct due to poor air quality and the detrimental health impacts that this may cause for sensitive populations and the broader community more generally.

¹⁴ Victorian Auditor-General's Office, *Improving Victoria's Air Quality*, Independent assurance report to Parliament, 2018, p. 15.

¹⁵ Environment Protection Authority Victoria, *Brooklyn Industrial Precinct: environmental monitoring and protecting your health*.

¹⁶ Commissioner for Environmental Sustainability, *Submission 28*, p. 7.

¹⁷ Ibid.

¹⁸ Carmen Largaiolli, *Submission 53*, p. 1.

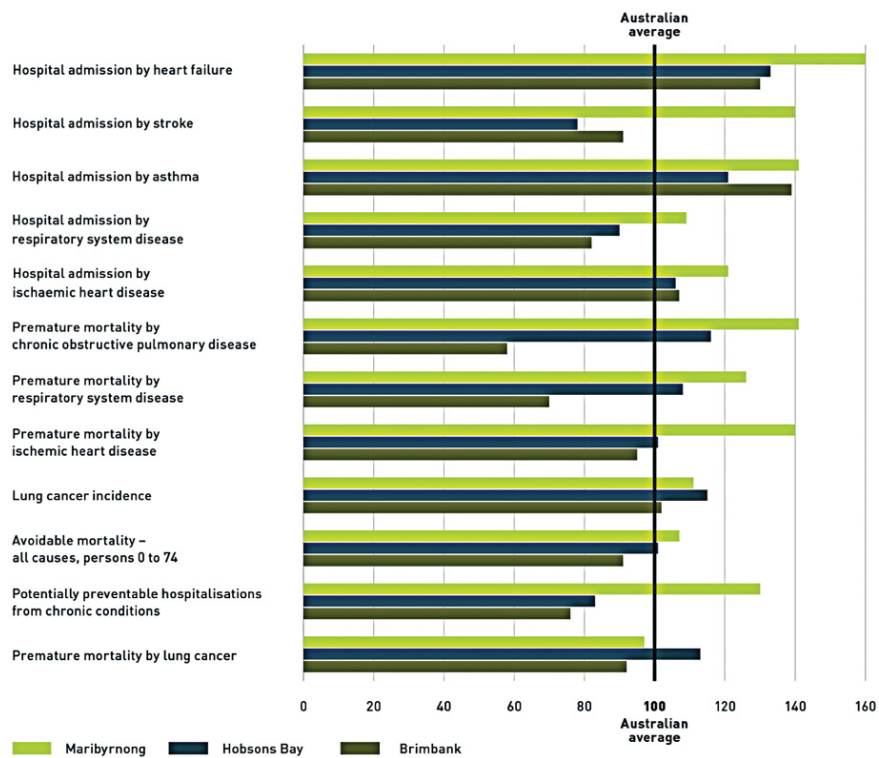
Industrial and transportation sources have contributed to air quality exceedances in relation to levels of:

- PM₁₀
- odour
- dust.

These pollution sources are associated with a number of health issues.

Figure 4.3 below shows health outcomes for residents of the Inner West against the Australian average. This graph was provided to the Committee at public hearings from the Inner West Air Quality Community Reference Group and the Maribyrnong Truck Action Group. The Inner West Air Quality Community Reference Group believed that these health outcomes cannot be explained by factors such as age, smoking or other socio-economic factors. Instead, it suggested that these poorer health outcomes were a consequence of residents being at greater risk due to air pollution exposure.¹⁹

Figure 4.3 Health outcomes for residents of the Inner West versus Australian average



Source: Torrens University Australia, *Social Atlas of Australia: Victoria Local Government Areas (2016 ASGS)*, 2020, <<http://phidu.torrens.edu.au/current/maps/sha-aust/lga-single-map/vic/atlas.html>>. Provided by Inner West Air Quality Community Reference Group and Maribyrnong Truck Action Group.

19 Ms Patsy Toop OAM, Inner West Air Quality Community Reference Group, public hearing, Melbourne, 29 June 2021, *Transcript of evidence*, p. 33.

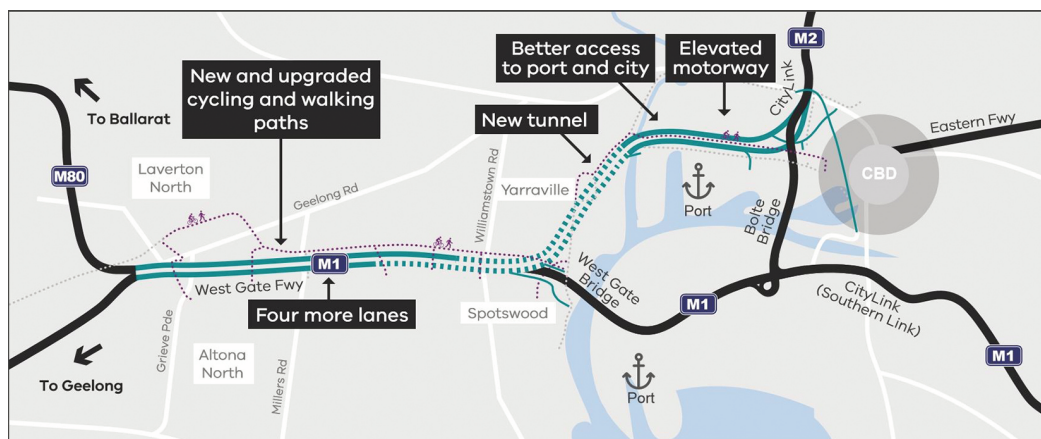
4.4 West Gate tunnel project

The West Gate tunnel project commenced major construction in January 2018. The project involves building:

- 4 additional lanes on the West Gate Freeway
- twin tunnels under Yarraville
- a new bridge over the Maribyrnong River linking to an elevated road above Footscray Road.²⁰

The purpose of the project is to improve travel in Melbourne's West by providing an alternative route to the West Gate Bridge. Upon completion of the tunnel, the Victorian Government will also implement 24-hour truck bans on local streets around the inner west to improve road safety, air quality and reduce noise pollution. According to the Victorian Government's Big Build website, construction is due to be completed by 2023.²¹ Figure 4.4 below shows a map of the West Gate tunnel project.

Figure 4.4 West Gate tunnel project map



Source: Victoria's Big Build, *West Gate tunnel project*, <<https://bigbuild.vic.gov.au/projects/west-gate-tunnel-project/about/explore-the-project/overview>> accessed 21 September 2021.

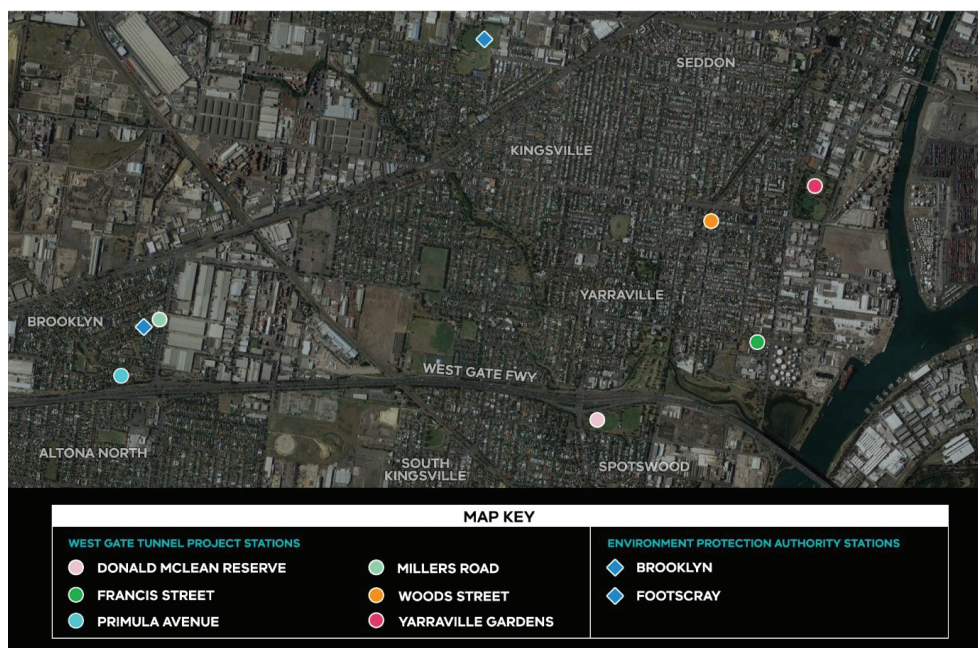
The EPA established six air monitoring stations for the project which record air quality data on the site and in surrounding areas. It also uses air quality data from existing monitoring stations located at Brooklyn and Footscray. Air quality monitoring will continue for at least 5 years following the tunnel's opening to ensure there is an ongoing assessment of any changes to air quality in the local area associated with the project.

Figure 4.5 below shows the location of all air quality monitoring stations used to capture air pollution data from the tunnel project.

²⁰ Victoria's Big Build, *West Gate Tunnel Project: Overview*, <<https://bigbuild.vic.gov.au/projects/west-gate-tunnel-project/about/explore-the-project/overview>> accessed 21 September 2021.

²¹ Ibid.

Figure 4.5 Air quality monitoring stations for the West Gate tunnel project



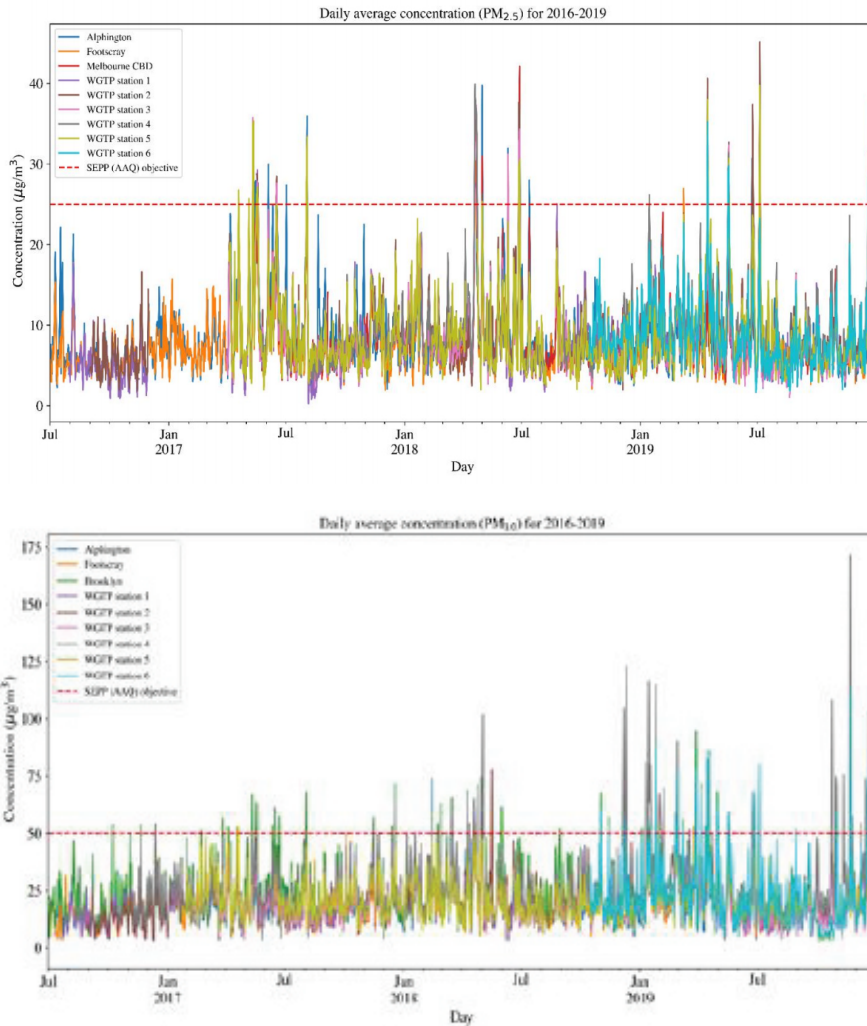
Source: West Gate Tunnel Project, *Tunnel ventilation and air quality*, <<https://bigbuild.vic.gov.au/projects/west-gate-tunnel-project/construction/tunnel-ventilation-and-air-quality/air-quality-monitoring-reports>> accessed 21 September 2021.

At the time of writing, the most recent Ambient Air Quality report for the West Gate tunnel project was published in April 2021. The report found that there no exceedances at any of the stations for any of the pollutants measured.²²

The EPA provided an *Analysis of West Gate tunnel project air monitoring data* to the Inner West Air Quality Community Reference Group which assessed the project's air pollution impacts. The project's monitoring stations have recorded numerous occasions where of daily average particulate matter concentrations have exceeded air quality objectives. Figure 4.6 shows the daily average concentrations for PM_{2.5} and PM₁₀ from July 2016 to December 2019 and where those exceedances have occurred over that three and a half year period.

²² Golder, *Ambient Air Quality Monitoring (AAQM) Report: West Gate tunnel project*, report for CPB JH Joint Venture, 2021.

Figure 4.6 Daily average particulate matter concentrations, PM_{2.5} and PM₁₀, July 2016 to December 2019



Source: Environment Protection Authority Victoria, *Analysis of West Gate Tunnel Project air monitoring data*, report for Inner West Air Quality Community Reference Group, 2020, pp. 4, 6.

A report into *Air Pollution in Melbourne’s Inner West* described some of the air pollution impacts of the project, ‘construction is causing unacceptable impacts from airborne dust, construction vehicles and machinery’.²³

The report which was conducted by the Inner West Air Quality Community Reference Group discussed the findings from West Gate tunnel air monitoring data, noting:

- there are very high emissions for both fine (PM_{2.5}) and coarse (PM₁₀) particulate matter in the Inner West
- in 2017 and 2019, annual average concentrations for PM_{2.5} and PM₁₀ exceeded Victorian objectives at most Inner West monitoring stations

²³ Inner West Air Quality Community Reference Group, *Air Pollution in Melbourne’s Inner West*, p. 2.

- excessive air pollution likely resulted from road emissions, such as vehicle exhausts, vehicle non-exhaust emissions (such as raised dust) and raised dust from industrial and commercial activities
- air monitoring cannot point the exact causes of air pollution exceedances; however, the data suggests the West Gate construction activity is a key contributor to dust pollution
- air pollution levels in 2019 across the West Gate tunnel air monitoring sites were ‘generally higher’ than background sites because of ‘proximity to local air pollution sources’.²⁴

The Inner West Air Quality Community Reference Group also discussed the impacts of construction on air pollution in its report, it found that:

- there were elevated dust levels from excavation and above-ground works²⁵
- construction activity has potentially contributed to ‘extremely high levels’ of PM₁₀ at Primula Avenue in Brooklyn
- most pollution is generated from on-site machinery and other construction equipment and vehicles; additional vehicle exhaust emissions are generated due to vehicles sitting idle in heavy traffic (which has increased since the commencement of the project).²⁶

A few stakeholders criticised the project’s assessment processes and the way the Environment Protection Authority Victoria has handled the project’s pollution concerns.

Ms Clare Walter from The Lung Health Centre (University of Melbourne) expressed concern that the risk assessment process for the West Gate tunnel project did not include a risk assessment for child respiratory health. She stated that this was ‘despite that area having a highest-rate incidence of hospital admissions for children and asthma, well above the national average and certainly the highest in Victoria’.²⁷

In 2015–2016, Cochrane Research Solutions, a Melbourne-based research consultancy business, was commissioned to develop a community consultancy report for the Western Distributor proposal (which includes the West Gate tunnel project). The consultancy report engaged the views of residents, community groups, council and other stakeholders impacted by projects associated with the Western Distributor proposal. Consultations occurred over two phases and sought input on the proposal design update (Phase 1, part 2) and concept design (Phase 2).

²⁴ Ibid., pp. 18–20.

²⁵ Per- and polyfluoroalkyl substances. Refers to a group of manmade chemicals that could found in food packaging, household products, workplaces, drinking water and other living organisms.

²⁶ Inner West Air Quality Community Reference Group, *Air Pollution in Melbourne’s Inner West*, p. 44.

²⁷ Ms Clare Walter, Honorary Research Fellow and PhD Candidate, The Lung Health Centre, The University of Melbourne, public hearing, Melbourne, 28 June 2021, *Transcript of evidence*, p. 44.

The impact on air quality was the most frequently raised topic in participant feedback on the updated proposal design, with 14.6% (178 references) of comments referencing 'concerns about air quality and noise impacts'. Table 4.1 below shows the percentage of participant comments for the most frequently discussed topics in feedback on the proposal design update.

Table 4.1 Most frequent topics in feedback on the Proposal Design Update, Western Distributor: Community consultation report, 2016

Topic	Participant comments (%)
Concerns about air quality and noise impacts	14.6
Concerns about impacts on open space	12.1
Tunnel and portal location	6.7
Suggestions or requests for design alternatives	6.7
Concerns about proximity of roads to home and facilities	6.6
Concerns that the updated design will not achieve the project objectives	6.3
Concerns about the updated design in comparison to previous designs	5.6
Concerns about traffic congestion and impacts	5.4
Concerns about health and amenity impacts	4.1
Concerns about the elevated structures and potential visual impacts	3.7

Note: Table produced by Legislative Council Environment and Planning Committee. Based on information provided in Dr Robyn Cochrane, Western Distributor: Community consultation report: Independent analysis, interpretation and reporting of findings, Cochrane Research Solutions, 2016, p. 13.

According to the report, concerns about air quality were primarily related to the impacts of pollution/emissions (31%), participants recurrently expressed concern about:

- existing air quality in the area
- air quality near the tunnel portals
- the tunnels ventilation structures technology.

Table 4.2 below shows the categories and themes related to air quality that were important to participants, broken down by concern, improvement idea or comment/query.

Table 4.2 Feedback themes—air quality, Western Distributor: Community consultation report, 2016

Categories and themes	Total
Concern	34 (46%)
Pollution/ emissions	23
Ventilation system and structure	6
Impact assessment approach	5
Improvement idea	35 (47%)
Assessment approach and information	15
Consultation and design development	12
Truck restrictions	8
Comment/query	6 (7%)
Total	75

Note: Dr Robyn Cochrane, Western Distributor: Community consultation report: Independent analysis, interpretation and reporting of findings, Cochrane Research Solutions, 2016, p. 57.

The Committee also heard concerns from stakeholders about potential air pollution impacts once the tunnel was completed, primarily around pollutants generated from trucks and motor vehicles. Mr Martin Wurt, President of the Maribyrnong Truck Action Group advocated for the construction of vent stacks to filter pollution from the trucks and motor vehicles using the tunnel. He explained some of the advocacy and scoping his organisation had undertaken to determine the viability of installing vent stacks in the West Gate tunnel:

Our suspicion was that—I mean, our hope was—if we got filtration on those vent stacks, it would have set the precedent for any other road projects going forward. MTAG even went to the lengths of contacting the pre-eminent filtration company in the world, which is in Austria. We were having communications with the CEO, and he said for a small amount of money he would be able to put filtration on those vent stacks and remove up to 90 per cent of the harmful pollution coming out of them. So we feel like it is a real lost opportunity.²⁸

Mr Wurt noted that the tunnel has been constructed so that vent stacks could be retrofitted on down the track but believed that ‘when you try and retrofit something it is never as good as actually putting it in the beginning.’²⁹

This issue was also raised in the Inner West Air Quality Community Reference Group’s report into *Air Pollution in Melbourne’s Inner West*. The report argued that the West Gate tunnel would exacerbate problems with vehicle emissions in the area because the current design:

²⁸ Mr Martin Wurt, President, Maribyrnong Truck Action Group, public hearing, Melbourne, 29 June 2021, *Transcript of evidence*, p. 38.

²⁹ Ibid.

does not incorporate air pollutant filtration, will lead to increased emissions in the Inner West airshed ... When the tunnel is operational, traffic and air pollution impacts will become worse along nearby 'feeder' routes such as Millers Road and Williamstown Road.³⁰

Both Maribyrnong Truck Action Group and the Inner West Air Quality Community Reference Group expressed disappointment that the Victorian Government decided not to include vent stacks as part of the tunnel's initial construction, despite recommendations from advisory bodies and other experts. In its submission, Maribyrnong Truck Action Group stated:

The Inquiry and Advisory Committee agreed with MTAG and the experts, recommending filtration for the West Gate Tunnel Project. It was extremely disappointing that the Government didn't accept this recommendation, stating that filtration "will do little to improve local air quality".

What this argument fails to take into account is the nature and composition of what is coming out of the ventilation stacks. The ventilation emissions would be almost entirely made up of vehicle emissions and therefore far more toxic than the equivalent amount of background particulate matter. Background particulate matter is primarily made up of dust and salt spray, not carcinogenic particulates from combustion engines. Removing this ventilated particulate matter from the airshed means removing the pollution that is most harmful to human health.³¹

Box 4.1 below summarises the West Gate tunnel's proposed ventilation system.

BOX 4.1: West Gate tunnel ventilation system

The West Gate tunnel's ventilation system will include two ventilation structures (refer to Figure 4.8 below):

- above the northern tunnel portal (near Maribyrnong River)
- above the southern tunnel portal (near the West Gate Freeway).

According to the project's website, the ventilation system will work by:

- drawing fresh air from tunnel entry, which will be pushed through the tunnel using vehicle movement and jet fans
- before tunnel exit, air is pushed out of the tunnel through a ventilation structure.

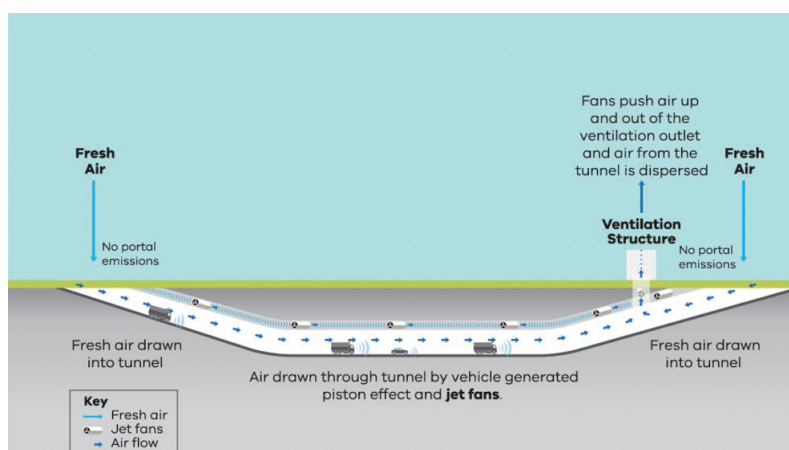
The project website stated that there will be 'no emissions from the tunnel portals where vehicles enter and exit'.

Source: West Gate Tunnel Project, *Tunnel ventilation and air quality*, <<https://westgatetunnelproject.vic.gov.au/about/keytopics/tunnel-ventilation-and-air-quality>> accessed 14 July 2021.

³⁰ Inner West Air Quality Community Reference Group, *Air Pollution in Melbourne's Inner West*, p. 2.

³¹ Maribyrnong Truck Action Group, *Submission 42*, p. 10.

Figure 4.7 West Gate tunnel ventilation system



Source: West Gate Tunnel Project, *Tunnel ventilation and air quality*, <<https://westgatetunnelproject.vic.gov.au/about/keytopics/tunnel-ventilation-and-air-quality>> accessed 14 July 2021.

The Committee understands that emissions and ventilation were considered extensively during the comprehensive Environmental Effects Statement (EES). Highly conservative air quality modelling shows that emissions from the ventilation system will be well below the levels required by the relevant standards for most pollutants. Air quality modelling of the emissions from roads and vent structures undertaken for the EES has also demonstrated that local air quality would generally improve within this component during operation, including along Buckley Street, Francis Street, Hyde Street, Whitehall Street and Williamstown Road.³²

The West Gate Tunnel will include best practice tunnel ventilation systems. Evidence from around the world shows that emissions from well-designed tunnel ventilation systems have no measurable effect on local or regional air quality. The West Gate tunnel project tunnel ventilation system has been designed based on best practice criteria for in-tunnel and ambient air quality. The tunnel ventilation system is required to achieve zero portal emissions, with all vehicle emissions being captured and emitted through a system that ejects pollutants higher into the atmosphere. Using this approach means that there would not be any significant degradation of air quality detectable around the operating tunnels. Air quality modelling shows that emissions impacts would be well below the levels required under regulations. These measures will provide a very high standard for a tunnel in Australia.³³

RECOMMENDATION 7: That the Victorian Government ensures that the West Gate Tunnel contractors comply with the provisions of the Environment Effects Statement to ensure that the ventilation is consistent with international best practice in tunnel ventilation systems.

³² Western Distributor Authority, Environment Effects Statement, Summary Report for West Gate Tunnel Project, May 2017, p 39.

³³ Ibid.

RECOMMENDATION 8: That the Victorian Government implement the recommendations put forward by the Inner West Air Quality Community Reference Group and continue to work on improving air quality for residents in Melbourne’s inner west, western and northern suburbs as a matter of priority.

4.5 West Footscray Industrial Fire (2018)

On 30 August 2018, a large fire broke out in a warehouse at 420 Somerville Road, Tottenham. The fire burned for several days with hotspots remaining for several weeks.³⁴ Investigations after the fire found that the warehouse was partially constructed with asbestos and illegally contained a large quantity of drums which contained unknown chemical and industrial waste.³⁵

According to the Inspector-General for Emergency Management’s Report into the West Footscray Industrial Fire, the site had been subject to multiple inspections that had ‘increased in frequency in the months leading up to the fire’.³⁶ Despite the increased frequency of inspections:

regulators and emergency services were not aware of the quantity of chemicals stored onsite as there had not been any notification of their presence. The safety measures associated with the storage and use of dangerous goods were also not appropriate for the quantity and types of chemicals stored in the warehouse.³⁷

The fire caused black smoke to plume into the air (Figure 4.8 and Figure 4.9) and cover surrounding areas, and significant amounts of chemicals contained in the drums ran into the nearby Stony Creek.³⁸ It was categorised as an 8th alarm which is the highest category given to an emergency response.³⁹ During the fire, EPA AirWatch categorised the air quality as ‘very poor’.

³⁴ Jack Kerr, ‘West Footscray warehouse photographs raise more questions about fire mystery’, *ABC News*, 6 December 2018, <<https://www.abc.net.au/news/2018-12-06/west-footscray-inferno-warehouse-empty-photos-show/10306174>> accessed 7 May 2020.; Chris Vedelago, Cameron Houston and Sumeyya Ilanbey, ‘What happened to us in West Footscray? Firefighters call for answers after toxic fire’, *The Age*, 7 November 2019, <<https://www.theage.com.au/national/victoria/what-happened-to-us-in-west-footscray-firefighters-call-for-answers-after-toxic-fire-20191106-p5382j.html>> accessed 7 May 2020.

³⁵ Jack Kerr, ‘West Footscray warehouse photographs raise more questions about fire mystery’; Chris Vedelago, ‘What happened to us in West Footscray? Firefighters call for answers after toxic fire’.

³⁶ Inspector-General for Emergency Management, *Report into the West Footscray Industrial Fire (August 2018)*, Victorian Government, 2020, p. 8.

³⁷ Ibid.

³⁸ Ibid.

³⁹ Parliament of Victoria, Legislative Council Environment and Planning Committee, *Inquiry into recycling and waste management: interim report*, August 2019, p. 7.

Figure 4.8 Smoke plume from West Footscray Industrial Fire

Source: Rohan Smith, 'CREWS still working to put out a Melbourne factory fire fueled by toxic drums of chemicals. It's been called one of the city's worst', *News.com.au*, 30 August 2018, <<https://www.news.com.au/national/victoria/news/footscray-factory-fire-sending-plumes-of-smoke-across-melbourne/news-story/8034976bc5f9afbc001143b7f8e844cc>> last accessed 7 May 2020.

Figure 4.9 Smoke plume from West Footscray Industrial Fire

Source: Rohan Smith, 'CREWS still working to put out a Melbourne factory fire fueled by toxic drums of chemicals. It's been called one of the city's worst', *News.com.au*, 30 August 2018, <<https://www.news.com.au/national/victoria/news/footscray-factory-fire-sending-plumes-of-smoke-across-melbourne/news-story/8034976bc5f9afbc001143b7f8e844cc>> last accessed 7 May 2020.

Air quality monitoring of the fire was primarily captured through two permanent air quality monitors in the area which were located under the plume. These were supplemented by the deployment of incident air monitoring equipment by the EPA and first response air monitoring deployed by fire services.⁴⁰

The Inspector-General's report observed that incident air monitoring deployment for the fire was delayed 'due to a lack of understanding of the roles of all agencies in air monitoring as per Joint Standard Operating Procedure J03.18'.⁴¹ Joint Standard Operating Procedure J03.18 is explained in Box 4.2 below. The report explained that the

⁴⁰ Inspector-General for Emergency Management, *Report into the West Footscray Industrial Fire (August 2018)*, p. 21.

⁴¹ *Ibid.*, p. 38.

EPA is responsible for incident air monitoring and fire services are responsible for first response air monitoring.⁴² However, the current operating procedures are ambiguous about response procedures due to not clearly specifying what type of monitoring is required or how to trigger first response air monitoring.⁴³ As a consequence, there was some confusion amongst agencies responding to the fire. The report stated that the Inspector-General was advised by the EPA that it is:

not resourced or trained to provide first response air monitoring or deploy incident air monitoring into 'hot zones' but often face discussions with control agencies as to whom should provide air quality information for responder health and safety purposes and/or for community in the immediate area.⁴⁴

BOX 4.2: Incident air monitoring for community health (J03.18)

The Joint Standard Operating Procedure for incident air monitoring for community health (J03.18) explains the procedure for Incident Controllers and the Environment Protection Authority to deploy incident air monitoring equipment and initial assessment of air quality data.

This Operating Procedure applies to 'significant or prolonged' events where smoke or other air emissions could potentially impact community health, including community exposure to smoke from fires, hazardous materials, planned burns or other sources.

J03.18 outlines the procedure for deploying incident air monitoring equipment, which broadly involves:

1. An **evaluation of the situation** by the Incident Controller.
2. A **consideration from the Incident Controller** to deploy incident air monitoring.
3. **Communication of deployment decision** and other relevant information from the Incident Controller to the Environment Protection Authority.
4. **Deployment of incident air monitoring equipment** by the Environment Protection Authority.
5. **Demobilisation of incident air monitoring equipment** by the Environment Protection Authority.

Upon approving a request from the Incident Controller, the Environment Protection Authority makes the final decision to initiate air monitoring equipment.

(Continued)

⁴² Ibid.

⁴³ Ibid.

⁴⁴ Ibid.

BOX 4.2: Continued

Once air monitoring equipment is deployed, the Environment Protection Authority using the data gathered through monitoring is responsible for:

- produce initial air quality reports
- report and provide advice for fine particles and other parameters
- report and provide advice for carbon monoxide (if present/relevant)
- report on any other identified emission that is a potential community health concern
- publish air monitoring data on AirWatch, and through community notifications and other warnings via Vic Emergencies
- approve and publish community information and warnings in areas not managed by the Incident Controller or which extend beyond the area of concern.

Source: Emergency Management Victoria, *Joint Standard Operating Procedure: Incident air monitoring for community health*, 2017, <<https://files-em.em.vic.gov.au/public/JSOP/SOP-J03.18.pdf>> accessed 13 July 2021.

The Inspector-General found that:

air quality in the community remained below levels of serious health concern throughout the incident due to weather and wind conditions. However, there were complaints of a chemical odour and significant community concerns about the large, black smoke plume.⁴⁵

In its report, the Inspector-General noted that:

There was a disconnect between the authorised community information and warnings concerning the air quality and the community's perceptions of safety during the incident. The warnings indicated there was no need to leave the area, however community members saw emergency personnel in HAZMAT clothing, noted childcare and school closures in the area and remained concerned about the smoke and chemical odour. There was also information being disseminated about the weather which may have heightened concern.

The Watch and Act, and Advice warnings all mentioned the smoke and smell, however, as the incident progressed there were growing community concerns that the area was not safe. A number of support agencies recognised that initial communications from the control agency did not address the likelihood that the community may not accept the information about the safety of the area, but there was limited opportunity to provide input to the control agency for the community information and warnings being issued.⁴⁶

This was also raised by some stakeholders to the Inquiry which similarly noted that official communication did not adequately address the health and safety concerns

⁴⁵ Ibid., p. 21.

⁴⁶ Ibid., p. 50.

of the community;⁴⁷ with the operational response—such as closing schools and emergency responders wearing hazmat gear—seemingly at odds with messages to the community that the incident posed no or little risk to their health.⁴⁸

In its submission, the Anti-Toxic Waste Alliance, a collective of community groups and organisations established in the wake of the West Footscray industrial fire, discussed the distress the fire had on nearby residents.⁴⁹ It noted that whilst the weather with the air pollution from the incident, the area is already subjected to poor air quality conditions due to pollutants from industrial sites.⁵⁰ Its submission described some of the personal and environmental impacts that occurred:

Imagine the stress for residents watching this stream across the sky. Strong metallic odours created further anxiety - what are we breathing in? Poor communication to the community on the day of the fire and immediately after added to the anxiety levels.

... Nearby Stony Creek was effectively killed by contaminated runoff entering the creek. Fish, eels and birds perished, trees along the creek banks have died and contaminated water flowed to the Yarra River, and out to Port Phillip Bay. Major rehabilitation works for the creek and Cruickshank Park were completed in 2020.⁵¹

At a public hearing, Ms Colleen Hartland from the Anti-Toxic Waste Alliance elaborated on the mental health impacts experienced by residents because of the 2018 fire. She believed that the resident's mental health in the aftermath of the fire has been affected because of the way agencies have responded to their concerns:

certainly their mental health is undermined by the relentless way that agencies operate to undermine them and say: 'You're imagining it. It's not really happening, nobody else has reported it, it doesn't affect your health' or 'All right, you have got eczema, asthma, migraines, runny eyes. You didn't have those before the fire happened, but it's got nothing to do with the fire'. So you are made to feel like you are an idiot, and that is what undermines people's mental health. I have seen people whose thought processes can be quite chaotic from the trauma that they have gone through. You see it with people in bushfires, in floods and in any kind of major national disaster; it is the same effect, but we do not see it in the same way when it is a big fire in a recycling plant.⁵²

Ms Hartland also explained that there was an inconsistency in the quality of community warnings for the fire compared to the type of warnings people receive during bushfires:

One of the things that happens in urban fires, unlike in bushfires, is they are not regarded seriously. You do not get the same kind of warnings. You are not alerted. You are not told what you should do. The chaos on the day of the West Footscray fire, around the local schools: should they be evacuated? Should the community centre be evacuated? All of those things: they are not dealt with in the same way. You have very

⁴⁷ For example: Victorian Council of Social Service (VCOSS), *Submission 74*; Anti-Toxic Waste Alliance (ATWA), *Submission 77*.

⁴⁸ Victorian Council of Social Service (VCOSS), *Submission 74*, p. 2.

⁴⁹ Anti-Toxic Waste Alliance (ATWA), *Submission 77*, p. 5.

⁵⁰ *Ibid.*

⁵¹ *Ibid.*

⁵² Ms Colleen Hartland, *Transcript of evidence*, p. 73.

clear protocols for bushfires and floods. It is not the same for a city-based major fire that could have the same kind of shocking consequences.⁵³

Public communication during air pollution events is discussed in detail in Chapter 9.

4.5.1 Findings from the Committee's *Inquiry into recycling and waste management: interim report*

In 2019 the Committee conducted an *Inquiry into recycling and waste management*, which produced an interim report focused on three major fires connected to Victoria's waste and resource recovery system:

- 2017 Coolaroo fire
- 2018 Campbellfield fire
- 2018 West Footscray fire.

The interim report concluded that the 2018 West Footscray fire was related to the 'illegal stockpiling of industrial and chemical waste'.⁵⁴

The report summarised the public health and environmental risks of the West Footscray industrial fire, key points noted by the Committee included:

- spikes in the level of PM_{2.5} that were in the 'unhealthy sensitive range' in West Footscray and Brooklyn
- very high concentrations of chemicals in Stony Creek during and in the days following which exceeded health guidelines
- measurements of volatile organic compounds, which were creating vapour and odour in the air, showed the presence of these compounds was 'well below health guideline levels'
- residents reported several symptoms they believed were associated with the fire and fumes, including nausea, dizziness, nose bleeds, headaches and respiratory problems.⁵⁵

In its submission to the *Inquiry into recycling and waste management*, the United Firefighter's Union described the type of chemicals firefighters were exposed to at the West Footscray (and Campbellfield) fire and the injuries reported by responders:

The firefighters who attend these fires have been exposed to highly toxic smoke and debris produced by the burning of chemicals, including acetone, oxy-acetylene, benzene, toluene ethylbenzene, xylene and methylethylketone, chlorinated solvents-carbon tetrachloride, trichloroethylene, or methylene chloride, class 3

⁵³ Ibid.

⁵⁴ Parliament of Victoria, Legislative Council Environment and Planning Committee, *Inquiry into recycling and waste management: interim report*, pp. 3, 20–21.

⁵⁵ Ibid.

diamond-flammable liquids, class 4 flammable solids, class 8 corrosives, class 9 miscellaneous goods, paints, inks and other unknown chemicals.

Firefighters who attended the fire reported having suffered from:

- Sore eyes, sore sinuses and a severe headache.
- Sinus infection which left me bedridden for a few days. This infection was exacerbated by my constant headaches.
- Fatigue and severe lack of concentration.
- Flu-like symptoms.
- Coughing, sore throat and hoarse voice.
- Lung irritation.
- Blood nose. Immediately after the fire, blood from nose multiple times a day. Now every two and three days.
- Fatigue, exhaustion.
- Memory loss.
- Dry itchy eyes and skin rashes.⁵⁶

In its interim report, the Committee made six findings several of which are relevant to this Report and echo evidence received from stakeholders to this Inquiry:

BOX 4.3: Key Findings from the interim report for the *Inquiry into recycling and waste management*

FINDING 2: While the information provided by the EPA and other agencies suggests that for the most part, air and waterway quality did not exceed human health guidelines, the Committee is concerned that some community members have reported adverse health impacts as a result of the fires.

FINDING 4: The Committee also finds that there was inadequate communication from the relevant agencies to the community about public health risks during and after the emergency.

FINDING 8: While the information provided by the EPA and other agencies suggests that for the most part, air and waterway quality did not exceed human health guidelines, the Committee is concerned that some community members have reported adverse health impacts as a result of the fires.

(Continued)

⁵⁶ United Firefighters Union, submission to Parliament of Victoria, Legislative Council Environment and Planning Committee, *Inquiry into recycling and waste management*, 2019, p. 5.

BOX 4.3: Continued

FINDING 10: The Committee also finds that there was inadequate communication from the relevant agencies to the community about public health risks during and after the emergency.

Source: Parliament of Victoria, Legislative Council Environment and Planning Committee, *Inquiry into Recycling and Waste Management*, November 2019, pp. xiii-xv.

FINDING 4: The Legislative Council Environment and Planning Committee endorses the key findings made by the previous parliamentary *Inquiry into recycling and waste management* in regard to the toxic fires in Melbourne's northern and western suburbs contained in its interim report.

RECOMMENDATION 9: That the Victorian Government improves communications with communities to provide timely and/or real time communications on any events that may have adverse health impacts when and where practicable.

RECOMMENDATION 10: That the Victorian Government supports local communities by providing localised health responses following toxic fire events that have occurred in Melbourne's western and northern suburbs. This support should be tailored to address the adverse health and/or mental health impacts that are identified.

5 Latrobe Valley

5.1 Introduction

The Latrobe Valley is located approximately 150kms east of Melbourne and is one of Victoria's major regional centres. It covers an area of 1,426 square kilometres and, at the 2016 Census, had a population of 73,257. The region is made up of four central towns: Churchill, Moe-Newborough, Morwell and Traralgon.¹

In its submission Latrobe City Council noted:

The consideration of air pollution within the context of the Latrobe City remains challenging, given the long-standing associations with energy generation and other heavy industry developments. The impact of these major employing industries to air quality and the centrality of these industries to socioeconomic conditions along with overall community health outcomes are significant and complex.²

The Latrobe Valley is synonymous both with heavy industry and pollution; it is a centre of heavy industry and a national air pollution hot spot. The Latrobe Valley region experiences significant disadvantage in education outcomes, health outcomes, employment, and wealth and income disparity relative to the rest of Victoria.³

The Latrobe Valley is one of the most bushfire prone areas in the world. It is home to a significant amount of heavy industry, including three large coal-fired power stations, the Maryvale paper mill, and the open cut coal mines. A large amount of controlled burns for logging coupes, hazard reduction and private land burn-offs are also conducted in the region.⁴

Coal-fired power stations are the primary source of air pollution in the Latrobe Valley, particularly PM_{2.5} sulphur dioxide and mercury. Concern about air quality has grown in the Latrobe Valley since the Hazelwood Mine Fire.⁵

In 2014 the Latrobe Valley experienced one of the worst industrial disasters in Australia, the Hazelwood mine fire. The fire was one of the most significant air-pollution incidents in Victoria's history, due to the amount of smoke generated, the proximity of the fire to the township of Morwell, and its duration (45 days over February and March 2014). The

1 Remplan, *Latrobe City, 'Economy, Jobs and Business Insights'*, 2021, <<https://app.remplan.com.au/latrobe/economy/summary?state=PZg7FAXMnFAbI2nf6Gj30JT1HPHqzi>> accessed 23 September 2021.

2 Latrobe City Council, *Submission 57*, p. 8.

3 ALiVe Inc, *Submission 105*, pp. 8–9 (with sources); Victorian Council of Social Service, *Submission 74*, p. 4 (with sources); Hazelwood Mine Fire Inquiry, *Hazelwood Mine Fire Inquiry Report*, 2014, p. 352.

4 Hazelwood Mine Fire Inquiry, *Hazelwood Mine Fire Inquiry Report*, 2014, p. 12; Environmental Justice Australia, 'Air quality in the Latrobe Valley unhealthy again', (n.d.), <<https://www.envirojustice.org.au/projects/air-pollution-in-the-latrobe-valley>> accessed 23 September 2021; Latrobe City Council, *Submission 57*, p. 3.

5 Victorian Council of Social Service, *Submission 74*, pp. 4–5.

Hazelwood mine fire constituted both a complex fire emergency and a serious public health emergency.⁶

A large, 20-year study investigating the long-term health effects of the 2014 Hazelwood mine fire, funded by the Government, began in the Latrobe Valley in 2014.⁷ The Latrobe Valley community continues to carry the trauma of this event.⁸

The Committee received evidence both in submissions and from public hearings relating to a number of concerns around air pollution impacts in the Latrobe Valley. Many of these issues are discussed generally throughout Report (see for example, health impacts in Chapter 2, woodsmoke in Chapter 6, and air quality monitoring and communications in Chapters 8 and 9).

It is important to note that the Committee has not sought to undertake a detailed inquiry into these issues in and of themselves. The Committee recognises that air pollution is one of many symptoms of complex historical, systemic and often interrelated issues in the Latrobe Valley covering economy, health, the environment, and others. However, this Inquiry did not have the remit or capacity to consider these broader issues in detail. For the purposes of this chapter, the Committee has considered the evidence it received from stakeholders in the context of certain key issues related to concerns with air pollution, namely:

- tension between industry and health impacts in the Latrobe Valley (Section 5.1.2)
- approval of a used lead acid battery recycling facility in Hazelwood North (Section 5.2)
- the Environment Protection Authority (EPA) licence review of brown coal power stations (Section 5.3).

The Committee also makes further comment on broader issues in the Latrobe Valley and how they might be addressed in Section 5.4 of this chapter.

5.1.1 Key pollutants

Significant sources of air pollution in the Latrobe Valley include three large coal-fired power stations and associated mines, the Maryvale paper mill, and other heavy industries.

In general, the main sources of criteria pollutants in the region (other than lead) are:

- sulfur dioxide: brown coal-fired power stations, Maryvale Paper Mill
- nitrogen oxides: fossil fuel burning and vehicle emissions, bushfires and planned burns, brown coal-fired power stations

⁶ Hazelwood Mine Fire Inquiry, *Hazelwood Mine Fire Inquiry Report*, 2014, p. 12.

⁷ Commissioner for Environmental Sustainability Victoria, 'AIR (A)', *Scientific Assessment Part III*, 2018, p. 28 <https://www.ces.vic.gov.au/sites/default/files/SoE2018ScientificAssessment_A.pdf>.

⁸ Victorian Government, 'Hazelwood Mine fire inquiry – Victorian Government response and actions', August 2021, <<https://www.vic.gov.au/hazelwood-mine-fire-inquiry-victorian-government-response-and-actions>> accessed 22 September 2021; ALive Inc, *Submission 105*, p. 10.

- ozone: bushfires and planned burns, occasional wind-blown pollution from Melbourne
- particulate matter: bushfires and planned burns, open cut coal mining, brown coal-fired power stations, dust from unpaved roads, domestic wood heaters, vehicle emissions, other industrial emissions.

In addition, the National Pollutant Inventory (NPI) shows that in the ten years to 2018–19, coal burning facilities and paper pulping contributed >20,000kg, and 1,100kg of mercury were emitted from power generation in 2018–19.⁹

5.1.2 A tension between health and economic impacts

The impacts of heavy industry in Latrobe Valley is a complex tension between its function as a major economic driver and source of employment and the adverse impacts it has on community health and the environment. This tension was noted by Latrobe City Council in its submission to the Inquiry:

Latrobe City Council acknowledges the dichotomy whereby the phased closure of coal fire powered stations would result in improved air quality and community health outcomes, however is also mindful of the potential secondary health and wellbeing impacts — including unemployment, reduced housing security, domestic violence and broader mental health considerations which may result.¹⁰

The Latrobe economy generates an estimated \$12.630 billion in output. Latrobe Valley represents, 1.3% of the \$964.237 billion output generated in Victoria, and 0.3% of the \$3.959 trillion output generated nationally.¹¹

The largest contributor to annual economic output in Latrobe is the ‘Electricity, Gas, Water and Waste Services’ sector, which represent 23.36% of total output, or an estimated annual output of \$2.950 billion; it is also Latrobe largest exporter, generating regional exports estimated at \$2.37 billion.¹²

Industries that contribute relatively significantly to air pollution collectively account for about a \$7.5 billion annual output and more than 31% of employment in the region (see Figures 5.1 and 5.2 below).¹³

⁹ Environmental Justice Australia, *Submission 110*, p. 14 (with sources).

¹⁰ Latrobe City Council, *Submission 57*, p. 8.

¹¹ Remplan, *Latrobe City*, ‘Economy, Jobs and Business Insights’.

¹² Ibid.

¹³ Ibid.

Figure 5.1 Latrobe economic output, selected industry sectors (accurate to 2020)

Industry sector	\$ million
Electricity, gas, water and waste services	2,949.909
Manufacturing	1,893.769
Construction	1,371.949
Mining	607.742
Transport, postal and warehousing	340.683
Agriculture, forestry and fishing	337.982
Subtotal	7,502.033
Balance	5,127.578
Latrobe	12,629.610

Source: Remplan, *Latrobe City*, 'Economy, Jobs and Business Insights'.

Figure 5.2 Latrobe employment figures, selected industry sectors (accurate to 2020)

Industry sector	Jobs (%)
Construction	8.72
Electricity, gas, water and waste services	7.81
Manufacturing	7.11
Transport, postal and warehousing	3.54
Agriculture, forestry and fishing	2.23
Mining	1.60
Subtotal	31.01
Balance	68.99
Latrobe	100.00

Source: Remplan, *Latrobe City*, 'Economy, Jobs and Business Insights'.

As noted above, people in the Latrobe Valley suffer poorer health outcomes relative to the rest of the State. The Inquiry into the Hazelwood Mine Fire found that the Latrobe Valley, particularly Morwell, has a poorer health profile compared to other Victorian local government areas as well as the State average. For people who live in Latrobe Valley communities, more years of life are lost on average than elsewhere in Victoria as a direct result of conditions including cancer, diabetes, mental disorders, cardiovascular disease, asthma and injuries. In addition, socioeconomic disadvantage in the Latrobe Valley relative to the rest of Victoria further exacerbates health conditions.¹⁴

¹⁴ Hazelwood Mine Fire Inquiry, 'Volume III – Health Improvement', *Hazelwood Mine Fire Inquiry Report*, 2015/2016, p. 22 (with sources).

Tables 5.1 and 5.2 (below) show comparisons of premature death rates for Latrobe against the national rates and selected health indicators for Latrobe against the Victorian measure, drawn from the Federal Government's Primary Healthcare Network June 2016 Needs Assessment for the Gippsland region.

Table 5.1 Premature deaths, ages 0–74, for Latrobe and Australia (2016)

Cause	Premature death rate of people aged 0–74 years (per 100,000 population)	
	Latrobe	National
All causes—males	378	299
All causes—females	214	183
All cancers	120	102
Lung cancer	28	21
Circulatory system diseases	64	48
Diabetes	11	6
Ischaemic heart disease	36	26
External causes	42	30
Road traffic injuries	10	6
Suicide and self-inflicted injuries	17	12

Source: Environment and Planning Committee using data from PHN Gippsland, *Needs Assessment Snapshot: Latrobe Local Government Area*, June 2016, p. 5.

Table 5.2 Average health indicator comparison of Latrobe and Victoria (2016)

Indicator	Measure	Latrobe	Victoria
Life expectancy—males	age	76.9	80.3
Life expectancy—females	age	82.2	84.4
High blood pressure reports	% of population	32	24
Osteoporosis reports	% of population	6.9	5.3
High/very high psychological distress reports	% of population	14	11
Intentional injuries treated in hospital	per 1,000 population	4.7	3.1
Asthma and related respiratory hospital admissions (3–19 year olds)	per 100,000 population	378	310
Asthma hospital admissions (20–44 year olds)	per 100,000 population	130	87
Heart failure hospital admissions	per 100,000 population	547	440
Malignant cancers diagnosed	per 100,000 population	522	522

Source: Environment and Planning Committee using data from PHN Gippsland, *Needs Assessment Snapshot: Latrobe Local Government Area*, June 2016, p. 5.

In its submission, Latrobe City Council noted:

- Information from the Latrobe Health Innovation Zone (see Box 5.1 below) shows the Latrobe Valley has among the highest percentage of use of asthma medications: 37% of children aged 3 to 19 use asthma medications compared to 24% Victoria-wide.
- Gippsland Primary Health Network findings from 2016 community engagement reported that the community is concerned about air pollution in the Latrobe Valley.
- Data from the Gippsland Primary Health Network indicates that avoidable deaths from respiratory disease are approximately double in the Latrobe Valley compared with the Victorian average, and deaths and hospitalisations from chronic obstructive lung disease are also close to double the Victorian average (noting the high rates of smoking in the community).¹⁵

BOX 5.1: Latrobe Health Innovation Zone

In response to the Hazelwood Mine Fire Inquiry, Latrobe Valley was designated a 'Health innovation Zone' to:

- provide measurable health improvements in the Latrobe Valley through the use of innovative strategies
- reduce health inequity within the Latrobe Valley, and between the Latrobe Valley and other parts of Victoria
- establish effective community engagement processes as the core driver of health improvements in the Latrobe Valley.

The Latrobe Health Innovation Zone was designed to prioritise community health, establish effective ways for community participation and collaboration in the outcomes in the region and strengthen access to health care. It provides a focal point for coordination and integration of health services and support for health-related projects.

Council told the Committee it supported ongoing, long term financial investment in the health and wellbeing of the Latrobe City community with a priority focus on prevention and early intervention, however:

investment must include the funding and delivery of transformational actions with a view to a strength's based community led approach.

It further submitted that the scope and focus of actions undertaken by the Latrobe Health Innovation Zone could be broadened to directly consider air pollution and its impacts on local health outcomes.

(Continued)

¹⁵ Latrobe City Council, *Submission 57*, p. 10.

BOX 5.1: Continued

Stakeholders to the Inquiry pointed out that the Latrobe Health Innovation is not recognised in the Latrobe Planning Scheme, which means there is no requirement for it to form part of considerations in relation to planning applications and amendments to the planning scheme. This issue has been thrown into sharp relief as a result of the approval of the Used Lead Acid Battery proposal discussed in Section 5.2.

Sources: Hazelwood Mine Fire Inquiry, 'Volume III – Health Improvement', pp. 120–121; ALiVe Inc, *Submission 105*, p. 10; Latrobe City Council, *Submission 57*, p. 10.

In 2014, the Hazelwood Mine Fire Inquiry reported that the significant health and social impacts of the Hazelwood fire had led a distrust of government agencies and services and that '[s]pecial attention and targeted action [was] require to change this and provide hope for current and future generations'.¹⁶

However, remedying this situation and building a sense of community confidence in public agencies and government processes, stakeholders argued, had not been helped by recent experiences, including:

- approval of the proposed used lead acid battery recycling plant in Hazelwood North (covered in Section 5.2 below)
- no requirement to consider the Latrobe Health Innovation Zone in planning decisions¹⁷
- a lack of scrutiny or regulatory oversight in planning approvals¹⁸
- failure to impose stricter licence conditions on Latrobe's brown coal power stations following the most recent licence review process (covered in Section 5.3 below).

Ms Veronique Hamilton, a registered nurse associated with Healthy Futures (a pollution reduction advocacy organisation of healthcare workers and others) articulated the issue of distrust from a personal perspective:

You mentioned about the distrust. I guess I am reflecting back. I have always grown up in this area, and as a young child I remember my brother as we would drive past the power stations joking, 'Hold your breath. Hold your breath', teasing me. And my mum would say, 'Don't be silly. It's just steam'. And that is what a lot of people do think. We believe that the government or whoever it is that is meant to be protecting us actually would be protecting us and would not let us breathe in pollution that could actually harm us and kill us. And then to find out that actually I have lived my 33 years breathing in these toxins does lead to mistrust. It is like, 'Wow, I just found out that Santa Claus

¹⁶ Hazelwood Mine Fire Inquiry, *Hazelwood Mine Fire Inquiry Report*, 2014, p. 352.

¹⁷ ALiVe Inc, *Submission 105*, p. 10; Voices of the Valley, *Submission 38*, p. 1.

¹⁸ Ms Maggie Jones, Secretary, ALiVe Inc, public hearing, Melbourne, 29 June 2021, *Transcript of evidence*, p. 44.

isn't real'. And so that is where that mistrust does come into it. People are not being informed about the impacts of the pollution. Everyday people are not being informed. And that is not fair.¹⁹

This sentiment was echoed in evidence to the Committee, from local community advocates ALiVe Inc. (Advocating for the Latrobe Valley) and Voices of the Valley (see below), while Environmental Justice Australia argued that the 2019 review of the Ambient Air National Environment Protection Measure (NEPM) evidenced an official view that was 'satisfied to sacrifice the health of [the Latrobe Valley] community... because it is not "cost-effective" to protect its health'.²⁰

A common concern raised with the Committee was that the Latrobe Valley's reliance on heavily-polluting industry, compounded by the continued locating of projects in the Latrobe Valley, rather than elsewhere, was a key driver of disproportionately negative health and environmental impacts in the region and highlighted a lack of environmental justice and health equity.

Voices of the Valley, a community advocacy group formed during the Hazelwood mine fire and based in the Latrobe Valley, observed that, since the Hazelwood mine fire, new industry proposals tended to be presented in comparison to existing industries and activities, rather than how they might add to existing industry and its associated environmental and health costs. This, it argued, perpetuated the effects of industrial pollution and associated health costs through the continual locating of dirty industries in poorer areas like the Latrobe Valley.²¹

ALiVe, another Latrobe Valley-based community advocacy group, echoed this view:

In line with the principle of environmental justice: The Latrobe Valley has carried the health burden of pollution and heavy industry to power the state of Victoria - it is therefore reasonable to assert that any new heavy industry required for the State should be located elsewhere.²²

ALiVe argued there was a prevailing myth within government that heavy industry investment was the best way to address socioeconomic problems in the Latrobe Valley. It considered this attitude was demonstrative of a limited understanding of the health impacts of pollution and well-established links between heavy industry and socioeconomic inequality.²³

The Latrobe City Council noted that future heavy industry developments would be dependent on technically sound, commercially viable and socially acceptable projects.²⁴

¹⁹ Ms Veronique Hamilton, Registered Nurses, Healthy Futures, public hearing, Melbourne, 28 June 2021, *Transcript of evidence*, p. 63.

²⁰ Environmental Justice Australia, *Submission 110*, p. 12.

²¹ Voices of the Valley, *Submission 38*, pp. 1–2.

²² ALiVe Inc, *Submission 105*, p. 10.

²³ *Ibid.*, pp. 8–9.

²⁴ Latrobe City Council, *Submission 57*, p. 8.

In its submission Voices of the Valley recommended:

- Proposals for new operations or significant change to an existing operation should be explicitly assessed for whether they add to or ameliorate existing air pollution in the local environment. Health costs should be included when calculating costs of air pollution and health savings used to off-set the costs of air pollution reduction strategies.
- A requirement for all proposals to include consideration of emissions and pollution, supported by continuous improvement in the regulation, monitoring, reporting and control of air pollution.²⁵

Ms Marianne Robinson, Secretary of Voices of the Valley, argued that a more holistic view of decisions and greater pooling of information between departments and regulators to inform decisions beyond the immediate responsibilities of individual decision-makers was required.²⁶ While, in its submission, Voices of the Valley pointed to a need to embed consideration of health issues and air pollution in the planning and approvals process:

We must start explicitly linking these two issues to ensure that proposals to implement a circular economy need to be carefully scrutinised and closely monitored to make sure we do not create the next environmental issues.²⁷

5.1.3 Air quality monitoring in the Latrobe Valley

The *Hazelwood Mine Fire Inquiry: Victorian Government Implementation Plan* sets out the actions the Government committed to take in meeting its commitment to implement recommendations from the Hazelwood Mine Fire Inquiry.²⁸

As part of this commitment, the EPA was responsible for developing a revised ambient air monitoring network and smoke sensor sub-network in the Latrobe Valley, using a co-design approach with the local community.²⁹

The co-design process sought to expand air monitoring capabilities and public reporting for the Latrobe Valley. The co-design process was conducted by more than 30 community members working with EPA air scientists and local experts, local councils and the former Department of Health and Human Services. It resulted in a map of a new preferred community-designed air monitoring network for the Latrobe Valley that was widely supported by the co-design panel.³⁰

²⁵ Voices of the Valley, *Submission 38*, p. 3.

²⁶ Ms Marianne Robinson, Secretary, Voices of the Valley, public hearing, Melbourne, 29 June 2021, *Transcript of evidence*, p. 50.

²⁷ Voices of the Valley, *Submission 38*, p. 1.

²⁸ Victorian Government, *Hazelwood Mine Fire Inquiry: Victorian Government Implementation Plan*, June 2016, p. 15.

²⁹ *Ibid.*, p. 29.

³⁰ Inspector-General for Emergency Management, *Hazelwood Mine Fire Inquiry: Implementations of recommendations and affirmations*, 2017, p. 30; Environment Protection Authority Victoria, 'Latrobe Valley Air Monitoring Co-design', 11 March 2021, <<https://www.epa.vic.gov.au/for-community/get-involved/citizen-science-program/citizen-science-projects/latrobe-valley-air-monitoring-co-design>> accessed 22 September 2021.

According to the most recent progress report from the Inspector-General for Emergency Management, the reconfiguration of the co-designed network is ongoing and overdue. Since 2017 EPA has worked with the co-design panel, air monitoring equipment suppliers, local council and private industry towards completing the network reconfiguration. This has seen the EPA install significantly more air monitoring equipment than was available at the time of the Hazelwood mine fire. In 2019 the network was reported to be close to completion, with work on equipment trials and investigations ongoing.³¹

The Government advised the Committee that, so far, the co-design process has resulted in the deployment of:

- six additional air monitoring sites
- 11 sensors to form a Latrobe Valley PM_{2.5} sensor network
- three web cameras to give a visual representation of air in the Latrobe Valley.³²

Air quality monitoring in Latrobe Valley, as well as the rest of the State, does not provide real-time air quality information. Rather, AirWatch displays air quality data on a 48-hour and 1-hour rolling average. This issue, as well as an overview of the EPA's current air quality monitoring network in Latrobe Valley, is covered in Chapter 8.

In addition to AirWatch information, industry-run air monitoring is also provided through the Latrobe Valley Air Monitoring Network (LVAMN), which is supported by the local power generators and Australian Paper. The LVAMN consists of three sites at Rosedale South, Jeeralang Hill and Traralgon. Four additional EPA sites (located at Morwell South, Morwell East, Moe and Churchill) also provide data to this network. Data from all sites are logged and polled on a daily basis by remote central computer systems. All data is validated before final reporting by the EPA. Data is also made available through the LVAMN website.³³

Latrobe City Council argued improvements to air quality monitoring in Latrobe Valley were essential to transparency, accountability and community confidence in industry and regulators. It noted that in Victoria, industry is not legally obliged to make its stack emissions monitoring data publicly available despite continuous emissions monitoring systems for particulate matter having been widely available for at least 18 years.³⁴

Further, the Council noted the lack of real-time data available for the Latrobe Valley through EPA's AirWatch website was in stark comparison to the real-time monitoring and air pollution information for the Hunter Valley provided by New South Wales.³⁵

³¹ Inspector-General for Emergency Management, *Hazelwood Mine Fire Inquiry: Implementations of recommendations and affirmations*, 'Progress Report', 2017, p. 23.

³² Victorian Government, *Submission 113*, p. 32.

³³ Environment Protection Authority Victoria, *Air pollution in Victoria – a summary of the state of knowledge*, August 2018, p. 27.

³⁴ Latrobe City Council, *Submission 57*, pp. 10-11.

³⁵ Ibid.

Latrobe City Council submitted that the current monitoring network had a number of limitations including:

- a limited number of locations
- non-capture or reporting of a number of recognised air pollutants
- information and reports are not in real time
- lack of accessibility in relation to the format of reported information.³⁶

To address the gaps in real-time air quality monitoring for the region, Latrobe City Council implemented the Latrobe Valley Information Network (LVIN), with support from the Federal Government (see Box 5.2 below). The LVIN operates separately to the EPA air monitoring network (local government does not hold regulatory responsibility for air quality monitoring). Rather, the network was established in the interests of community health to provide an enhanced ability to respond to a range of climatic conditions and events, including air pollution, where previous data from EPA AirWatch had not been as useful in such circumstances.³⁷

Some expansion to air quality monitoring by power station operators has recently been required as a result of the EPA's brown coal power station licence review. However Latrobe City Council, at this stage, was unclear as to whether or how the review outcomes would bring about change to the capture and dissemination of emissions data from power generators.³⁸ This is discussed in Section 5.3.2 below.

BOX 5.2: Latrobe Valley Information Network (LVIN)

The Latrobe Valley Information Network (LVIN) was designed and built by Australian engineering company Attentis with support from the Australian Government.

LVIN is a real-time, region-wide, air quality network comprising 45 sensors that combine bushfire ignition detection, river and stream level monitoring, air quality tracking and 24-hour microclimate weather conditions to provide early notification of fires, floods and air quality issues. It is considered to be a world leading example of real time air monitoring. LVIN has been online since 2019. A phone app has also been developed, which went live on 28 May 2020.

LVIN was designed to connect the Latrobe City community with relevant, real-time, local environmental information to create community resilience and awareness of conditions that impact their daily lives and better equip residents to reduce their exposure to air pollution events. It aims to inform all community members, industries and agencies

(Continued)

³⁶ Ibid, p. 11.

³⁷ Latrobe City Council, Inquiry into the Health Impacts of Air Pollution in Victoria, response to questions on notice received 19 July 2021, pp. 4–5; Mr Steven Piasente, Chief Executive Officer, Latrobe City Council, public hearing, Melbourne, 28 June 2021, *Transcript of evidence*, p. 3.

³⁸ Latrobe City Council, *Submission 57*, p. 11.

BOX 5.2: Continued

through a greater understanding of local conditions and support mitigation through early detection. The network supports a range of needs of the community and industry. For example, it provides:

- Real-time monitoring of a range of air pollutants, including carbon monoxide, carbon dioxide, and PM₁, PM_{2.5} and PM₁₀.
- Live air concentration levels and movement to avoid contact with airborne pollens and contaminants, including smoke.
- The ability to set personalised warnings.
- Access to live and historical data on rainfall, soil moisture, localised micro climate weather conditions and a range of analytical tools and automation options to assist farmers to optimise water consumption
- 24-hour monitoring of risk to plantations, coal mines and power stations to protect industry resources in the region.
- A range of air quality analytics for large and small town locations across the Latrobe region.
- Assistance on resource positioning and situational awareness for firefighters, particularly on the front line, to be instantly aware of changes in wind speed directions, smoke concentration levels, and fire movement.

Latrobe has used the data to meet various needs, for example, including some real-time monitoring of bushfires and smoke events, or to feed flood information back to the Bureau of Meteorology. During the 2019/2020 New South Wales and East Gippsland Fires the Latrobe City Council actively utilised the LVIN to review the smoke, health conditions and air quality throughout the region to encourage vulnerable residents to remain indoors and reduce their exposure.

Latrobe Valley Information Network was partially funded by the federal Government's Smarter Cities initiative (\$700,000), the system owner, Attentis (\$1 million). No funding support was contributed from the Latrobe City Council. Attentis continues to fund maintenance and upkeep from within its own funds

The implementation of the network was supported by the Municipal Emergency Management Planning Committee (MEMPC), incorporating representation from Victoria Police, VicRoads, State Emergency Service, Country Fire Authority, Gippsland Water, Water Catchment Management Authority and local communities. Attentis worked with Council to identify appropriate locations to facilitate the system installation.

Sources: Latrobe City Council, *Submission 57*, pp. 11-12; Latrobe City Council, response to questions on notice, pp. 3-4, 6; Mr Steven Piasente, *Transcript of evidence*, pp. 2-3, 10.

5.2 Used Lead Acid Battery Recycling Facility

Further to the note in the introduction to this chapter, the Committee has not attempted to conduct a discrete, detailed inquiry into the approval of a Used Lead Acid Battery (ULAB) Recycling Facility in Hazelwood North. The ULAB proposal is addressed here in the context of concerns related to air pollution raised by stakeholders to the Inquiry.

5.2.1 Background

In 2019, the Chunxing Corporation applied for a permit to build a Used Lead Acid Battery (ULAB) secondary Lead Smelter in Hazelwood North.

The ULAB recycling facility will use secondary lead smelting technology to recycle 50,000 tonnes of ULABs to produce 28,000 tonnes of refined lead per year.³⁹ The proposed project will operate 24 hours, 7 days per week, with allowance for 30–40 days of maintenance per year.⁴⁰

The proposed location of the facility is an industrial zone site on the outskirts of Morwell that has not been used since 1969. The closest residential property is 800 m away; there is a primary school within 1.5 km; and the Morwell residential zone is 2 km away.⁴¹

The planning application and EPA works approval drew significant community opposition to the project from the Latrobe Valley community.⁴² This included 136 submissions as part of the EPA's works approval process, one 'change.org' petition⁴³ of nearly 5,000 signatures and a petition to Parliament⁴⁴ exceeding 2,500 signatures, over 100 submissions to Council, and active communication to local political representatives and media.⁴⁵

An assessment of the submissions revealed that the main concern of submitters was the likely impact of air emissions (lead, sulphur compounds and particulates) on public health, land, surface water and groundwater resulting from the operation of the proposed facility.⁴⁶

39 Environment Protection Authority Victoria, *SO1003702 Chunxing ULAB Recycling Project Works Approval Assessment Report*, p. 10 <https://s3.ap-southeast-2.amazonaws.com/hdp.au.prod.app.vic-engage.files/2915/9910/3689/SO1003702_Chunxing_Assessment_Report_final.v2_20200903.pdf>.

40 Engage Victoria, *Chunxing Corporation Pty Ltd (ULAB)*, 'What the application proposes', (n.d.), <<https://engage.vic.gov.au/epa-works-approvals/ulab>> accessed 22 September 2021.

41 ALiVe Inc, *Submission 105*, p. 3.

42 Healthy Futures, *Submission 70*, pp. 2–3.

43 change.org, 'Stop the Battery Recycling Plant', <<https://www.change.org/p/epa-stop-the-lead-battery-plant>>.

44 Parliament of Victoria, *Legislative Council E-Petitions*, No. 298 'No secondary lead smelter in Hazelwood North', <<https://www.parliament.vic.gov.au/council/petitions/electronic-petitions/view-e-petitions/details/12/311>> accessed 10 October 2021.

45 ALiVe Inc, *Submission 105*, p. 3.

46 Environment Protection Authority Victoria, *SO1003702 Chunxing ULAB Recycling Project Works Approval Assessment Report*, p. 26.

On 25 February 2020, a Section 20B community conference⁴⁷ was held in Churchill to provide the community with an opportunity to raise issues and concerns about the proposal with the EPA and the applicant. The conference report noted:

From review of submissions and the discussion during the 20B Conference it is evident that there is minimal support for the ULAB recycling facility proposed for Hazelwood North. A small (less than three) number of conference participants identified that they were confident that the potential health and environmental impacts had been appropriately considered by the applicant.⁴⁸

In August 2020 the EPA approved the Works Approval, however, in September 2020, the Latrobe City Council voted to decline the planning permit application citing reasons of planning requirements, health concerns, impact to the amenity of surrounding region, and community opposition. The Chunxing Corporation applied to the Victorian Civil and Administrative Appeals Tribunal (VCAT) to appeal the decision, which was scheduled for a 5-day hearing in April 2021.

On 31 December 2020 the Minister for Planning overruled Latrobe City Council's decision to refuse the planning application resulting in the matter no longer being subject to a VCAT hearing. Reasons given included:

- the plant was of state and regional significance
- undue delays to the planning permit process
- economic stimulus created from the investment
- the site was 'as of right use'.

Following ministerial approval, the applicant (Chunxing Corporation) must now (at the time of writing) satisfy the conditions of the Works Approval before commencing work. The EPA will assess the submitted plans⁴⁹ in relation to these conditions to determine if construction can proceed.⁵⁰ If approved, a further assessment will occur after construction is completed to ensure it has complied with the works approval conditions.⁵¹

After this, Chunxing Corporation will be allowed to prove the operational performance of the facility in line with the Works Approval. If this is successful, they can apply for an operation licence, which will be granted subject to specified conditions being met. The licence will also contain ongoing conditions with which the operator must comply.⁵²

⁴⁷ In accordance with the *Environment Protection Act 1970* (Vic).

⁴⁸ RMCG, *Works Approval Application 20B Conference Report – Chunxing Used Lead Acid Batter Recycling Facility*, prepared for EPA Victoria, April 2020, p. 35.

⁴⁹ Provided to the EPA in June 2021. The EPA is currently reviewing these and must approve those documents before the project can proceed to construction stage.

⁵⁰ Mr Lee Miezis, Chief Executive Officer, Environment Protection Authority Victoria, public hearing, via video conference, 10 August 2021, *Transcript of evidence*, pp. 12–13.

⁵¹ Engage Victoria, *Chunxing Corporation Pty Ltd (ULAB)*, (n.d.), <<https://engage.vic.gov.au/epa-works-approvals/ulab>> accessed 22 September 2021.

⁵² Ibid.

5.2.2 Assessment of the proposal and compliance requirements

The EPA advised the Committee that the ULAB proposal had been properly and thoroughly assessed and strict conditions attached to the Works Approval. Mr Lee Miezis, Chief Executive Officer of the EPA, explained:

EPA assessed the proposed facility, including consideration of risk to the environment and human health and the impacts of lead processing from the facility. We certainly also undertook a lot of engagement with local community. We engaged independent expert technical reviewers, and all of their recommendations were adopted and included in conditions that were attached to the works approval.⁵³

In relation to assessments of the proposal, the EPA found that the:

- proposed and modelled maximum air emissions were considerably lower than or below thresholds set under Victorian and international standards
- the risks posed by lead from the facility, when combined with the facility's proposed pollution controls, were found to be negligible
- expected impacts on soil and air were both well below levels that were considered safe for human health
- human health risk assessment concluded that potential cumulative exposure from inhalation, skin contact, and ingestion pathways is lower than health-based guideline levels
- when assessing inhalation of airborne lead, model concentrations were found to be about 350 times lower than levels that are not expected to pose a risk to human health.⁵⁴

The EPA Works Approval contains a range of conditions that the proponent must satisfy before the facility can be constructed, including the:

- requirement to develop an ongoing community engagement plan to be used during construction and operation of the facility
- development of a comprehensive environmental monitoring program, which will include real-time air emissions monitoring and ongoing environmental monitoring for impacts to air, to soil and to water
- requirement for adequate emergency planning and risk management to ensure safe operation of the facility.⁵⁵

The Works Approval also stipulated maximum emissions for the proposal, requirements for fugitive air emission control systems, and the design of a continuous and periodical air emission monitoring program to demonstrate compliance with air quality standards,

⁵³ Mr Lee Miezis, *Transcript of evidence*, p. 12.

⁵⁴ *Ibid.*, p. 12.

⁵⁵ *Ibid.*, pp. 12-13.

including testing of stack emissions, as well as site boundary, soil and surface water monitoring.⁵⁶ Dr Paul Torre, Senior Applied Scientist at the EPA, spoke to the overall assessment and approvals process and how it operates to ensure emissions from the proposed facility would be in line with required standards:

The modelling is only one aspect of the whole assessment. During the works approval there was an expert who came in to have a look at those controls and to then critique and vigorously review the capability of that technology to undertake those emissions. So it is all based on how much they can control and will the controls be effective. That independent then provided that back into the assessment process—just to understand that. But also in the works approval process there are mechanism systems in place. They need to demonstrate clearly, with evidence, that all the control technologies and the processes and systems are working accordingly, and they need to do those tests and show them so they can actually meet those emission rates. So there is that rigour in our assessments and developments, a process to try to ensure that. Once they are met, that is when EPA signs off on it. But they need to meet that standard. Now that we have got the new Act, the focus is really on the prevention and how effective they are in minimising and preventing those emissions. That is how the works approval system works.⁵⁷

Latrobe City Council commissioned an independent assessment to assist its consideration of the ULAB proposal. The review provided information about primary and secondary lead smelters in Australia, and examined the site location, proposed buildings, storage, potential emissions, and alternative technologies. The review concluded that environmental compliance of the proposed facility could be achieved by virtue of:

- The buffer distance between the proposed facility and sensitive receptors is well in excess of that required and that recommended by EPA.
- All processing occurring within a fully enclosed building that is maintained under a negative atmospheric pressure.
- The relatively few similarities between primary lead smelting and the more sophisticated process involving secondary lead smelting outlined by the proponent.
- The highly automated emissions management systems, each with designed redundancy.
- These features provide a sound foundation for achieving a high standard of environmental performance. Should they be absent then we would not be making such a conclusion.
- The large margin of safety between the maximum predicted ground level concentrations and the maximum allowed ground level concentrations.
- The offer from the proponent to make available live and on-line emissions monitoring data.

⁵⁶ Latrobe City Council, *Submission 57*, pp. 13-14

⁵⁷ Dr Paul Torre, *Transcript of evidence*, p. 13.

- The regulatory powers available to the EPA and council.
- The soon to become available rights of affected individuals to commence their own court actions in the event of alleged environmental breaches.⁵⁸

Based on the above conclusions, the review considered that the proposal would achieve a high standard of environmental performance, and emissions from operation could be contained and treated within the plant building using dedicated air pollution control equipment.⁵⁹

5.2.3 Community concerns

The application and approval process for the ULAB facility has been the source of significant community opposition and concern. Key issues raised include:

- The facility will add to the already high levels of air pollution in the Latrobe Valley.
- The Latrobe Valley community is highly sensitised to the health impacts of air pollution and occupational safety as a result of decades of harm related open cut brown coal mining and energy generation, and the physical, mental and social consequences of the Hazelwood Mine Fire.
- EPA standards relating to air emission for lead are out of date, Australia's standards are three times lower than United States (US) standards.
- Concerns regarding the EPA publication *1518: Recommended Separation Distances for Industrial Residual Air Emissions – Guideline* (2013), in particular that it notes that 'state of the art' facilities are not guaranteed to achieve elimination of emissions 100% of the time, which can lead to emissions affecting sensitive land uses beyond the boundary of the source premises.
- Proximity of the proposal site to Hazelwood North Primary School, dwellings and agricultural activities within a 2km radius of the proposed ULAB recycling facility.
- The EPA does not currently effectively monitor or measure lead levels and other contaminants in the air.
- There was a lack of independent analysis and assessment of the project, notably because the EPA accepted the applicant's own emissions data from a model plant in China which was extrapolated to Latrobe.

These concerns are discussed in the following sections.

⁵⁸ Latrobe City Council, *Submission 57*, p. 14.

⁵⁹ *Ibid.*

Adequacy of the assessment and lack of an Environment Effects Statement

As noted above, the ULAB proposal has garnered significant and sustained opposition across the Latrobe Valley community. Many Latrobe Valley community stakeholders have strongly argued that the assessment contained significant flaws, contradictory statements and a lack of independent analysis. ALiVe listed concerns, including:

- The EPA's acceptance of the applicant's own emission data based on a model plant in China without further scrutiny.
- No literature review of emissions from similar facilities was undertaken.
- No emissions modelling based on internationally accepted emission data-sets was undertaken.
- No attempt was made to address apparent contradictions between the EPA's expert report and statements made by the applicant.
- A failure to meet guidelines outlined in the State Environment Protection Policy (Air Quality Management) (SEPP AQM) (2001) for Air Quality Control Regions.
- Acceptance of National Pollutant Inventory (NPI) data for existing lead emissions without any investigation into the cumulative impact of air pollution and legacy contamination (discussed in further detail below).
- A failure to meet guidelines outlined in the US national emissions standards for secondary lead smelters despite the claim this formed the basis of the EPA's assessment.
- A failure to assess, estimate and consider fugitive emissions.
- Claims that the facility would have full enclosure despite the three-quarter high slag cooling pool house walls specifically to allow for release of steam, containing lead, directly into the atmosphere.
- Acknowledgement that the current standards around are being no longer reflective of international best practice was not accompanied by follow-through to address this issue.
- No referral to the Department of Health to assess the human health impacts of the plant, despite international consensus that there is no safe level of lead exposure.⁶⁰

Of particular note were the strong concerns raised by the Latrobe City community regarding outdated standards applied to the assessment of industrial emissions. Ms Bronya Lipski, a lawyer with Environmental Justice Australia, stated it was 'another example of a works approval application going through that did not include international best practice pollution controls for that type of facility'.⁶¹

⁶⁰ ALiVe Inc, *Submission 105*, p. 4.

⁶¹ Ms Bronya Lipski, Lawyer, Environmental Justice Australia, public hearing, Melbourne, 29 June 2021, *Transcript of evidence*, p. 6.

In relation to this matter, Latrobe City Council submitted its support for the review and amendment of EPA standards to bring them into alignment with best practice international standards. Any changes required to subordinate instruments would require a Regulatory Impact Statement allowing industry comment and implications to be understood.⁶²

Latrobe City Council noted that while measures in the works approval for emissions monitoring were appropriate and supported, it was concerned there was no requirement for continuous monitoring and publicly available, 'real time' reporting. It submitted:

the inclusion of such requirements would likely support greater confidence by the community and ensure greater accountability of operators due to the transparency and dissemination of information.⁶³

The lack of an environment effects statement (EES) in relation to the proposal was also a significant source of criticism, driven in large part by the EPA's reliance on the environmental assessments supplied by the applicant.

Latrobe City Council informed the Committee that, in its formal submission to the EPA, it did not request an EES in relation to the works approval application, and the works approval assessment report notes that the Department of Environment, Land, Water and Planning confirmed that the applicant was able to demonstrate the EES referral criteria were not met.⁶⁴

However, Ms Jones (ALiVe) argued that a lack of due process had been applied to the project and, at a minimum, it should be put on hold for an EES to be undertaken.⁶⁵ Healthy Futures was also in favour of an EES being done.⁶⁶

Heavy metals emissions

Latrobe City Council's independent environmental assessment of the ULAB proposal provided the following information in relation to lead:

- a number of other countries have more stringent air quality standards for lead in air than applies in Victoria
- the lowest limit is the 3-month rolling average of 0.15 µg/m³ which is the US National Ambient Air Quality Standard for lead
- the magnitude of those differences in the standards is not large

⁶² Latrobe City Council, *Submission 57*, pp. 7–8.

⁶³ *Ibid.*, pp. 13–14

⁶⁴ Latrobe City Council, response to questions on notice, p. 3; Environment Protection Authority Victoria, *SO1003702 Chunxing ULAB Recycling Project Works Approval Assessment Report*, p. 27.

⁶⁵ Ms Maggie Jones, *Transcript of evidence*, p. 48.

⁶⁶ Ms Veronique Hamilton, *Transcript of evidence*, p. 64.

- based on the data reviewed, the proposed Hazelwood North ULAB recycling facility would achieve compliance with the air quality standards in any of the countries/regions examined
- a direct comparison between standards is only possible when the averaging time being used is the same.⁶⁷

The EPA does not monitor ambient air lead or mercury emissions in Victoria. The NPI is currently the only information source it can draw-on to understand the lead or mercury burden in Latrobe Valley or elsewhere in Victoria.

There is significant community concern about the health and environmental impacts of lead, mercury and other heavy metal emissions in Latrobe Valley based on the cumulative impacts of lead and mercury pollution from nearly 100 years of mining and heavy industry in the region.⁶⁸ The health burden of mercury and lead in Latrobe Valley alone is estimated at AUD\$52 million and AUD\$28.8 million respectively.⁶⁹

Because there is no lead emissions data, the EPA relied on cumulative lead emissions data from the 2018-19 NPI reporting period as part of its assessment of ULAB facility works approval application. There are significant issues associated with using NPI data because reported emissions are estimates based calculations rather than real-time monitoring data of point-source emissions.⁷⁰

ALiVe submitted that the current national and Victorian standard for lead in ambient air of 0.5 mg/m³ and in soil of 300 mg/kg is not protective of human health, with international research indicating the standard should be capped at 0.02 µg/m³.⁷¹

Ms Jones told the Committee that the EPA's assessment did not include a cumulative assessment on lead:

I actually received a response to some questions that I sent to the EPA's CEO...One of the questions that I had asked is, 'Did the EPA attempt to establish a baseline measure for lead in air across the region? If not, why not?'. And what they said was that the current policy that determines acceptable emission limits is based on data from across Victoria, but the EPA cannot be certain whether that baseline data included the Latrobe Valley. They also went on to say that there is no available ambient data after 2004. Without this data a reliable baseline cannot be established. The EPA does not have the resources or capability to undertake the complex process of attempting to extrapolate ambient data to establish a reliable baseline.⁷²

Environmental Justice Australia submitted it was understandable that community outrage regarding the health impacts of lead was stoked by the approval of the

⁶⁷ Latrobe City Council, response to questions on notice, pp. 2-3.

⁶⁸ Ms Maggie Jones, *Transcript of evidence*, p. 48.

⁶⁹ Environmental Justice Australia, *Submission 110*, p. 15.

⁷⁰ Ibid.

⁷¹ ALiVe Inc, *Submission 105*, p. 15.

⁷² Ms Maggie Jones, *Transcript of evidence*, p. 48.

ULAB proposal without having access to critical environmental information about the pre-existing lead burden in the region or access to reliable lead emissions data other than the NPI.⁷³

ALiVe noted that the EPA refused a request to undertake broad scale testing of soil and establish air monitors for heavy metals including lead as part of the ULAB proposal assessment.⁷⁴

In order to understand and appropriately regulate heavy metal emissions, stakeholders recommended the EPA:

- at a minimum, monitor lead and mercury emissions
- undertake a comprehensive assessment of the heavy metal contaminants in the Latrobe Valley to determine baseline data for the region and allow accurate assessment of cumulative impacts
- establish an emissions monitoring network for heavy metals, such as lead and mercury, in industrial regions such as Latrobe Valley
- design and implement a heavy metal soil testing program in Latrobe Valley to determine baseline and additional levels of, at least, lead and mercury.⁷⁵

This issue is also discussed in relation to mercury in Section 5.3.1 below.

RECOMMENDATION 11: That the Victorian Government consider conducting an assessment and monitoring of heavy metals emissions in the Latrobe Valley if it is not already doing so.

Community engagement

In its submission, ALiVe noted ‘the community was determined to be involved in the process’ for the ULAB proposal.⁷⁶ However, Mr Steven Piasente, Chief Executive Officer at Latrobe City Council, argued that insufficient work had been done by the Chunxing Corporation and the EPA to address community concerns. He noted that support from the community was contingent the community’s understanding of the environment and economic outcomes, supported by a rigorous and well tested evaluation process.⁷⁷ Mr Piasente highlighted the Australian Paper ‘energy from waste proposal’ as a good example of this compared to the ULAB proposal:

In this instance—in terms of that proposal you touched on there, the used lead-acid battery—council had asked for some understanding of the background levels of lead in the environment and then for ongoing real-time air quality monitoring of lead in

⁷³ Environmental Justice Australia, *Submission 110*, p. 15.

⁷⁴ ALiVe Inc, *Submission 105*, p. 6.

⁷⁵ Environmental Justice Australia, *Submission 110*, pp. 14–16; ALiVe Inc, *Submission 105*, p. 17.

⁷⁶ ALiVe Inc, *Submission 105*, p. 3.

⁷⁷ Mr Steven Piasente, Chief Executive Officer, Latrobe City Council, public hearing, Melbourne, 28 June 2021, *Transcript of evidence*, p. 9.

relation to into the future when that proposal, if it does proceed, becomes a reality. And so certainly from council's perspective we have made a number of inquiries to the EPA in the past about things that they might do or the things that council would like to see. There have certainly been questions asked by councillors and the community about how they go about their role in terms of setting standards—that example of the used lead acid battery, is it the most up-to-date standard that should apply to that type of facility?—and also questions around how proposals like that are assessed. I used the example earlier of the work that Australian Paper did in terms of really good engagement with the community about what they were proposing and how they went about it as compared to this proposal, the used lead acid one, where there was not that piece of work done. So the community—rightly, I think—had serious questions about its approval, as did council, and it ended up not supporting it.⁷⁸

Mr Piasente argued the experience with ULAB illustrated the need for guidelines to be developed to assist project proponents in undertaking effective community engagement:

there might be some better guidelines about some standards or an approach to how you would actually best engage with the community around those proposals. You need to meet minimum requirements to lodge a planning application, but that is really the technical aspect. It is not actually helping the community, from my perspective, fully understand what the proposal is and what the standards might be and engaging with them around that. You often get applications from technical experts. They might know their field and they might know their application, but they are not necessarily experts in that community engagement, helping the community to understand their proposal. So that is I suppose a variation that I see that certainly has helped—and I use the Opal Australian Paper proposal. They did it really well. If you look at the ULAB one, they did not, from my perspective—and we did encourage them to do that. It was left to them, and we tried providing with them support. But I think some better guidance around that might be useful; that is what I am suggesting.⁷⁹

ALiVe argued for changing community engagement rights by embedding clear engagement processes to ensure people could express their perspectives and be heard and creating a 'social license' clause to:

- give voice to marginalised communities
- foster allow healthy and informed debate
- avoid costly court proceedings.⁸⁰

It conducted a questionnaire to collect community stories and sentiments regarding the ULAB proposal, including questions on the adequacy of community consultation, to inform its submission and develop recommendations. ALiVe recommended the

⁷⁸ Ibid., p. 8.

⁷⁹ Ibid., pp. 9–10.

⁸⁰ ALiVe Inc, *Submission 105*, pp. 16–17.

Government embed community liaison and the establishment of a 'social license' into all planning decisions and new EPA license applications.⁸¹

The basis of ALiVe's recommendation was reflected in Mr Piasente's observation that he was seeing 'a lot more interest in that process from people in the community who might want to see a different future than what has been in the past in terms of that strong social licence around industry development'.⁸²

Mr Piasente informed the Committee that concerns and increased anxiety around what a project will deliver and what it will mean for community members has meant that, from Council's perspective, any proposals to establish new industry would be expected to meet modern, contemporary standards of air quality.⁸³

RECOMMENDATION 12: That the Victorian Government consider developing effective community consultation guidelines and/or practice notes to assist project proponents in meeting community expectations, especially where heavy industry is in operation or likely be in operation.

5

Ministerial intervention

The Minister for Planning's intervention to override the Council's decision to refuse the permit application drew significant criticism from the community and Latrobe City Council.

ALiVe submitted that the ULAB proposal represented more than just the right to health and wellbeing, '[f]or many in the community the Ministers intervention truncated the right to have a say in the Latrobe Valley's transition from coal and their fundamental rights to have a say in the regions future'.⁸⁴ In its submission, it listed a number of community concerns raised regarding the criteria used by the Minister:

- The claim the project is of state or regional significance despite not being classed as such in relation to the waiving of the requirement for an EES.
- A VCAT proceeding in line with standard planning approval processes cannot be considered 'undue delay'.
- The negative financial, psychological and health impact on the community outweighs the claimed benefits of job creation.
- The nearby primary school will suffer, with 2 families having already moved their children to new schools in 2021 due to the proposed facility.
- The decision is a reversal of the Government's previous commitment to the establishment of the region as a Health Innovation Zone.

⁸¹ Ibid., pp. 2, 16–17, 21.

⁸² Mr Steven Piasente, *Transcript of evidence*, p. 5.

⁸³ Mr Steven Piasente, *Transcript of evidence*, p. 5.

⁸⁴ ALiVe Inc, *Submission 105*, p. 8.

- The claim that the zoning was ‘right of use’, despite the plant requiring a planning permit and not meeting the Productivity Commission’s definition of ‘as of right use’.
- The Minister’s comment that the facility is subject to negative pressure demonstrates a complete disregard of the EPA works approval that set a maximum annual rate of lead of 54 kg.⁸⁵

Latrobe City Council publicly expressed its disappointment and frustrations about the ministerial intervention and has sought to ensure that community sentiment about the health and environmental impacts of the proposal have been communicated to the Government.⁸⁶ Mr Piasente observed that the approval of the ULAB proposal despite Council’s opposition did not serve to instil community confidence about how government decisions were made:

Obviously it was ultimately approved, but there were still questions. There were a couple of reports that went up subsequent to that issue being approved by the minister for council to consider, and it has had a significant ongoing impact, I think, on the community. One of the things I have said to the councillors and also to my staff and others is that the biggest impact the approval of that proposal has had is ongoing concern from some in the community about the role of government in stepping in and making a decision when there was certainly concern around that. That I think also flows on to concern around the role of the EPA having approved it through the EPA works approval process. There are still question marks on behalf of the community about, ‘Why would they approve that when council opposed it?’, as an example. So it certainly has not helped in terms of the community having confidence in government decisions in that example.⁸⁷

Such sentiment was underlined by Ms Jones who, at a public hearing, quoted comments from an unnamed resident of Morwell:

fast-tracking of the proposal denied the residents of Hazelwood North and the surrounding areas a democratic voice in the process. The government failed to follow their own due process. Such a decision breeds mistrust and fails to take into account the health innovation zone and the lack of an environmental statement. The residents affected by the proposed lead smelter were asked to follow due process by the government regulatory authorities when the government itself broke rank.⁸⁸

Healthy Futures argued that when substantial community sentiments about potential health issues are expressed in the way they have been for the ULAB proposal, they should be respected and appropriately addressed rather than overruled.⁸⁹

⁸⁵ ALiVe Inc, *Submission 105*, pp. 3, 7–8; Latrobe City Council, response to questions on notice, pp. 7–8.

⁸⁶ Latrobe City Council, ‘Special Council meeting – Used Lead Acid Battery (ULAB) recycling facility at Hazelwood North’, (n.d.), <https://www.latrobe.vic.gov.au/news-and-media/Special_Council_meeting_Used_Lead_Acid_Battery_ULAB_recycling_facility_at_Hazelwood_North> accessed 23 September 2021.

⁸⁷ Mr Steven Piasente, *Transcript of evidence*, pp. 8–9.

⁸⁸ Ms Maggie Jones, *Transcript of evidence*, p. 44.

⁸⁹ Healthy Futures, *Submission 70*, pp. 2–3.

FINDING 5: Community members in the Latrobe Valley experienced significant frustration as a result of the Minister for Planning’s approval, under the *Planning and Environment Act 1987* (Vic), of an application for a used lead acid battery secondary smelter about which increased concerns about air quality were held by the local community.

RECOMMENDATION 13: That the Victorian Government conduct an environment effects statement on the proposed used lead acid battery secondary smelter in Hazelwood North.

5.3 Brown coal power stations and the EPA’s periodic licence review

Further to the note in the introduction to this chapter, the Committee has not attempted to conduct a discrete, detailed inquiry into the existence and operation of brown coal-fired power stations in the Latrobe Valley or the recent review of licence conditions undertaken by the EPA. These issues are addressed here in the context of concerns related to air pollution raised by stakeholders to the Inquiry.

5.3.1 Background

Latrobe Valley is home to three brown coal-fired power stations situated within a 30 km zone, which supply electricity to all of Victoria:

- AGL Loy Yang A (Loy Yang)
- IPM Loy Yang B (Loy Yang)
- Energy Australia Yallourn (Yallourn).

The three brown coal power stations in Victoria were designed in the 1970s–1980s and commissioned in the 1980s–1990s. All three power stations are scheduled for closure in the next 15–25 years.⁹⁰ A fourth power station, Hazelwood, was decommissioned in 2017.⁹¹

The Latrobe Valley also contains one of the world’s largest coal deposits, accounting for most of Australia’s brown coal reserves and 25% of known global reserves. Two open cut mines in the region supply coal to feed the three power stations.⁹²

As noted in Chapter 3, the EPA undertakes licence reviews of brown coal power stations approximately every 5 years to ensure that licence conditions remain consistent with current environmental legislation and regulations. In 2017, the EPA commenced a

⁹⁰ Environment Protection Authority Victoria, *Brown coal-fired power stations licence review: public report*, March 2021, pp. 3, 18.

⁹¹ Engie, ‘Hazelwood Rehabilitation’, (n.d.), <<https://engie.com.au/home/what-we-do/our-assets/hazelwood-rehabilitation>> accessed 20 September 2021.

⁹² Victorian Government, ‘Earth Resources: Coal’, June 2021, <<https://earthresources.vic.gov.au/geology-exploration/coal>> accessed 20 September 2021.

licence review for three brown coal power stations in the Latrobe Valley, which was completed in March 2021. This is covered in detail in Section 5.3.2 (below).

In relation to particulate matter, to comply with licencing agreements, each power station utilises electrostatic precipitators⁹³ to extract solid particles from boiler flue gases before the gases are discharged into the atmosphere.⁹⁴

Unfiltered brown coal power stations in the Latrobe Valley are the single largest source of Victoria's anthropogenic air pollution and are among the worst polluting power stations per kilowatt hour of electricity produced in the world.⁹⁵ According to NPI data, electricity generation (including coal mining) is the largest source of coarse particle emissions (PM₁₀), fine particle emissions (PM_{2.5}) and sulfur dioxide emissions (SO₂) each year.⁹⁶ The closure of the Hazelwood mine and power station in March 2017 does not appear to have significantly changed PM_{2.5} levels in the region (the annual PM_{2.5} average at Morwell South, adjacent to the former mine and power station site, dropped by only 3% from 2016–2017).⁹⁷

The Climate and Health Alliance submitted the national health cost of air pollution from coal-fired power was estimated at \$2.4 billion annually in 2009, and national mortality costs estimated at \$16 billion per year.⁹⁸

Another 2020 report used industry-standard air modelling to estimate health impacts of air pollution from coal fire power stations (see Table 5.3 below). The report estimated that health impacts per person in the region were larger than the rest of Victoria (e.g. annual premature deaths due to coal pollution were estimated to be more than seven times higher per capita in the Latrobe Valley compared to Victoria) as a result of the concentration of power station pollution in the Latrobe Valley. The modelling also showed that the air pollution from Victorian power stations could travel considerable distances from a power station's location, with transport of PM_{2.5} reducing air quality in Melbourne and as far west as Warrnambool, and as far south as Burnie in Tasmania.⁹⁹

93 An electrostatic precipitator separates solid particles from gases by electrically charging the dust particles and then attracting them to collecting electrodes of opposite polarity. On the electrode surface the dust particles give up their charge and, in time, form a layer which can be rapped off and removed. The electrostatic precipitators remove on average approximately 99% of the particles, with a peak separation efficiency (depending on the ash properties and other process conditions) of 99.5%.

94 AGL Loy Yang Pty Ltd, 'AGL's Response to the Issues Raised by the Community During the EPA's Brown Coal-Fired Power Station Licence Reviews', 6 August 2018, p. 12, <https://s3.ap-southeast-2.amazonaws.com/hdp.au.prod.app.vic-engage-files/3715/3359/9643/AGL_Loy_Yang_A_response_to_community.pdf>.

95 The Lung Health Research Centre, University of Melbourne, *Submission 100*, p. 19 (with sources).

96 Environmental Justice Australia, *Submission 110*, p. 8.

97 Commissioner for Environmental Sustainability Victoria, 'AIR (A)', *Scientific Assessment Part III*, 2018, p. 16 <https://www.ces.vic.gov.au/sites/default/files/SoE2018ScientificAssessment_A.pdf>.

98 Climate and Health Alliance, *Submission 79*, p. 5 (with sources).

99 Healthy Futures, *Submission 70*, p. 1 (with sources); Environmental Justice Australia, *Submission 110*, pp. 8–9 (with sources).

Table 5.3 Comparative estimated health impacts of air pollution from coal-fired power stations

Health outcome	Latrobe	Gippsland	Victoria
Premature deaths	17	37	195
Cases of low birth weight	11	33	248
Instances of children experiencing asthma symptoms	217	580	4,188

Source: Healthy Futures, *Submission 70*, p. 1.

However, as discussed in Section 5.1.2 (above), the tension between health, environmental and economic impacts of heavy industry and power generation in the Latrobe Valley is a complex matter. Addressing the planned closure of coal-fired power stations in Latrobe, Mr Piasente observed that the region's transition away from coal-fired power generation would be challenging:

That...may have a benefit in terms of obviously reducing emissions, but I have touched on that being a complex matter for Latrobe city. It has obviously economic outcomes, so ensuring that— And whenever we have spoken at those inquiries in the past it has been around the need to have a good plan around that and support job creation and economic outcomes into the future to ensure that this community is not disadvantaged. And we have been at the forefront obviously of providing power for the state for a very long period of time, as you would well know. There have been benefits of that in terms of employment, but that transition journey is going to be a long one. There might be improvements in air quality in terms of less pollution from those sorts of industries, but there is that complex challenge around ongoing employment.¹⁰⁰

Mercury

As noted in Section 5.2.3 (above), the EPA does not monitor ambient air lead or mercury emissions in Victoria. The NPI is currently the only information source it can draw on to understand the lead or mercury burden in Latrobe Valley or the rest of Victoria.

There is significant community concern about the health and environmental impacts of lead, mercury and other heavy metal emissions in Latrobe Valley, including mercury emissions from power stations.

Mercury is a noncriteria air pollutant for which health implications are widely acknowledged, and the specific health burden for Victoria's Latrobe Valley has recently been evaluated.¹⁰¹

Environmental Justice Australia noted that recent academic studies undertaken by at Melbourne University and the Australian National University had demonstrated that mercury deposition in Latrobe Valley was connected to emissions from coal-burning

¹⁰⁰ Mr Steven Piasente, *Transcript of evidence*, p. 6.

¹⁰¹ The Lung Health Research Centre, University of Melbourne, *Submission 100*, p. 6.

activities which have increased background levels of mercury deposition into the surrounding environment.

5.3.2 Brown coal power station licence review

Review summary

In 2017, the EPA commenced a licence review for three brown coal power stations located in Latrobe Valley—AGL Loy Yang A, IPM Loy Yang B and Yallourn. The EPA undertakes licence reviews of brown coal power stations approximately every 5 years to ensure that licence conditions remain consistent with current environmental legislation and regulations. This was the first systemic review of the licences for the three Latrobe Valley power stations. The review was completed in March 2021.¹⁰²

The review was conducted under s 20(9) of the *Environment Protection Act 1970 (Vic)* (the 1970 Act) which empowers the EPA to amend or add conditions to licences already issued.

A section 20B community conference was conducted in 2018 to better understand community concerns and identify potential solutions. The conference report made several recommendations across seven topic areas for the EPA to consider as part of its review. The recommendations are set out in Table 5.4 (below).

Table 5.4 Section 20B conference report recommendations to the EPAs brown coal power station licence review

Topic area	Recommendation
1. General	<ul style="list-style-type: none"> • Licence conditions should be outcome-focussed and not prescriptive of the method employed to achieve the outcome. • Consider a more regular licence review process to ensure that the licences remain aligned with government policy, community expectations, and advances in technology.
2. Monitoring and reporting	<ul style="list-style-type: none"> • Consider conducting a review of the monitoring stations in the Latrobe region to ensure the number, location and operation of monitoring stations are compliant with national air quality monitoring standards and reflect the current and future plans for the housing footprint in the area. • Consider a risk-based approach to determine the appropriate monitoring frequency and suite of pollutants tested, and community request for real time monitoring of all pollutants including in-stack emissions monitoring. • Consider community request for more regular reporting of the real-time monitoring data, and integration and public release of the data collected by EPA and Latrobe Valley Air Monitoring Network (LVAMN). • Further consider an appropriate format for public release of data in simple and plain language. Data should be accessible in a summary form, and the raw data available in a user friendly and downloadable format. • Further consider idea that power station operators contribute to the cost of monitoring and reporting processes, while maintaining independence of data collection and reporting processes.

¹⁰² EPA Victoria, *Brown coal-fired power stations licence review: public report*, March 2021, p. 3.

Topic area	Recommendation
3. Continuous improvement	<ul style="list-style-type: none"> Further consider the idea that licences should require evidence of continuous improvement. Consider including licence conditions to require continuous improvement plans, and appointment of an independent auditor to review plans and monitor the progress. Power station operators should consider conducting a joint feasibility study of best-practice pollution reduction technologies and controls to identify potential outcomes, likely benefits, and likely implementation costs.
4. Accountability	<ul style="list-style-type: none"> Consider the request to report on exceedances and licence condition breaches, including enforcement action taken. Consider request for more clarity on data and reporting verification processes of air quality monitoring data to provide more transparency and confidence around EPA's accountabilities and data reporting chain.
5. Best practice site management	<ul style="list-style-type: none"> Further consider licence conditions designed to protect both surface and ground water quality, and appropriate water quality monitoring of discharges, ensuring monitoring data is publicly available. Also consider need for a hydrological assessment of any potential impacts and accessions to underground aquifers. Consider conducting a review of current water discharge limits to ensure adequate protection to surface and ground water meets community expectations. Further consider licence conditions that ensure best practice dust management at mine sites, including need for boundary dust monitoring and effective co-regulation and enforcement processes for fugitive dust emissions exceedances. Power station operators should consider effective mechanisms to inform the local community about mine closure bonds and financial assurances covering each site. Consider request for appropriate levels of community consultation on site rehabilitation issues, designs, and implementation processes and timelines.
6. Health impacts	<ul style="list-style-type: none"> Consider idea that it is critical for local community to have access to real time data for air quality and adequate alerts for periods of higher risk of pollutant emissions to enable people to better make informed decisions to manage their health. Clarify level of risk associated with water vapour emissions and pollutants likely to be in the water vapour component; and consider expanding the list of pollutants to be monitored to include water vapour. Consider concept of a pollution emissions exceedance levy to be paid back to the community as health compensation for exceedances of licence limits.
7. Climate change	<ul style="list-style-type: none"> The community expects the EPA to consider climate change in all decisions. The community submitted that EPA needs to consider the request for more clarity on EPA's scope of powers under the <i>Climate Change Act 2017</i> (Vic) and what greenhouse gas (GHG) regulatory powers can apply to the licence review process. Power station operators should consider joining Victoria's Take2 climate change pledge program (to reduce emissions) to align with State Government policy and community expectations of corporations operating in Victoria. Further consider licence conditions that require a Continuous Improvement Plan for GHG emissions with clear targets, and a clear implementation plan; consider including a staged/stepped reduction in emissions targets and the use of an independent auditor to monitor progress; also consider mechanisms to communicate progress to the community and key stakeholders.

Source: EPA Victoria, *Brown coal-fired power stations licence review: public report*, March 2021, pp. 9–11.

Under the 1970 Act, the EPA was required to have regard to the matters raised in the section 20B community conference. As a result of the review, EPA made amendments to the licence conditions for air emissions, wastewater, mines and landfills. The key amendments related to air emissions were:

- Consistency of parameters required to be monitored across all three licences.
- Discharge maximum limits and monitoring requirements for mercury fine particles (PM_{2.5}) and coarse particles (PM₁₀) were added to each licence.
- Development of a monitoring program to establish the distribution PM_{2.5} and PM₁₀ emissions and to inform future changes to emission limits.
- The air discharge limits for most parameters reduced.
- Requirement for continuous monitoring of air emissions and provision of the data with community through licence holders' company websites.
- Yallourn was required to undertake continuous emissions monitoring system to be able to monitor in real time oxides of nitrogen and sulfur dioxide, bringing it in line with Loy Yang A and B.
- Added monitoring condition for relevant class 3 indicators (extremely hazardous substances that are carcinogenic, mutagenic, teratogenic, highly toxic, or highly persistent, and which may threaten the beneficial uses of the air environment).
- In accordance with SEPP AQM, introduction of a risk management monitoring program requirement—due to be implemented under the amended *Environment Protection Act 2017* (Vic)—to require regular and robust analysis of the practicability of introducing continuous technological and process improvement to reduce emissions. With requirement for licence holders to describe how identified risks are being minimised where they cannot be eliminated (EPA's expectation is that this condition requires the licence holders to continually assess emerging technologies concerning emissions reductions and determine their suitability).

The periodic licence review process focused on monitoring, reporting and pollution emission limits to ensure compliance with the state air quality standards.¹⁰³ Dr Torre from the EPA explained that, as it was done under the old Environment Protection Act, the air quality management framework under that legislation dictated all the licence conditions were considered, including the operation, the power generated, the technology in use, the emissions levels, and, importantly, air pollution concentrations within surround towns of the Latrobe Valley. He told the Committee:

we have actually, by putting these [emission] limits, effectively limited the amount of coal that can be burnt by the power stations because of the limitations. And through this process as well they have done a number of upgrades to improve general efficiency and also maintenance to improve their main source of control...So it is really about that combined effort of trying to reduce those emissions and in the future looking at that control technology to drive those emissions down even further.¹⁰⁴

¹⁰³ Mr Lee Miezis, *Transcript of evidence*, p. 16.

¹⁰⁴ Dr Paul Torre, *Transcript of evidence*, p. 16.

Community response to Review outcomes

In general, evidence to the Committee suggested a large portion of the community was disappointed with the Review outcome, considering it a missed opportunity to implement regulations and standards that are consistent with best international practice.¹⁰⁵

Healthy Futures expressed disappointment that the renewed licence conditions apparently did not require the power stations to adopt any new technologies to reduce emissions,¹⁰⁶ while Ms Lipski from Environmental Justice Australia argued the Review was the most recent example of the EPA not putting best practice standards into practice. She characterised it as:

An example of, firstly, the glacial rate at which change can be made, because it was a process that went on for three years, and, secondly, despite knowing that the stack emissions limits for coal-fired power stations are not as strict as they could be and certainly not as strict as what they are in other jurisdictions and despite being presented with expert evidence demonstrating that the air modelling that the power stations had done and the engineering responses to this whole brown-versus black-coal furphy was just that, they had an opportunity to implement international best practice standards into the licences of the power stations and did not do it.¹⁰⁷

The Lung Health Centre was disappointed to note that no stipulation for the Yallourn power station to undertake immediate upgrades requiring the installation of filters and scrubbers considered to be standard use worldwide and capable of reducing SO₂ point source emissions by over 90%. It called for the installation of standard pollution controls such as flue gas desulfurisation and selective catalytic reduction equipment into all coal fired power stations.¹⁰⁸ Associate Professor Robyn Schofield, Director, Environmental Science Hub at the University of Melbourne, explained:

So filtration is one aspect. There is also the flue gas desulphurisation and those catalytic converters for the NOx and things. There is no question they are our biggest source of pollution to those local areas there. For brown coal, it is wet, and the efficiency of filters is actually reduced because it is brown coal that is being burnt, but those fabric filters et cetera that they use in New South Wales are less efficient on those power stations on the whole. Should it be done? I absolutely think the gains in the air quality speak for themselves, and mercury obviously and those heavy metals that are coming out are then captured, but you only capture mercury through the desulphurisation process.¹⁰⁹

Environmental Justice Australia was particularly critical, noting that despite significant contributions by community members and health experts, the Review outcomes suggested the EPA's perception of its effectiveness was out of step with the

¹⁰⁵ Dr Harry Jennens, Coordinator, Healthy Futures, public hearing, Melbourne, 28 June 2021, *Transcript of evidence*, pp. 62–63.

¹⁰⁶ Healthy Futures, *Submission 70*, p. 2.

¹⁰⁷ Ms Bronya Lipski, *Transcript of evidence*, p. 6.

¹⁰⁸ The Lung Health Research Centre, University of Melbourne, *Submission 100*, pp. 19–20 (with sources).

¹⁰⁹ Associate Professor Robyn Schofield, Director, Environmental Science Hub at the University of Melbourne, public hearing, Melbourne, 20 June 2021, *Transcript of evidence*, p. 50

community's. It argued that the EPA must function as a fearless and robust regulator to regulate and enforce pollution in line with international best practice standards to protect health: It stated:

In short...the EPA chose to ignore scientific health data and technology and maintained a "business as usual" approach to regulating air pollution. Some very small changes were made to improve the power station licences, but not anywhere near enough to reduce emissions and protect health. It is clear from the public report that industry significantly influenced the EPA's decision with respect to the licence amendments.¹¹⁰

Latrobe City Council welcomed the imposition of new emissions limits but questioned how monitoring these would support the community's ability to respond on poor air quality days given reporting would be retrospective and in general terms. Further, the Council noted:

- While air modelling undertaken for the Review indicated that standards for a range of air contaminants were often breached, it remained unclear on what response actions might be taken by industry or the EPA '[w]here exceedances were captured by industry-run monitors]'.
- No limitations were introduced for CO₂ emissions and that licence requirements in Victoria remained below those of other countries including the US, Europe and China.¹¹¹

Latrobe City Council observed that a reluctance to invest in substantial emission reductions treatments of power stations was understandable given pending closures. However, in considering the issue of energy and mining operations it was the Council's view that the needs and aspirations of the community in regard to environmental and public health considerations should be given a high priority.¹¹²

5.4 Committee comment

The Latrobe Valley experiences impacts from air pollution from a range of sources including industry, power generation, smoke, transport, mining and farming. The Committee recognises that the challenges associated with health impacts from air pollution faced by people in the Latrobe Valley are, in the main, relatively complex compared to many other parts of the State.

While air pollution is not a root cause of these complexities, it symptomatic of them and its very real impacts feed significant and legitimate community concerns. This was evident in the multitude of stakeholder submissions that addressed two issues covered in this Chapter: the ULAB recycling plant proposal and brown coal power stations.

¹¹⁰ Environmental Justice Australia, *Submission 110*, p. 20.

¹¹¹ Latrobe City Council, *Submission 57*, p. 6.

¹¹² *Ibid.*, pp. 6-7.

The Committee is of the view that meaningful and detailed consideration of these concerns must have regard to systemic and historical issues that are unique to the Latrobe Valley. This task was beyond the remit and capability of the Committee in this Inquiry.

The Committee suggests that a fully resourced, independent, broad-based inquiry into issues concerning the Latrobe Valley would be an appropriate way to consider and address many, often interrelated, challenges in a way that can lead to genuine and effective change.

6 Wood smoke

6.1 Landscape fire smoke

Landscape Fire Smoke is a recognisable source of air pollution in Victoria caused when atmospheric particulate matter arises from combustion in bushfires and planned burns. Both prescribed burns and bushfires emit smoke plumes as a result of incomplete combustion. Fires can emit up to 1% of the fuel load as particulate matter; the rate of fire emissions are affected by fire behaviour and the amount of fuel burned.¹

During the period 2007–2013, Australian weekly bushfire frequencies increased by 40%, particularly during Summer. Bushfires can create intense, protracted and far-reaching smoke events. The emissions from these fires have increased pressure on air quality both close to the areas burned and in much larger urban areas affected by the smoke. Climate change is expected to increase these pressures.²

The increasing threat from bushfires has increased pressure for more prescribed burning, which is a key activity undertaken to reduce the risk, intensity and impact of bushfires on public and private land. The Government has a legal obligation to manage fire risk in state forests, national parks and on protected public land. Planned burns are also undertaken by other land managers, including private land owners, for a range of other purposes such as managing weeds, pests and diseases.³

Smoke from planned burns and bushfires are typically the main contributors to the majority of PM_{2.5} exceedances, with exceedances on ‘mild, still days with medium humidity’ being mostly attributable to planned burn smoke.⁴ Smoke particles often rise high into the atmosphere and can have a life of hours to days. Smoke can also travel long distances and affect people a long way from the location of a fire.⁵

6.1.1 Bushfires

Bushfires are uncontrolled fire in the landscape. These particularly affect natural or seminatural vegetation, and occur largely on public land. Not all impacts of bushfire are negative, for example, heat and smoke are required to stimulate germination in some vegetation species and high temperatures cause seed release in others. However, bushfires that burn too hot, too frequently, or over too large an area can kill-off

1 Australia State of the Environment 2016, ‘Prescribed burning and bushfires’, *Ambient air quality (2016)*, 2016, <<https://soe.environment.gov.au/theme/ambient-air-quality/topic/2016/prescribed-burning-and-bushfires>> accessed 17 September 2021.

2 Ibid.

3 Victorian Government, *Submission 113*, p. 16.

4 Environment Protection Authority Victoria, *Air pollution in Victoria – a summary of the state of knowledge*, August 2018, p. 4.

5 Australia State of the Environment 2016, ‘Prescribed burning and bushfires’, *Ambient air quality (2016)*.

regeneration, reduce landscape diversity, change soil characteristics, increase erosion and reduce water quality. There is increased recognition of the cost of uncontrolled bushfires, both of human life and property, and ecosystem function and the natural environment.⁶

Bushfire smoke is a key contributor to air pollution in Victoria, particularly during the warmer months. Smoke from bushfires can:

- reduce air quality and visibility
- cause various health issues, ranging from irritation to the nose and eyes to serious lung and heart damage from smoke inhalation.

Air pollution from bushfires is a 'sporadic, major source of air pollution in regional and urban areas.'⁷

In Victoria, smoke from bushfires is often the cause of air pollution exceeding the four-hour average ozone standard for safe air quality. The *Victorian State of the Environment 2018* scientific assessment on air quality noted that:

although very few summer smog days have been recorded in Melbourne this century, with all Victorian stations recording 10 or fewer days exceeding the four-hour average ozone standard this century. **The few days exceeding ozone standards in recent years have generally been due to smoke from bushfires**, [emphasis added] as occurred during the 2002 to 2003 and 2006 to 2007 summer bushfire seasons.⁸

The assessment also predicted that, 'a projected increase in the frequency and severity of bushfires is also likely to increase peak ozone levels'.⁹

Smoke from large bushfires are also the cause of the most widespread particle pollution impacts across Victoria, with smoke from large fires capable of travelling across vast parts of the State. For example, smoke from a large fire in far eastern Victoria in 2014 blew over Bass Strait and resulted in poor air quality in Melbourne for four consecutive days.¹⁰

Environmental Justice Australia's *People's Clean Air Action Plan for Victoria* puts the total estimated health costs of the bushfire smoke at \$1.95 billion.¹¹ In its 2018 *State of Knowledge* summary, the Environment Protection Authority Victoria (EPA) noted there was increasing evidence of the association between bushfire smoke and effects on health:

6 Australia State of the Environment 2016, 'Regional and landscape-scale pressures: Bushfire', *Land (2016)*, 2016, <<https://soe.environment.gov.au/theme/land/topic/2016/regional-and-landscape-scale-pressures-bushfire>> accessed 17 September 2021.

7 Australia State of the Environment 2016, 'Prescribed burning and bushfires', *Ambient air quality (2016)*.

8 Commissioner for Environmental Sustainability Victoria, 'AIR (A)', *Scientific Assessment Part III*, 2018, p. 9 <https://www.ces.vic.gov.au/sites/default/files/SoE2018ScientificAssessment_A.pdf>.

9 Ibid.

10 Ibid., p. 13.

11 Environmental Justice Australia, 'The People's Clean Air Action Plan for Victoria, 2021, p. 4', *Submission 110*, p. 25.

- One comprehensive review in 2016 concluded that consistent evidence from a large number of studies demonstrated bushfire smoke exposure was associated with respiratory morbidity.
- Associations with cardiovascular outcomes were found in a local 2015 study conducted in Melbourne and another 2015 study that included the whole of Victoria.
- A study of the health effects of PM_{2.5} exposure attributable to bushfire and planned burn smoke in Sydney suggested that this smoke is an important contributor to overall air pollution and the related population health burden. The impact of bushfire and planned burn smoke exposure during 2001–2013 was estimated at approximately 14 premature deaths per year in Sydney.¹²

2019/2020 Victorian Bushfires

In 2019–20, Victoria experienced catastrophic bushfires following large fires breaking out in New South Wales and Queensland. The 2019/2020 fires impacted over 1.5 million hectares of land in Victoria, and smoke significantly impacted Victorian communities and reduced air quality for prolonged periods.¹³

Over the course of several days in January 2020, according to EPA AirWatch, Victoria's air quality ranged from 'very poor' to 'hazardous' levels due to smoke from bushfires in East Gippsland and north-east Victoria, some of which had been burning since late-November 2019.

On 14 January 2020, Melbourne CBD recorded hazardous levels of fine particles in the air in the early morning (12am–4am), with the remainder of the day classified 'very poor'. Other regions to recorded hazardous air quality levels were: Geelong, Latrobe Valley, Central region, Gippsland, and North-central region. Air quality across the State remained between 'very poor' to 'hazardous' until late afternoon the following day (15 January 2020). By the evening Melbourne CBD's air quality improved until it was classed as 'good' by the EPA.¹⁴ It was also reported in some media that, at times, several locations were recorded as having some of the worst air quality in the world. For example, Melbourne was ranked worst in the world on the 14 January 2020, and Wangaratta was ranked 3rd worst in the world on 15 January 2020 (see Figures 6.1 and 6.2 below).

¹² Environment Protection Authority Victoria, *Air pollution in Victoria – a summary of the state of knowledge*, August 2018, p. 44 (with sources).

¹³ Victorian Government, *Submission 113*, p. 16.

¹⁴ Australian Associated Press, 'Melbourne's air quality 'worst in the world' as bushfires continue to burn across Victoria', *The Guardian*, 14 January 2020, <<https://www.theguardian.com/australia-news/2020/jan/14/melbourne-choked-by-hazardous-smoke-as-bushfires-continue-to-burn-across-victoria>>, accessed 7 May 2020; 'Melbourne air quality drops to 'hazardous' levels as bushfire smoke lingers over Victoria', *ABC News*, 14 January 2020, <<https://www.abc.net.au/news/2020-01-14/melbourne-air-quality-drops-to-hazardous-from-bushfire-smoke/11865178>> accessed 7 May 2020.

Figure 6.1 Smoke in the air above Melbourne, 14 January 2020



Source: 'Melbourne air quality drops to 'hazardous' levels as bushfire smoke lingers over Victoria', ABC News, 14 January 2020, <<https://www.abc.net.au/news/2020-01-14/melbourne-air-quality-drops-to-hazardous-from-bushfire-smoke/11865178>> accessed 7 May 2020.

Figure 6.2 Smoke in the air above Wangaratta, 15 January 2020



Source: 'Storms sweep across Victoria bringing heavy rain, hail, thunder and improved air quality', ABC News, 16 January 2020, <<https://www.abc.net.au/news/2020-01-15/melbourne-air-quality-could-return-to-hazardous-bushfire-smoke/11867796>> accessed 7 May 2020.

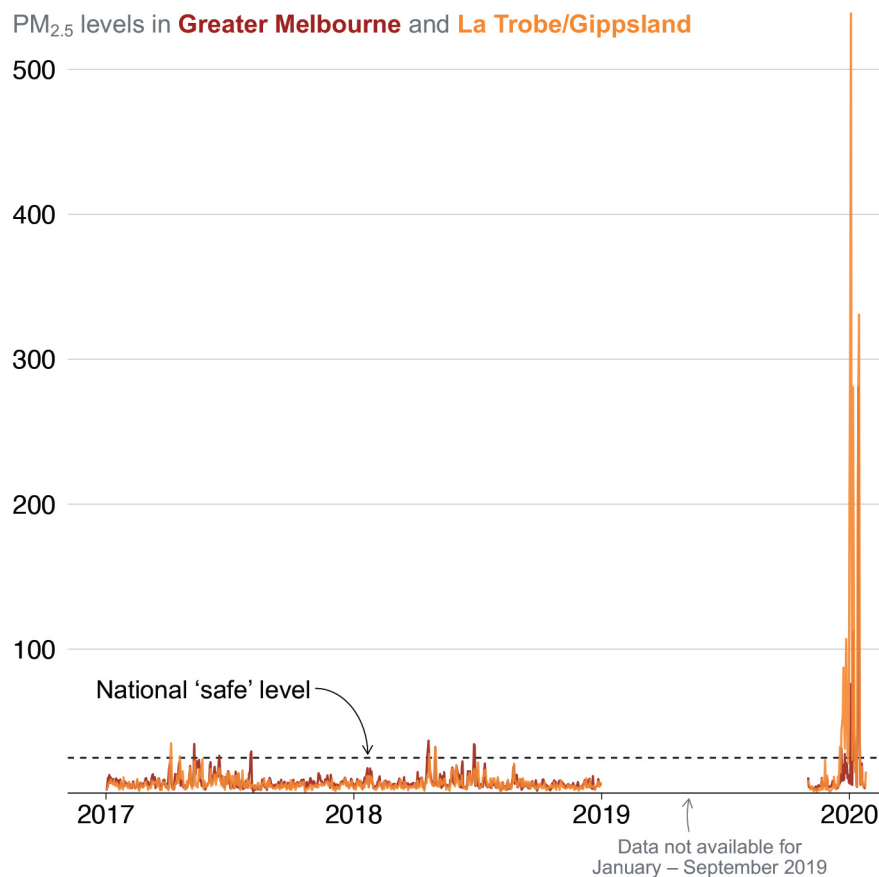
A submission to the Inspector-General for Emergency Management's *Inquiry into the 2019-20 Victorian Fire Season* by the Grattan Institute examined the health effects of the 2019/2020 bushfires, including the impact the fires had on air quality. The Institute noted that:

- 11 million Australians reported exposure to smoke cause by the bushfires
- large parts of Victoria were covered in smoke for 'prolonged period[s]', particularly in January 2020

- smoke drifted from bushfire affected regions in Victoria's east to Melbourne and surrounding suburbs
- millions of Victorians were exposed to harmful levels of air pollution (see Figure 6.3 below)—
 - in Gippsland, which was at the centre of the bushfires, air pollution levels peaked at over 500 PM_{2.5}
 - in Melbourne air pollution levels peaked at over 300 PM_{2.5}
 - several days were classified as 'hazardous' or 'very poor' by the EPA
- the 2019/2020 bushfires caused air pollution in excess of 25 times the National safe level.¹⁵

Figure 6.3 from the Grattan Institute's submission shows air pollution in Greater Melbourne and Latrobe/Gippsland from the 2019/2020 Victorian bushfires.

Figure 6.3 Air pollution from the bushfires was many times the 'safe' level in Victoria



Source: Grattan Institute, *The health effects of the 2019-20 bushfires: Submission to the Inquiry into the 2019-20 Victorian Fire Season*, submission to the Inspector-General for Emergency Management, Inquiry into the 2019-20 Victorian Fire Season, 2020, p. 6.

¹⁵ Grattan Institute, *The health effects of the 2019-20 bushfires: Submission to the Inquiry into the 2019-20 Victorian Fire Season*, submission to the Inspector-General for Emergency Management, Inquiry into the 2019-20 Victorian Fire Season, 2020, pp. 5-6.

While long term health effects of the 2019/2020 bushfires are not yet known, immediate examinations of health impacts from the smoke included:

- A survey of 12,000 people by Asthma Australia, which indicated that many respondents with asthma experienced adverse health impacts, despite taking actions to protect themselves against the bushfire smoke (e.g. staying inside, keeping windows and doors closed).¹⁶
- Research published in the *Medical Journal of Australia* found smoke from the fires was associated with:
 - an estimated 120 premature deaths in Victoria (417 national) and 916 hospital admissions (3,151 national)¹⁷
 - 1,305 asthma emergency department presentations (national).¹⁸

6.1.2 Planned burns

Planned burning is undertaken to reduce the risk, intensity and impact of bushfires on public and private land. Planned burns are also undertaken by other public and private land managers, for a range of purposes, including promoting ecosystem health, increasing agricultural productivity and managing weeds, pests and diseases. Traditional Owners also undertake cultural burns for a variety of purposes, including protecting biodiversity and harvesting food.

Recent work undertaken by the CSIRO¹⁹ indicates that the emission factors for particulate matter and carbon monoxide from smouldering combustion (characteristic of planned burns) was about three times higher than emissions produced by the flaming combustion typical of a bushfire (based on pollutant per weight of fuel). Smoke from a planned burn may also be more visible due to higher moisture content in the fuel resulting in increased concentrations of volatile organic compounds due to incomplete combustion.²⁰

Although smouldering combustion produces more carbon monoxide and particulate matter than flaming combustion, there are other factors which can affect the overall production of emissions in planned burns compared to bushfires:

- Bushfires tend to occur during periods of low humidity, high winds and temperatures; planned burns are conducted in conditions with high humidity, and low winds and temperatures.
- Planned burns target different fuel sources to those often consumed by bushfires.

¹⁶ Asthma Australia, *Submission 39*, p. 10.

¹⁷ Victorian Government, *Submission 113*, p. 16; Climate and Health Alliance, *Submission 79*, p. 4.

¹⁸ Climate and Health Alliance, *Submission 79*, p. 4.

¹⁹ Commonwealth Scientific and Industrial Research Organisation.

²⁰ Environment Protection Authority Victoria, *Air pollution in Victoria – a summary of the state of knowledge*, p. 22.

- Smoke plumes from planned burns are cooler and less buoyant than bushfire plumes; they may travel shorter distances and are more likely to be concentrated in the nearby area.
- Planned burns are significantly smaller in size compared to bushfires meaning emissions of particulate matter and carbon monoxide are more likely to be greater from bushfires compared to planned burns (although the actual smoke impacts can vary greatly depending on conditions and location).
- Topography has a major influence on smoke dispersion. If smoke is generated in or enters a valley, it can become trapped and will linger, which can lead to extended periods of smoke impacts.²¹

Bushfire mitigation

Victoria takes a risk-based approach to managing bushfire risk that is designed to consider the risk and consequence of bushfires and the most effective way to reduce those risks. Fuel management, including planned burning, is one of the key parts of this approach. Ms Carol Jackson, Acting Deputy Secretary, Environment and Climate Change at the Department of Environment, Land, Water and Planning (DELWP) explained:

DELWP considers the relative effectiveness and impact of fuel management activities such as the impact of smoke from planned burning compared to the risk and impact of bushfires on the same values. DELWP works closely with communities, industries and partners to minimise the impact of fuel management, including smoke, during the scheduling and delivery of planned burns.²²

DELWP's fuel management activities are carried out in line with the *Code of Practice for Bushfire Management on Public Land*, which sets out objectives to minimise the impact of major fires on a range of values. DELWP's fuel management activities form part of the Joint Fuel Management Program, an integrated program of works led by DELWP and the Country Fire Authority (CFA) across public and private land to mitigate bushfire risk and impact.²³

The Government's submission to the Inquiry included an overview of fuel management activities conducted by DELWP, noting its Advanced Forest Fire Management strategic, risk-based approach to bushfire fuel management would contribute to reduced air quality impacts by reducing the likelihood, size, intensity and impact of major bushfires including by:

- ensuring planned burning can be undertaken year-round, maximising opportunities to reduce bushfire risk
- expanding the network of strategic fuel breaks to protect communities, assets and provide forest firefighters with a strategic advantage to fight bushfires

²¹ Ibid., p. 22–23.

²² Ms Carol Jackson, Acting Deputy Secretary, Environment and Climate Change, Department of Environment, Land, Water and Planning, public hearing, via video conference, 10 August 2021, *Transcript of evidence*, p. 3.

²³ Victorian Government, *Submission 113*, p. 17.

- undertaking large scale mosaic burning²⁴ to slow fire spread and severity and increase the likelihood of successful suppression of new fires
- increasing use of non-burn fuel management such as slashing, mowing and mulching to reduce fuels close to communities and assets and enable delivery of year-round fuel reduction without additional smoke
- improving road and track access to support fuel management and firefighting
- partnering with Traditional Owners to implement cultural land and fire practices.²⁵

DELWP acknowledged that smoke from planned burns drove some concerns about health and amenity impacts on individuals, communities and businesses. However, it noted that planned burning was one of the most effective ways to reduce the future scale and intensity of bushfires, in turn reducing the overall impact of bushfire smoke and emissions. DELWP informed the Committee that decisions about planned burning are informed by a range of factors including weather conditions and ventilation patterns as well as overall smoke load from other fires in the landscape (e.g. private land burns) and incorporation of smoke modelling and monitoring into the planning process.²⁶ If weather is not conducive to the dissipation of smoke from hazard reduction burning, the burn may be cancelled or delayed as smoke impacts are part of the risk assessment conducted ahead of ignition.²⁷

Other types of planned burns are carried-out for a range of purposes including:

- prescribed burning to reduce fuel and mitigate bushfire risk on private land
- sustainable fire management practices to improve ecology and biodiversity
- agricultural stubble burning (burning the base (stubble) of the plant and post-harvest straw residue of particular crops so that the land is clear for reuse)
- post-timber harvesting burns to clean-up material and waste from timber harvesting operations
- prescribed burning for invasive plant management.

In relation to fuel management and bushfire risk mitigation on private land, Mr Hamish Webb, Director, Knowledge, Planning and Risk, Forest, Fire and Regions (DELWP), informed the Committee of work underway in conjunction with the CFA to develop a digital fire permit system for private land hazard reduction burning:

We are also building the ability to consider private land burning, so we have been working with the CFA. We (CFA) have built a digital fire permit system that enables us to model and better understand the smoke impact of non-public land burns. So obviously

²⁴ Frequent, low-intensity fire to reduce highly flammable fuel loads and create a patchwork of areas with lower fuel loads.

²⁵ Victorian Government, *Submission 113*, p. 17.

²⁶ Mr Hamish Webb, Director, Knowledge, Planning and Risk, Forest, Fire and Regions, Department of Environment, Land, Water and Planning, public hearing, via video conference, 10 August 2021, *Transcript of evidence*, p. 14

²⁷ Inspector-General for Emergency Management, 'Phase 1: Community and sector preparedness for and response to the 2019-20 fires season', *Inquiry into the 2019-20 Victorian fire season*, 2020, p. 159.

we (DELWP) can control the burning program on public land and we now have a better understanding of the burning program on private land through the use of that digital fire permit system, and that gets us a better understanding of when and where we choose to undertake fuel management in Victoria.²⁸

Post-timber harvesting burns

In relation to timber harvesting on public land, VicForests has an obligation to regenerate harvested areas to defined standards. VicForests may use burning as a method for regeneration of forests post-harvest. Any such burning must be undertaken in accordance with relevant regulatory and risk mitigation requirements. Depending on location and fire risk, VicForests may also have obligations to keep fuel hazard within thresholds defined by the *Management Standards and Procedures for Timber Harvesting in Victoria's State Forests*.²⁹

Environmental Justice Australia submitted that planned burns to clean-up post-logging materials (both private and public) and agricultural wastes were detrimental because they had 'significantly more biomass is burned when post-logged material is bulldozed into piles and set alight as compared with hazard reduction burns'.³⁰ It suggested that under the updated environment protection laws, the EPA could consider regulating post-logged land and agricultural waste burns as industrial pollution.³¹

Newlands Friends of the Forest similarly called for air pollution from logging burns to be treated like other forms of industrial pollution with consideration given to how it can be better evaluated and regulated.³²

Cultural burning

The Firesticks Alliance Indigenous Corporation uses the term 'cultural burning' to describe burning practices developed by Aboriginal people to enhance the health of the land and its people. Cultural burning can include burning or prevention of burning of Country for the health of particular plants and animals, bushfoods, threatened species and biodiversity in general. It may involve patch burning to create different fire intervals across the landscape or it could be used for fuel and hazard reduction. Fire may be also used to clean up important access pathways, maintain cultural responsibilities and as part of culture heritage management.³³

There is growing adoption of cultural burning for a variety of land management practices across Australia, including to repair damage done by European farming, and to reduce hazardous fuel loads in bushfire prone areas. Selecting what areas to burn,

²⁸ Mr Hamish Webb, *Transcript of evidence*, p. 14.

²⁹ Victorian Government, *Submission 113*, p. 18.

³⁰ Environmental Justice Australia, *Submission 110*, p. 16 (with sources).

³¹ *Ibid.*, p. 17.

³² Newlands Friends of the Forest, *Submission 93*, p. 6.

³³ Firesticks Alliance, 'What is cultural burning?' (n.d.), <<https://www.firesticks.org.au/about/cultural-burning>> accessed 27 September 2021.

when, and how often, is part of the Indigenous knowledge of the land. The adoption of traditional Aboriginal burning requires a sound understanding and consideration of local conditions, climate, plants and animals to ensure its effectiveness and safety.³⁴

In its submission to the Inquiry, the Government stated an ongoing commitment to partnering with Traditional Owners to implement cultural land and fire practices.³⁵

6.2 Management and mitigation of smoke from landscape fires

Much of the work around air quality management relating to landscape fires is about striking a balance between the amount and risk of smoke produced by fuel management burns compared to bushfires. DELWP told the Committee it was confident it had strong processes and procedures in place to manage smoke from these fires.

Mr Webb explained:

[DELWP] have built and developed smoke models so we can make decisions and understand in terms of predictions of the likely impacts of our fuel management program on—how smoke from the planned burning program will impact on communities...we are able to see where that smoke will come from and predict where it will go. We can then make operational decisions about whether burns will proceed or go ahead and also then put in place and work with the EPA...about how we then message the communities...And we mitigate our fuel management practices and programs in terms of how we ignite fires and when we ignite them. We look at ventilation, especially in the valleys of Gippsland and the alpine areas. How long smoke will stay within the valleys? Will it ventilate, will it clear out from the valleys over time or will it sit there? So we can choose and make those decisions in terms of the fuel management program that is delivered on public land.³⁶

DELWP also has a role in community messaging of smoke impacts and supporting an ongoing research program to improve smoke modelling and decision making. DELWP uses these tools to inform communities of potential smoke impacts from bushfires.³⁷ However some stakeholders spoke about the need for better and more practical community information and awareness around the hazards of smoke in addition to existing information campaigns on fire risk. Discussion of community messaging and education appears in Chapter 9.

Some smoke mitigation interventions discussed in this section, such as leaky houses and use of air purifiers with high efficiency particulate air (HEPA) filters also have application in relation to smoke produced from domestic wood heaters. Wood heaters are covered in detail Section 6.3.

³⁴ Landcare Australia, 'Traditional Aboriginal burning in modern day land management', (n.d.), <<https://landcareaustralia.org.au/project/traditional-aboriginal-burning-modern-day-land-management>> accessed 27 September 2021.

³⁵ Victorian Government, *Submission 113*, p. 17.

³⁶ Mr Hamish Webb, *Transcript of evidence*, p. 14.

³⁷ Victorian Government, *Submission 113*, p. 16.

6.2.1 Smoke from planned burns

Asthma Australia argued hazard reduction burning should be scaled-back in favour of non-burning options such as mechanical fuel load reduction. It noted that, for people with asthma, these burns could be extremely hazardous and lead to life-threatening symptoms, especially as longer fire seasons and more frequent adverse weather events had resulted in fewer days available for hazard reduction burning and more regular occurrences of burning over consecutive days.³⁸ Asthma Australia also cited the following evidence of the detrimental impacts of hazard reduction burns:

- Over a 16-year period in Western Australia, the health costs of hazard reduction burns were higher overall compared to bushfires.
- In relation to a 5-day period of hazardous air quality from hazard reduction burns in the greater Sydney region in May 2019:
 - a rapid assessment of the impact estimated the burns caused 14 premature deaths of people with respiratory and cardiovascular disease
 - an Asthma Australia survey of 550 people in areas affected by the same Sydney smoke event indicated:
 - 20% of respondents reported difficulty breathing
 - 19% of respondents reported having an asthma emergency
 - 21% of respondents reporting being sick for longer than a week, with 28% having to take sick leave or work from home and 22% incurring unexpected financial costs due to extra medication or equipment needs.
- The Royal Commission into National Natural Disaster Arrangements noted:
 - exposure to low level particulate matter over multiple days from hazard reduction burns could be as harmful as a substantial, short-term increase in particulate matter
 - the need to balance the health impacts of hazard reduction burn smoke with the risks of fuel loads when planning burns.
- The New South Wales Bushfire Inquiry called for a much better understanding of cost-benefit and effectiveness of different hazard reduction techniques, including the public health costs associated with smoke from prescribed burning. It found that non-burning approaches to fuel reduction were particularly important around communities and recommended consideration of biofuel generating opportunities to dispose of cleared green waste.³⁹

In his *Inquiry into the 2019–20 Victorian Fire Season*, the Inspector-General for Emergency Management agreed that smoke from fuel management was a valid concern and efforts to ensure its dispersion should continue to be developed. However, as

³⁸ Asthma Australia, *Submission 39*, p. 9.

³⁹ *Ibid.*

observed in the 2019/2020 bushfire event, the smoke generated from major, prolonged bushfires is also problematic and poses additional problems to communities due to its expanse and concentration. The Inspector-General noted: 'Fuel management smoke is manageable, and every effort is made to protect public health. The same opportunities are not possible for natural bushfire'.⁴⁰ The Inspector-General made the following points in relation to smoke management from hazard reduction burning in the Inquiry report:

- Land and fire managers must carefully assess the trade-offs between undertaking fire-related fuel management actions and human health and well-being.
- Forest Fire Management Victoria uses the Smoke Impact Management Tool and associated guidance to assess the impact of smoke to communities and look for opportunities to burn when smoke will be dispersed quickly.
- A challenge for planned burns is the possibility that that smoke impacting a community may come from another area, including interstate, which local planning may not account for.
- Assessing the potential impacts from smoke is a complex issue. While the spread of smoke from a hazard reduction burn may be predicted, outcomes that are influenced strongly by the actions of people are difficult to quantify.
- While the impact of smoke from planned fires can be predicted, predicting the occurrence of unplanned bushfires and associated smoke impacts is virtually impossible.
- Managing the health implications of fire smoke, from bushfires, hazard reduction burns, and ecological and cultural burns, should be integral to future fire planning and bushfire emergency responses and will require collaboration between health, education, environmental, fire management and emergency response agencies.
- Non-burning (mechanical and biological) fuel treatments may be feasible alternatives for hazard reduction burns in certain situations.⁴¹

DELWP works with the EPA, Department of Health and other agencies to apply the *Victorian State Smoke Framework*⁴² during the conduct of the planned burns to assist with the management of planned burns and community smoke impacts. The Framework operates to ensure opportunities to undertake planned burns are optimised to reduce long term accumulation of fuel hazard and bushfire risk, including risks from bushfire smoke, and manage the impact of smoke from planned burning on communities.⁴³

The Government submitted that planned burning would continue to be a significant feature of managing public land, plantations, agribusinesses and natural systems into

⁴⁰ Inspector-General for Emergency Management, 'Phase 1: Community and sector preparedness for and response to the 2019-20 fires season', *Inquiry into the 2019-20 Victorian fire season*, p. 159.

⁴¹ Ibid.

⁴² The Victorian State Smoke Framework, created in response to the 2014 Hazelwood mine fire, is a strategy for Victoria that identifies the types of events, tools and processes that facilitate coordinated planning, decision-making and management of significant or prolonged events that generate smoke or other emissions, including from extended bushfires and large-scale planned fuel reduction (Emergency Management Victoria, *State Smoke Framework*, November 2016, version 3.0, p. 4).

⁴³ Victorian Government, *Submission 113*, p. 18.

the foreseeable future. However, it noted that bushfire risk management strategies were continually evolving to take account of the effects of climate change and new scientific evidence. It cited examples of increased use of mechanical fuel treatment and the establishment of an increased network of permanent strategic fuel breaks to reduce the risk and impact of bushfires, particularly those close to communities.⁴⁴

Stakeholder recommendations to minimise the health impacts of hazard reduction burning included:

- Review planned burning practices with a view to increasing non-burning options such as mechanical fuel load reduction, particularly around settled areas.⁴⁵
- Include health authorities and consumer representatives in burning planning to ensure health impacts are considered in the planning phase of hazard reduction.
- Coordinate activities with health authorities and agencies so health messages can be provided to the community ahead of the planned burn to ensure the potential for adverse health impacts is minimized (this is discussed further in Chapter 9).
- Where possible, stagger burns to ensure they do not result in prolonged periods of poor and hazardous air quality.⁴⁶
- Adopt Tasmania's 'temporary stopping rule' in relation ignition of further fires until air quality improves.⁴⁷

RECOMMENDATION 14: That the Victorian Government continue to develop and strengthen partnerships with First Nations People to make greater use of Traditional Owner land management practices.

6.2.2 Smoke modelling, air quality forecasting and research

DELWP funds the Bureau of Meteorology (BoM) to provide smoke modelling services for Victoria. It supported the development of the current Air Quality Forecasting system (AQFx) in partnership with the BoM and CSIRO; the AQFx model is now part of the BoM forecast service for emergency services. DELWP utilises AQFx and visualisation tools in planned burning decision making to better predict smoke generation and dispersion. DELWP is actively involved in the national roll out of AQFx, which has been endorsed by the Australasian Fire and Emergency Service Authorities Council as the national smoke modelling system for bushfires and planned burning.⁴⁸

⁴⁴ Ibid., p. 17.

⁴⁵ Asthma Australia, *Submission 39*, p. 9; Australasian College of Emergency Medicine (ACEM), *Submission 26*, p. 3; Kate Forster, *Submission 115*, p. 5.

⁴⁶ Asthma Australia, *Submission 39*, p. 9.

⁴⁷ Australasian College of Emergency Medicine (ACEM), *Submission 26*, p. 3.

⁴⁸ Victorian Government, *Submission 113*, pp. 16–17.

DELWP also maintains an active research program into smoke forecasting to improve underlying modelling, decision making, community messaging, and to better understand and track the impact of smoke on community health and exposed industries, such as wine production and apiary.⁴⁹

6.2.3 Indoor smoke mitigation

Asthma Australia considered that a major issue for people with asthma and others vulnerable to air pollution is the quality of their housing. It submitted that homes were often leaky, meaning pollutants such as PM_{2.5} could enter even when windows and doors are closed. Asthma Australia's Bushfire Smoke Impact Survey (n = 12,152) on the 2019/2020 bushfires indicated that smoke inside the home was a significant issue for many respondents.⁵⁰

Kate Forster, a submitter to the Inquiry, recommended that bushfire smoke should be considered as part of future planning and design of houses, town planning, and design of communities, including safe (e.g. earth sheltered) community buildings that could be used as fire and smoke refuges.⁵¹

The EPA informed the Committee that although it did not have a regulatory role in this area (building standards including house 'leakiness' are ultimately regulated by the Victorian Building Authority), it did recognise it as an air pollution issue:

This has led EPA to undertake some research in this space collaborating with RMIT and the Australian Catholic University to evaluate the leakiness of Australian homes. This includes identifying areas for improvement to help reduce the ingress of smoke and improve energy performance. All homes evaluated in the study are located in regions where the air is often polluted by smoke from controlled burns, wood heaters, and fireplaces. This will help EPA provide appropriate advice in relation to reducing infiltration of outdoor smoke indoors. The findings of this research will be available shortly.⁵²

Senior Environmental Epidemiologist at the EPA, Dr Martine Dennekamp spoke further on the use of HEPA filters in homes to remove particulate exposure, effectively 'cleaning smoke from the air':

We have evidence from overseas, specifically North America, that indoor air cleaners—so they are portable indoor air cleaners with HEPA filters—perform really well, but we had very limited information in Victoria. So before we would put that out as a recommendation we partnered with [Australian Catholic University], and in fact that study has just recently been finished, so it will be published soon. But what it did show is that the majority of the homes showed that infiltrated smoke would return

⁴⁹ Ibid., p. 17.

⁵⁰ Asthma Australia, *Submission 39*, p. 5.

⁵¹ Kate Forster, *Submission 115*, p. 5.

⁵² Environment Protection Authority Victoria, *Inquiry into the Health Impacts of Air Pollution in Victoria*, response to questions on notice received 23 August 2021, p. 1.

to background levels within 30 to 45 minutes. Now, obviously when you talk about a longer term smoke event, staying indoors gives you some protection, but it clearly shows that with HEPA filters used appropriately in the right room we are able to create clean air spaces within the home if the HEPA air filters are used due to conditions and appropriately. The only problem with them is that they obviously cost a few hundred dollars, so they are not affordable for everyone.⁵³

Asthma Australia agreed that air purifiers with HEPA filters could be highly effective in minimising exposure to bushfire smoke when used in a well-sealed room. It further noted that air conditioning was also often necessary during air pollution events in hot weather requiring vulnerable people to shelter inside for hours or days at a time. However, it too noted the cost of such interventions was often prohibitive and recommended the Government consider providing financial support for people with asthma towards the costs of purchasing and running air purifiers.⁵⁴

The issue of indoor air pollution in workplaces, schools and public buildings was also raised. Asthma Australia called on the Government to develop a framework to enable timely institutional responses to air pollution events, including support for upgrades to reduce indoor air pollution.⁵⁵

The Committee was informed that one action already taken as a result of the 2019/2020 bushfires was to support local government with guidance about creating cool and clean air spaces of respite to support people when air quality is heavily impacted by bushfire smoke.⁵⁶

RECOMMENDATION 15: The Victorian Government consider the introduction of a scheme to assist people from a low socioeconomic background to:

- evaluate houses for poor air quality and/or air flow containment issues, and
- provide rebates, prioritising those with chronic lung and/or breathing conditions, to assist with improvements to the indoor air quality of their homes.

RECOMMENDATION 16: The Victorian Government consider the introduction of a rebate scheme to subsidise the purchase of HEPA filters for people from low socioeconomic background, prioritising those with chronic lung conditions.

⁵³ Dr Martine Dennekamp, Senior Environmental Epidemiologist, Environment Protection Authority Victoria, public hearing, via video conference, 10 August 2021, *Transcript of evidence*, p. 17.

⁵⁴ Asthma Australia, *Submission 39*, p. 11.

⁵⁵ *Ibid.*, pp. 12–13.

⁵⁶ Professor Brett Sutton, Chief Health Officer, Department of Health, public hearing, via video conference, 10 August 2021, *Transcript of evidence*, p. 7.

6.2.4 Community clean air shelters

Community clean air shelters are a particularly important strategy for communities that experience socioeconomic disadvantage and poor housing quality. The Australasian College for Emergency Medicine (ACEM) argued that community clean air shelters should be considered a policy priority as part of the emergency response to prolonged smoke events in Victoria, and potentially integrated into the State Smoke Framework.⁵⁷

ACEM submitted that guidance and recommendations on the minimum filtration requirements and management of community clean air shelters should be developed by the DELWP, while implementation and management of community clean air shelters could be undertaken through partnership with other organisations, including local councils.⁵⁸

Asthma Australia suggested investigating the feasibility of a clean air shelter program for times of high air pollution to aide people caught away from home, local residents whose homes have poor air quality, and people experiencing homelessness. Asthma Australia noted these shelters could also work to minimise the risk of hospitalisations and deaths from thunderstorm asthma.⁵⁹

In its submission, the Victorian Council of Social Service (VCOSS) noted that Infrastructure Victoria recommended the construction of public shelters for a broad purpose in its draft 30-year Infrastructure Strategy. However, VCOSS also emphasised that such facilities needed to be accessible and responsive to community needs, for example:

- rough sleepers
- people with a disability
- people made homeless by bushfire or other climate events.⁶⁰

RECOMMENDATION 17: The Victorian Government investigate the feasibility of establishing community clean air shelters in various locations across Victoria in partnership with local government authorities if and where appropriate.

6.3 Domestic wood heaters

The Committee heard from a variety of stakeholders on the extent of use of domestic wood heaters and the potential to impact on ambient air quality during the cooler months of the year.

⁵⁷ Australasian College Emergency Medicine (ACEM), *Submission 26*, p. 5.

⁵⁸ Ibid.

⁵⁹ Asthma Australia, *Submission 39*, pp. 12–13.

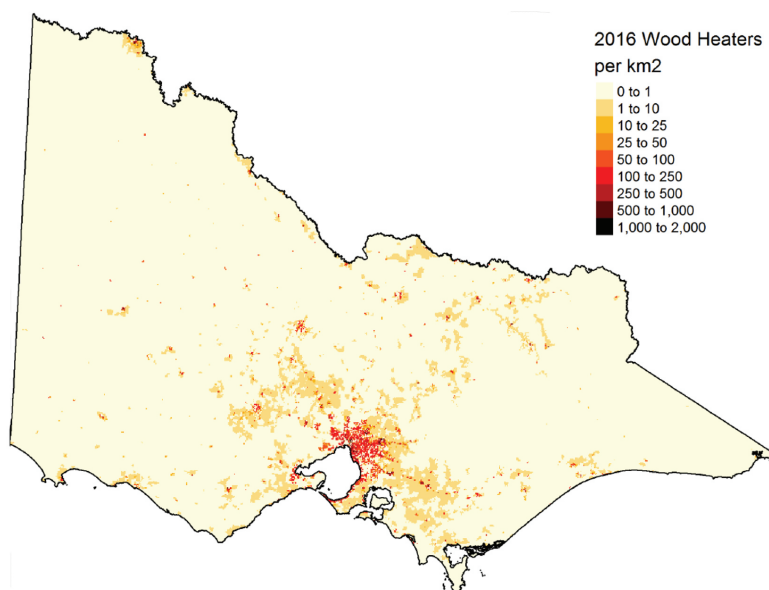
⁶⁰ Victorian Council of Social Service (VCOSS), *Submission 74*, pp. 3–4.

Domestic wood heating is a major source of air pollution in Australia, including fine particulate matter (PM_{2.5}). It is generally regarded as one of the most hazardous air pollutants: any level of exposure is harmful to human health.⁶¹ At a public hearing, Victoria's Chief Health Officer, Professor Brett Sutton, noted that particulate matter from woodfire burning was a disproportionate contributor to poor air quality given the small point source numbers, making it a 'significant issue' and 'one that has a not insignificant preventable component to it'. He told the Committee that '[w]ith the challenges of climate change and what that will mean for bushfire seasons, it is one to absolutely focus on'.⁶²

Approximately 10% of Australian dwellings (900,000) used wood heaters as the main source of heating in 2014, with 70% of these located outside the capital cities.⁶³ Impacts are also present in major cities. For example, wood smoke has been identified as a major source of winter air pollution in Sydney, making up approximately 40% of PM_{2.5} (dropping to almost zero in Summer).⁶⁴ In colder climates, such as Armidale, New South Wales, this can be as high as 85%.⁶⁵

Wood heaters are spatially well distributed across Melbourne and Victoria. In 2017, the EPA estimated there were 96,900 wood heaters in the Port Phillip Region and 142,800 in total across Victoria (a 2016 spatial distribution of wood heaters across Victoria based on data collected from real estate listings is shown in Figure 6.4 below).⁶⁶

Figure 6.4 Spatial distribution of wood heaters across Victoria (2016)



Source: Environment Protection Authority Victoria, *Air pollution in Victoria – a summary of the state of knowledge*, p. 21.

⁶¹ Centre for Air Pollution, Energy and Health Research, *Submission 65*, p. 1 (with sources).

⁶² Professor Brett Sutton, *Transcript of evidence*, p. 16–17.

⁶³ Australia State of the Environment 2016, 'Domestic wood heaters', *Ambient air quality (2016)*, 2016, <<https://soe.environment.gov.au/theme/ambient-air-quality/topic/2016/domestic-wood-heaters>> accessed 11 March 2021.

⁶⁴ Ibid.

⁶⁵ Ibid.

⁶⁶ Environment Protection Authority Victoria, *Air pollution in Victoria – a summary of the state of knowledge*, pp. 20–21.

The Centre for Air Pollution, Energy and Health Research (CAR) noted domestic wood heating causes disproportionately higher impacts on air quality than many other common sources of air pollution. For example, 4.4% of Sydney households use wood combustion as their main heating source, yet wood heater smoke contributes more to PM_{2.5} exposure (24%) in the Sydney Metropolitan Region annually than motor vehicles (17%) and power stations (11%). Similar impacts are likely for Melbourne where there is a similar prevalence of wood heaters as Sydney (4%) with 25% in other regions of Victoria.⁶⁷

Woodfire heater smoke is also a significant contributor to winter air pollution in Victoria. Wood heater usage tends to occur during winter when conditions are cold and wind speeds are generally low, which can exacerbate air quality issues.⁶⁸ According to the *Australia State of the Environment 2016* report, emissions from domestic wood heaters—primarily smoke, as well as volatile organic compounds—impose significant pressure on ambient air quality during cooler months, often leading to air quality below mandated PM standards.⁶⁹ In its submission *Asthma Australia*, citing the National Environment Protection Council, noted that urban domestic wood heating was a significant contributor to the number of exceedances of the PM_{2.5} standard in Victoria: ‘these generally occurred on cold, still nights, which are usually associated with increased usage of heating and meteorological conditions that limit the dispersion of smoke’.⁷⁰

The Lung Health Research Centre similarly noted that domestic wood heaters were a major source of wintertime air pollution in both urban and regional Victoria,⁷¹ while Dr Rob Phair, a rural doctor and current President of the Rural Doctors Association Victoria, noted that EPA data showed domestic wood burning was responsible for 27% of PM_{2.5} fine particulate pollution in the Port Phillip Air Quality Control Region, which covers greater Melbourne and Geelong.⁷² Similar assertions were echoed by numerous other stakeholders to the Inquiry.

FINDING 6: Wood smoke from domestic heating is a significant contributor to air pollution in built-up areas across Victoria, particularly in cooler months.

Stakeholder engagement on the impacts of smoke from domestic wood heaters was reflected in a large proportion of the submissions received by the Committee. Among the issues canvassed, the most prominent themes were:

- wood heater emissions are harmful to human health at any level
- air quality monitoring of smoke from wood heaters is inadequate and not representative of local levels of woodsmoke pollution, meaning high levels of hazardous air are not recorded

⁶⁷ Centre for Air Pollution, Energy and Health Research, *Submission 65*, p. 3 (with sources).

⁶⁸ Environment Protection Authority Victoria, *Air pollution in Victoria – a summary of the state of knowledge*, p. 26.

⁶⁹ Australia State of the Environment 2016, ‘Domestic wood heaters’, *Ambient air quality (2016)*.

⁷⁰ *Asthma Australia, Submission 39*, p. 7 (with sources).

⁷¹ The Lung Health Research Centre, University of Melbourne, *Submission 100*, p. 18.

⁷² Dr Rob Phair, *Submission 96*, p. 1.

- the sale and operation of wood heaters in accordance with mandated standards does not reflect actual emissions produced by real world operation
- the claimed low costs wood heaters compared to some other modes of heating is far outweighed by the health costs resulting from wood heater emissions
- regulatory and compliance measures are inconsistent and often fail to provide effective outcomes for affected community members
- there is a need for better public education and awareness of the negative health impacts of domestic wood burning.

6.3.1 Regulation and operation of wood heaters

Regulation of wood heaters and wood heater smoke in Victoria is provided under the following:

- Waste Management Policy (Solid Fuel Heating) under the *Environment Protection Regulations 2021* (Vic) imposes emissions and efficiency standards on the manufacture and sale of wood heaters (AS/NZS4012 and AS/NZS4013):
 - AS/NZS4012 sets the power output and efficiency of wood heaters, i.e. the amount of wood burned to generate heat
 - AS/NZS4013 sets the emission factor of wood heaters, i.e. the amount of PM_{2.5} emitted per kilogram of wood burnt.
- Installation of wood heaters is regulated by the Victorian Building Authority under the *Plumbing Regulations 2018* (Vic), which imposes installation standard AS/NZS2918.
- Local councils are responsible for investigating nuisance complaints relating to wood heaters under the *Public Health and Wellbeing Act 2008* (Vic).
- The imposition of the general environmental duty (GED) by the updated *Environment Protection Act 2017* (Vic) requires duty holders to minimise their risks, this includes in relation to the operation of wood heaters.⁷³

The EPA provides guidance⁷⁴ on its website to assist with meeting the GED for wood heaters, including:

- information about the correct operation of solid fuel heaters to assist households with wood heaters to take practical steps to reduce smoke emissions
- advice on how to report concerns about smoke from a neighbour's wood heater.⁷⁵

⁷³ Professor Brett Sutton, Chief Health Officer, Department of Health, *Inquiry into the Health Impacts of Air Pollution in Victoria*, response to questions on notice received 23 August 2021, p. 2.

⁷⁴ This guidance was under review at the time of writing.

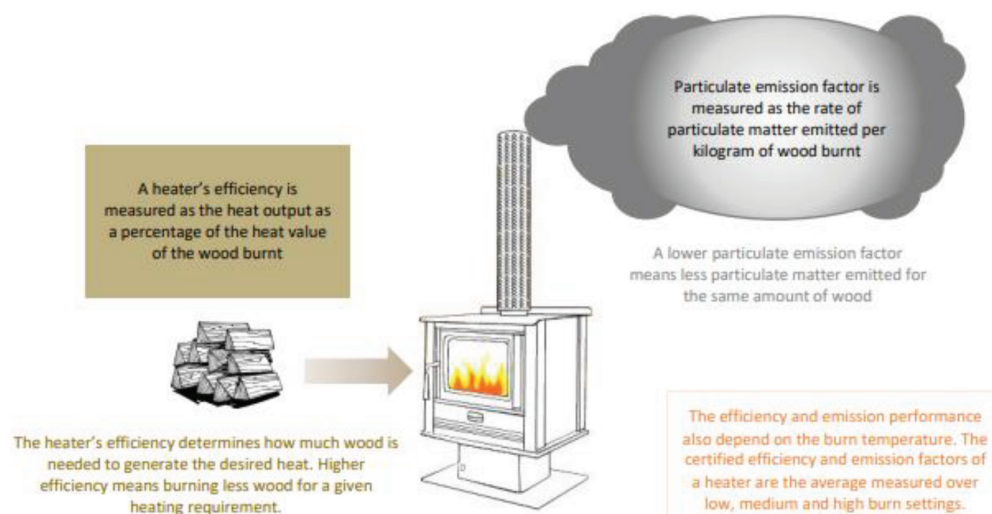
⁷⁵ Professor Brett Sutton, response to questions on notice, p. 2.

As the lead agencies for state and national policies concerning air quality and the impacts of air pollution on health, DELWP, together with the EPA, have primary oversight of wood heaters in Victoria. The Committee was informed that DELWP were looking at initiatives undertaken in other jurisdictions to address wood heater smoke as part of the development of the Victorian Air Quality Strategy.⁷⁶

The regulatory framework governing air pollution and air quality standards is covered in Chapter 3.

Wood heaters vary in performance, depending on their design, how they are operated, and the type and quality of the fuel burnt (see Figure 6.5 below).

Figure 6.5 Wood heater efficiency



Source: Environment Protection Authority Victoria, *Air pollution in Victoria – a summary of the state of knowledge*, p. 22.

The Australian Home Heating Association (AHHA), an industry body representing manufacturers, retailers, installers and maintenance service providers in the wood heating industry, pointed to the comprehensive and rigorous standards that apply to the sale and operation of wood heaters. It argued that mandated emissions standards (1.5 g of particulate emissions per kg) had resulted in an approximately 63% reduction in emissions over the last 10 years, stating the 'voluntary reduction in emissions, driven by industry, has seen emissions reduce from 4 g per kg down to 1.5 g per kg'.⁷⁷

While new wood heaters must meet compliance standards set under the Waste Management Policy (Solid Fuel Heating), old, non-compliant heaters that produce excessive emissions are effectively unregulated. The AHHA submitted that measures should be implemented to ensure these units are not offered for sale or installed in households. The AHHA was supportive of a phase-out of non-compliant wood heaters,

⁷⁶ Ibid., p. 1.

⁷⁷ Australian Home Heating Association, *Submission 50*, p. 1.

however it argued that imposing unnecessary restrictions would be unreasonable and impractical.⁷⁸

The current AS/NZS4013 test is based on laboratory measurements of a correctly operated wood heater.⁷⁹ However a key criticism levelled at wood heater emissions claims is that standards based on lab testing do not reflect real world use. For example:

- A study of Launceston of households (following the Launceston Woodheater Replacement Program, see Box 6.1 below) that were aware their emissions were being measured found real-life emissions averaged 9.4 g per kg of wood, which was double the ratings of the heaters in the AS/NZS4013 lab test.⁸⁰
- A 2011 New South Wales appraisal of real-life emissions of AS/NZS4013 compliant heaters with ratings below 2.5 g, 1.5 g and 1.0 g per kg, were estimated to be 8.2 g, 6.7 g and 6.4 g per kg respectively.⁸¹

Stakeholders also argued that low emissions counted for naught if people did not operate their heater properly and/or use appropriate wood fuel. This issue was acknowledged by Mr Ashley Stride, Deputy Chair of the AHHA, as an ongoing challenge:

one of the biggest contributors to a fireplace not operating within [that scope of testing] is the fuel that has been put inside the fireplace. Your two variables when you are operating a fireplace are going to be the fuel that is put into it and then the user and how they operate the controls on the unit.⁸²

At a public hearing, Associate Professor Fay Johnston, Chief Investigator at CAR, told the Committee there was ‘no evidence anywhere that air pollution in any town has actually improved as a consequence’ of emissions standards adopted in Australia. She expanded on this point, arguing:

- the way standards are tested does not reflect real-world operation, the dirty start-up phase is not included in Australian standards
- even the best and most efficient heaters require skilled and motivated operation
- while individuals can be taught to improve their own behaviour on correct heater operation, there is no evidence that education delivered at scale across an entire community has worked to improve community air quality.⁸³

⁷⁸ Ibid., pp. 2-3.

⁷⁹ D L Robinson, ‘Woodsmoke: Regulatory failure is damaging public health’, *Air Quality and Climate Change*, vol. 48, no. 4, 2014, p. 57.

⁸⁰ Australian Air Quality Group, *Submission 75*, p. 3 (with sources).

⁸¹ D L Robinson, ‘Woodsmoke: Regulatory failure is damaging public health’, p. 57.

⁸² Mr Ashley Stride, Deputy Chair, Australian Home Heating Association, public hearing, Melbourne, 29 June 2021, *Transcript of evidence*, p. 57.

⁸³ Associate Professor Fay Johnston, Chief Investigator, Centre for Air Pollution, Energy and Health Research, public hearing, Melbourne, 28 June 2021, *Transcript of evidence*, p. 34.

However, Associate Professor Johnston noted there was some evidence that alternative methods of emissions regulation could have a positive effect. She cited a method adopted in Canterbury, New Zealand that was worthy of investigation:

there is a method, the Canterbury method from New Zealand, that is worthy of investigating. That is a different set of standards with very stringent—more stringent, almost an order of magnitude more stringent than our current ones—and tested under real-world operating conditions. That was introduced in a region of New Zealand five or six years ago. It drove a lot of innovation in new heater design, and there is some emerging evidence that this did contribute to improved air quality in that region. So I am not saying it is the answer for Australia, but it is worthy of investigation.

The AHHA suggested that tackling incorrect heater operation and use of inappropriate fuel would be best addressed via community awareness campaigns, co-designed by industry and government, that provided factual and accessible information about the efficient operation of wood heaters.⁸⁴

However, addressing the Launceston case, the Australian Air Quality Group (AAQG) questioned whether education was enough:

Despite considerable efforts to encourage owners of remaining heater in Launceston to operate them as carefully as possible, the 54% reduction in wood heaters resulted only in a 40% reduction in wood heater pollution, suggested that education on how to operate heaters to minimize pollution was largely unsuccessful.⁸⁵

Dr Dorothy L Robinson from the AAQG expanded on this at a public hearing. She argued that while the education material on health impacts of wood heater emissions had led to positive change in Launceston, educating people on correct operation of wood heaters was less effective:

[Launceston] also had a few other strategies, like trying to educate people on how to use wood heaters...that tended to have a very, very temporary effect, and it is very, very labour intensive. So it is very, very costly and usually the benefits phase-out after a couple of years. That is why, because they really did not follow through with the education for the whole period of time, things are now getting gradually worse and they are now starting to have several exceedances of air quality standards every year.⁸⁶

⁸⁴ Australian Home Heating Association, *Submission 50*, p. 1.

⁸⁵ Australian Air Quality Group, *Submission 75*, p. 3.

⁸⁶ Dr Dorothy L Robinson, Australian Air Quality Group, public hearing, Melbourne, 29 June 2021, *Transcript of evidence*, p. 30.

BOX 6.1: Launceston Woodheater Replacement Program and community education intervention (Tasmania)

In September 2001, a AUD\$2.05 million Natural Heritage Trust funded program was implemented in Launceston, Tasmania. In operation for approximately five years, the program focused on public education about the health impacts of wood smoke pollution and encouraged people to replace wood heaters with clean heating alternatives with the offer of up to \$500 rebates to replace wood heaters with cleaner alternatives.

Approximately 2,000 households were recipients of the subsidy over the life of the program, while many others replaced wood heaters at their own expense. These interventions dramatically accelerated a general trend towards using heat pumps instead of wood heaters.

At the time of the program's implementation, 66% of Launceston households used domestic wood stoves as the main source of heating; emissions from these accounted for an estimated 85% of particulate air pollution in winter. Results indicated that the program contributed to improved regional air quality by accelerating the existing downward trend in the number of wood heaters in Launceston. Modest reductions in mortality rates from respiratory and cardiovascular diseases was also observed.

Over the life of the program:

- prevalence of wood heaters fell from 66% of households to 30%
- the average daily wintertime PM₁₀ concentration fell by 61% (from 44 µg/m³ during 1994–2000 to 27 µg/m³ during 2001–2007)
- a small reduction in wintertime deaths from respiratory disease (28%) and cardiovascular disease (20%) was observed
- results were more significant in relation to the male-only population, with reduction in deathrates of 17.9% and 22.8% in relation to cardiovascular and respiratory diseases, respectively
- reduction in overall mortality rates was calculated to cost approximately \$21 per resident.

The success of the Launceston program over a relatively short period relied on a combination of science, direct education programs (including smoke patrols), effective monitoring, and media publicity, in addition to the subsidy scheme. The program also demonstrated that, to be effective, education and behaviour change programs were of most effect when operated collaboratively between state and local levels of government.

Sources: The Lung Health Research Centre, University of Melbourne, *Submission 100*, p. 18 (with sources); Environmental Justice Australia, *The People's Clean Air Action Plan for Victoria*, 2021, p. 21 (with sources); Rob Mitchell et al., EPA and Department of Health and Ageing (South Australia), Comments and recommendations to the National Environment Protection Council Service Corporation's consultation regulation impact statement for reducing emissions from wood heaters, 10 July 2013, p. 1; Department of the Environment and Heritage (Cth), *Woodheaters in Launceston - Impacts on Air Quality*, 'A study funded by the Natural Heritage Trust and undertaken by CSIRO Atmospheric Research', September 2005, p. i.

6.3.2 Usage vs health costs

A Policy Impact Assessment prepared for the EPA in 2017 assessed the impacts of formally adopting AS/NZS4012 to require all heaters newly manufactured or supplied in Victoria to meet minimum certified efficiency levels (i.e. burning less wood to achieve the same heat output). The Assessment modelled the impact of three potential interventions (based on an estimated 142,800 wood heaters in Victoria at a growth rate of 0.4% in greater Melbourne and Geelong⁸⁷ and 0.8% in the rest of Victoria):

1. adopting AS/NZS4012 (the action proposed and ultimately adopted by the EPA⁸⁸)
2. adopting a tighter emission factor standard of 1 g per kg
3. increasing the replacement rate of existing heaters.⁸⁹

The Assessment quantified total health costs of particulate matter emissions from the use of wood heaters at >\$8 billion over 10 years. The adoption of AS/NZS4012 was estimated to deliver a net benefit of \$33.9 million, significantly lower than the estimated \$462.8 million net benefit of accelerating the replacement of existing heaters. However, the proposed action was estimated to provide the greatest benefit-cost ratio of the three interventions (see Table 6.1 below).⁹⁰

Table 6.1 Policy impact assessment on the Waste Management Policy (Solid Fuel Heating)

	Adopt efficiency standard AS/NZS4012 (proposed action)	Tighten emission factor standard to 1 g/kg (alternative)	Increase replacement rate of existing heaters (alternative)
PM emissions avoided (tonnes)	671	674	11,241
Value of avoided emissions	\$33,171,837	\$30,197,783	\$521,873,961
Costs	\$212,887	\$2,143,957	\$58,996,108
Net benefit	\$32,958,950	\$28,053,826	\$462,877,853
Benefit-cost ratio	155.8	14.1	8.8
Cost effectiveness (cost per tonne of PM avoided)	\$317.43	\$3,179.83	\$5,248.28

Note: All figures are net present values over 10 years. All impacts are relative to the 'base case' of taking no further action beyond the current Policy (which incorporates the emissions standard that requires a maximum emissions factor of 1.5 g/kg from 2019) and existing actions to promote awareness of wood heater emissions and information to reduce emissions (including activities undertaken by industry and local councils).

Source: Regulatory Impact Solutions, *Policy Impact Assessment: Variation to the Waste Management Policy (Solid Fuel Heating)*, report for Environment Protection Authority Victoria, November 2017, p. i.

⁸⁷ Specifically, the Port Phillip Air Quality Control Region, which covers most of greater Melbourne and Geelong.

⁸⁸ Environment Protection Authority Victoria, *Variation to the Waste Management Policy (Solid Fuel Heating)*, 26 August 2021, p. i, <<https://www.epa.vic.gov.au/about-epa/what-we-do/standards/variation-to-the-waste-management-policy-solid-fuel-heating>> accessed 17 September 2021.

⁸⁹ Regulatory Impact Solutions, *Policy Impact Assessment: Variation to the Waste Management Policy (Solid Fuel Heating)*, report for Environment Protection Authority Victoria, November 2017, p. i.

⁹⁰ Ibid.

However, stakeholders argued any claimed usage savings derived from wood heaters was vastly outweighed by the significant health costs associated with exposure to the emissions they produced.

The CAR argued that wood heaters had a high health burden for both household members and the wider community as they increase pollution levels population wide. It submitted that, in Tasmania, an estimated 65 premature deaths annually were attributable to wood heater emissions with an associated annual health cost of \$4,232 per heater.⁹¹ Associate Professor Johnston expanded on this point:

It costs a lot—heaters are \$3000 to \$4000 each—but the health impacts cost so much. More than one study has done this estimate: if you take the health costs, the costs of earlier-than-expected death, the hospital costs, and divide them by the number of wood heaters, it is approximately—this is an estimate for Tasmania—\$3500 in health costs per wood heater per year from the particulate air pollution associated with heaters. When you take that into account, incentive schemes for reducing the number of heaters are very cost effective.⁹²

Dr Rob Phair noted a recent study (published August 2021) on the effects of mortality and financial costs of wood heater pollution in Armidale, New South Wales.⁹³ It found that 14 premature deaths per year (corresponding to 210 years of life lost) were attributable to long term exposure to wood heater PM_{2.5} pollution, with an estimated financial cost of \$32.8 million (or \$10,930 per wood heater per year).⁹⁴

Asthma Australia submitted that people with asthma and other respiratory illnesses, as well as pregnant people, children and elderly people, were particularly vulnerable to wood heater emissions. It noted exposure to emissions had been associated with certain cancers, cardiovascular and respiratory hospital admissions and emergency department visits, premature birth and premature death (an overview of health impacts of air pollution is provided in Chapter 2).⁹⁵

In 2020, Asthma Australia commissioned a large, nationally representative survey on the public attitudes to woodfire heaters and their regulation. A common response among the survey results was that people attempted to protect themselves from wood heater smoke by staying inside with their doors and windows closed when smoke was present. Asthma Australia argued this was an impractical solution as wood heater smoke was a persistent problem in affected regions during colder months where people may be exposed daily. It was also unlikely to be effective in protecting the many people living in homes which weren't well-sealed.⁹⁶ An overview of the survey findings appears in Box 6.2 below.

⁹¹ Centre for Air Pollution, Energy and Health Research, *Submission 65*, p. 3 (with sources).

⁹² Associate Professor Fay Johnston, *Transcript of evidence*, p. 34.

⁹³ Dr Rob Phair, President, Rural Doctors Association of Victoria, public hearing, via video conference, 11 August 2021, *Transcript of evidence*, p. 22.

⁹⁴ Dorothy L Robinson et al., 'The effects on mortality and the associated financial costs of wood heater pollution in a regional Australian city', *Medical Journal of Australia*, vol. 215, no. 6, 20 September 2021, p. 1, doi: 10.5694/mja2.51199

⁹⁵ Asthma Australia, *Submission 39*, pp. 7–8.

⁹⁶ *Ibid.*, p. 8.

BOX 6.2: Asthma Australia national survey of attitudes to woodfire heaters

In 2020, Asthma Australia commissioned a national survey of more than 25,000 people and 15 focus groups to learn about public attitudes to woodfire heaters and their regulation. Quantitative research was conducted over 10–29 November 2020 via a representative online survey and telephone interviews. Qualitative research occurred from 22 October 2020 to 4 November 2020 across 15 focus groups; focus groups comprised a representative sample of 12 Australians and ran for approximately 90 minutes.

A combined total of 25,039 people completed the telephone and online surveys. The sample was representative of the Australian population across major demographic, geographic and socioeconomic factors. Survey results indicated most Australians would support regulations to phase-out wood heaters for healthier options, particularly Australians with asthma.

Ownership and use

- 1 in 9 Australians (11%) reported owning and using a wood heater.
- 7% reported use as the main source of heating; these rates were higher in cooler states/territories at 13% in Tasmania and 14% in ACT.
- People with asthma were marginally less likely to own and use a wood heater.

Health impacts

- 23% of people with asthma reported experiencing respiratory symptoms when exposed to wood heater smoke; compared to 11% of the general population.
- 75% of the general population agreed that woodfire heaters can cause health problems for certain people; this was also reflected in the focus group.
- Impact of wood heater smoke on the general population was less recognised with 55% of Australians believed wood heaters could cause health problems for the general population.
- 28% of the general population and 18% of people with asthma said they were able to protect themselves from wood heater smoke.

Attitudes to regulation

- 77% of the general population agreed that wood heaters should not be allowed in urban or built-up areas, 55% agreed they should be phased out and 54% said they should be banned.
- Rate of support for regulation of wood heaters in urban or built-up areas was 84% of people with asthma, with 71% in support of a phase-out and 65% agreeing they should be banned.
- 37% of the general population and 50% of people with asthma supported community education on how to correctly use wood heaters.

(Continued)

BOX 6.2: Continued

- Focus groups participants similarly reported stricter regulation of wood heaters was the best method to improve the air quality, with particular support for mandated government emissions standards applying to sale of woodfire heaters and requirement that heaters should only be permitted in regional or rural areas.
- A small number of participants disagreed with stricter regulation and believed people should continue to be free to heat their homes as they had done in the past.
- Some focus group participants were supportive of a subsidy scheme to assist people to upgrade inefficient and low quality wood heaters.

Sources: Asthma Australia, *Woodfire Heaters and Health Survey Key Findings Report*, (n.d.), <<https://asthma.org.au/wp-content/uploads/2021/03/Asthma-Australia-Woodfire-Heaters-and-Health-Survey-Report.pdf>> accessed 17 September 2021; Asthma Australia, *Submission 39*, pp. 8–9; Asthma Australia, *Public would support a 'phase-out' of woodfire heaters*, 18 March 2021, <<https://asthma.org.au/about-us/media/public-would-support-a-phase-out-of-woodfire-heaters>> accessed 17 September 2021.

Key arguments made in support of domestic wood heating were that wood heaters:

- are the primary source of heat for many vulnerable people
- cannot be easily replaced where there is no access to natural gas or electric heating.

The EPA's 2017 Policy Impact Assessment stated:

Banning new wood heaters may also cause some households to use inadequate alternative heating, which in turn could lead to adverse health impacts from cold. Wood heater bans were previously considered in 2004 by EPA as part of the development of the current Waste Management Policy. A ban was not supported on the grounds that in some circumstances it would place economic pressure on disadvantaged groups in the community which could result in health impacts during the cooler months.⁹⁷

Mr Stephen Meloury, Unit Manager, Building Services and Environmental Health in the City of Moreland, also pointed out that in some cases, wood heaters were the only source of heating for some residents:

Sure. We do not know exactly how many residents have wood heaters across the municipality. We do know that for some residents wood heaters continue to be the only source of heating that they have, which is part of I guess our concern when we get these complaints come in and when we assess those complaints doing site visits—that some people rely still very heavily on their wood heaters for heating and other measures as well.⁹⁸

⁹⁷ Regulatory Impact Solutions, *Policy Impact Assessment: Variation to the Waste Management Policy (Solid Fuel Heating)*, report for Environment Protection Authority Victoria, November 2017, p. 24.

⁹⁸ Mr Stephen Meloury, Unit Manager, Building Services and Environmental Health, City of Moreland, public hearing, Melbourne, 20 June 2021, *Transcript of evidence*, p. 17.

While this point was acknowledged by some stakeholders, others argued that the ‘poor households’ argument perpetuated poor health outcomes for the more economically vulnerable members of the community.

For example, Ms Liz Poole from Communities for Clean Air Network stated that wood heaters were ‘about economics, but not in the way that people think’. She rejected the argument that removing wood heaters would disadvantage low-income people as a narrative widely promoted by the wood heating industry, making the counterpoint that it was this claim that saw low-income earners paying the highest price for wood heating—with their health—due to a higher likelihood of living in poorly sealed homes in areas of high housing density, surrounded by others also using wood heaters regularly.⁹⁹

Addressing a related argument, Dr Robinson noted that, when applied to off-grid remote and rural properties, the ‘only source of heating’ argument was less of a concern as these properties did not really harm neighbouring houses. She noted in such cases the only people being harmed were the people on the property, and it was up to them to make an informed choice.¹⁰⁰

Another considerable challenge to reducing wood heater use was the strong cultural attachment to wood fires held by many in the community. This was noted by Ms Kate Forster, who considered that most burning of wood was now cultural, not essential (although she acknowledged that financially vulnerable people were more likely to be caught-out relying on a wood heaters for heating).¹⁰¹

The AHHA stated that ‘[w]ood heating is a desirable source of warmth for many at a reasonable cost’.¹⁰² Dr Phair expanded on this issue at a public hearing:

Look, education is critical and especially in rural communities who love wood heaters and who often have got a whole culture associated with going and collecting wood, and it is a family activity and it is what we have always done. So there are major cultural factors which need to be acknowledged and need to be respected. I mean, the problem we have got is that we have actually have, as we have heard previously, 85 per cent of wood heater sales going into rural communities, and these are mostly small towns. All are on the grid, so all have access to electricity. On a nationwide level the data I have heard is that 40 000 wood heaters are going into Australian homes nationwide every year, so we actually need to work out a way of transitioning that involves selling fewer of these devices and installing fewer of them as well.¹⁰³

6.3.3 Compliance and enforcement

Air quality is controlled at local government level through planning permits (such as prevention of open burning) and enforcement of nuisance provisions in the *Public*

⁹⁹ Ms Liz Poole, Communities for Clean Air Network, public hearing, Melbourne, 29 June 2021, *Transcript of evidence*, p. 24.

¹⁰⁰ Dr Dorothy L Robinson, *Transcript of evidence*, p. 26.

¹⁰¹ Ms Kate Forster, public hearing, Melbourne, 29 June 2021, *Transcript of evidence*, p. 24.

¹⁰² Australian Home Heating Association, *Submission 50*, pp. 2–3.

¹⁰³ Dr Rob Phair, *Transcript of evidence*, p. 21.

Health and Wellbeing Act 2008 (Vic) (the Public Health Act) in relation to complaints about smoke from burning on private properties, wood heaters, and air emissions from smaller industries.¹⁰⁴

Banyule City Council argued that the practicality of utilising the nuisance provisions for smoke complaints was difficult. It advised that over the past 5 years, Council had responded to approximately 143 complaints of wood heater smoke and had received a further 65 complaints that did not require investigation. However, Banyule Council submitted that the vast majority of complaints investigated did not fit the nuisance provisions in the Act; many complaints were about the smell of smoke rather than there being excessive smoke.¹⁰⁵

Banyule City Council advised that while its actions around wood heater management focused on education about the correct installation and operation, flue height, and appropriate fuel types, it recommended complementary actions that could work in support of education activities including:

- the ability to issue infringement penalties where continual visible smoke was present
- the ability to issue a smoke abatement order to an occupier of a residence from which excessive wood heater smoke is emitted (similar to provisions under the *Protection of the Environment Operations Act 1997* (NSW))
- implementation of guidelines for enforcement agencies
- additional funding support to assist enforcement or education activities
- State-wide implementation of buy-back schemes, heater replacement rebates, or bans.¹⁰⁶

In the City of Moreland, complaints regarding air quality from wood heaters are resolved through restrictions that are imposed under the *Moreland City Council General Local Law 2018*.¹⁰⁷ Mr Meloury told the Committee that Council received a small number of complaints each year,¹⁰⁸ which were dealt with on a case-by-case basis, generally by working with residents to better educate and inform them. He also noted that residents often didn't know how to complain or what information was already available:

we provide information to residents as they are complaining, or if we get a pocket of complaints about a particular area in relation to this we will go out and do some work to that particular area in response to that. But the experience tells us that either residents do not know who to complain to or, if they do complain to council about it, they are not really aware of what information is out there—not only in terms of regulation and what should happen but also measures that they can be taking themselves to minimise

¹⁰⁴ Victorian Government, *Submission 113*, p. 49.

¹⁰⁵ Banyule City Council, *Submission 10*, pp. 1–2.

¹⁰⁶ *Ibid.*, p. 3.

¹⁰⁷ Mr Stephen Meloury, *Transcript of evidence*, p. 15.

¹⁰⁸ *Ibid.*, p. 17.

impacts on their own health and wellbeing. So it would certainly be of benefit to have a much broader education piece so that we are not continuing to deal with things on an individual case-by-case basis.¹⁰⁹

Mr Meloury suggested that a mechanism that provided greater visibility on the number and types of wood heaters in a particular area could be useful from both a compliance and planning perspective:

we do not actually have any mechanism in place at the moment to record which properties use wood heaters, what standard those wood heaters are at or what they are particularly used for unless we are resolving a complaint. So it would be useful to have potentially a database of all wood-fired heaters across not only our municipality but also the greater Melbourne area. We know if there is a wood fire being used in, say, Darebin or Moonee Valley and the wind blows in a particular direction, that does have the potential to impact on Moreland residents, particularly if there is a cluster of them together, so it would be useful from a planning perspective to know where they are all located so that we can try and resolve those issues.¹¹⁰

Stakeholders argued that, currently, people affected by wood smoke had no practical recourse for action due to a lack of consistency, enforcement and resourcing across local government around wood heaters; they called for the EPA to take a more active role in compliance and enforcement activities. Arguments included:

- The EPA directs complainants to their local council, which often redirects the person back to the EPA while little practical benefit to the affected party is achieved.¹¹¹
- Councils do not undertake adequate enforcements in municipalities where wood fires are banned.¹¹²
- Council responses to woodsmoke are so ineffective that the burden of monitoring smoke levels falls on neighbouring residents.
- More support is needed for local government to enforce environmental regulations.¹¹³

Ms Arabella Daniel from Clean Air Communities suggested compliance and enforcement activities should sit with the EPA rather than individual councils:

In my recommendations...is to transfer this responsibility to the EPA...you cannot have a scenario when one council acts and then across the road, the border of the next council, you have no action; it does not work. We need this to be a statewide implementation.¹¹⁴

¹⁰⁹ Ibid., pp. 15–16.

¹¹⁰ Ibid., pp. 17–18.

¹¹¹ The Lung Health Research Centre, University of Melbourne, *Submission 100*, p. 18.

¹¹² Name Withheld, *Submission 124*, p. 1.

¹¹³ Asthma Australia, *Submission 39*, p. 8.

¹¹⁴ Ms Arabella Daniel, Clean Air Communities, public hearing, Melbourne, 29 June 2021, *Transcript of evidence*, p. 26.

Ms Forster considered there was a lack of clarity around who was legally responsible to enforce emissions requirements and what power local government actually has.¹¹⁵ While Ms Poole asserted the EPA did not have any line of sight into what happens at a local level:

the EPA does not have any line of sight into what happens at the local level, and have no oversight of how local councils deal with issues around wood-smoke pollution. They are not equipped, they are not resourced. I think that they are just not a good level of government to address this. I think it needs to be statewide and coordinated. It needs to be something that is consistent across the state, and if it is just left up to councils, it will not be consistent.¹¹⁶

In its submission, Communities for Clean Air Network provided a detailed summary of the key issues around local monitoring and enforcement by the EPA and local government:

- **Advice and monitoring are ineffective**

The only advice the EPA provides to residents affected by neighbouring woodsmoke is to talk to their neighbours, use dispute resolution procedures if negotiations fail, and contact their council or the EPA. Real-world experiences of people who have attempted to act on this advice demonstrates the recommended approach fails to protect affected residents.

- **Neighbours are left with responsibility for resolving disputes**

The EPA's advice that affected people should talk to their neighbour is similar to advice for other neighbourhood issues such as excessive noise, littering or barking dogs. However, while these other issues are supported by clear standards and regulations, wood heater use is effectively unrestricted and affected residents are not backed-up by regulation, leaving them to resolve these issues themselves.

Similarly, there is no compulsion for a woodsmoke emitter to engage in dispute resolution, another option recommended by the EPA. Anecdotal experiences suggest attempts to pursue this tactic often result in threats and hostility.

Framing air pollution as a neighbourhood dispute akin to noisy dogs or rubbish on a nature strip would more effectively place the onus on emitters to address the pollution.

- **Councils cannot adequately monitor woodsmoke:**

- it is resource intensive
- poor wood heater use often occurs after hours
- there is an unavoidable time lag between a complaint and council attendance, after the worst of the smoke may have abated

¹¹⁵ Ms Kate Forster, *Transcript of evidence*, p. 26.

¹¹⁶ Ms Liz Poole, *Transcript of evidence*, p. 27.

- wood heater use occurs in private homes
- contaminated wood can be easily hidden
- monitoring by impacted resident does not provide required burden of proof
- wood heater ownership is viewed by some as a 'right' which leads to justification for thwarting the efforts of authorities
- councils are reluctant to use the *Public Health and Wellbeing Act 2008* (Vic).

- **The EPA provides inadequate data on air quality in Victoria**

(covered in detail in Chapter 8)

- **Neither the EPA nor local councils are prepared to take responsibility**

While the EPA provides information on the correct operation of wood heaters and appropriate fuels, there are no specific restrictions on how often a wood heater can be used.¹¹⁷

Asthma Australia submitted that the State and local governments needed to work together to better enforce environmental regulations by investigating complaints and reports of excessive wood heater smoke, educating individuals around reducing emissions and issuing infringement notices when needed.¹¹⁸

The Lung Health Research Centre recommended the creation of a task force with objectives to improve the current approach to regulation and enforcement of, and education regarding, neighbourhood wood heater smoke emissions.¹¹⁹ The Committee makes further comment on the Lung Health Centre's recommendation in Section 6.3.4 below.

RECOMMENDATION 18: The Environment Protection Authority Victoria work with local councils to develop more practical approaches to the management and enforcement of local laws that govern air pollution impacts caused by domestic wood smoke, including consideration of recommendations made by Banyule City Council to provide for:

- the issue of infringement penalties where continual visible smoke was present
- the ability to issue a smoke abatement order to an occupier of a residence from which excessive wood heater smoke is emitted
- the implementation of guidelines for enforcement agencies
- additional funding support to assist enforcement or education activities.

¹¹⁷ Communities for Clean Air Network, *Submission 82*, pp. 6–8.

¹¹⁸ Asthma Australia, *Submission 39*, p. 8.

¹¹⁹ The Lung Health Research Centre, University of Melbourne, *Submission 100*, p. 19.

6.3.4 Wood heater emission mitigation and reduction

Dr Phair submitted that ‘solid fuel burning was one of the most significant preventable causes of air pollution across much of southern Australia’.¹²⁰ According to Environmental Justice Australia’s *People’s Clean Air Action Plan*, principle control measures for wood heater pollution include:

- regulating the use of existing wood heaters
- phasing out wood heaters in residential areas
- offering incentives to upgrade insulation and install clean heat pumps.¹²¹

These control measures are most effective when accompanied by targeted public education and communication about the health risks associated with wood smoke to help drive the uptake of clean forms of heating.¹²²

The Government informed the Committee it had committed \$335 million to support 250,000 low income and vulnerable households with rebates of \$1,000 to install an efficient reverse-cycle air conditioner to replace inefficient gas, electric or wood heaters.¹²³

Many stakeholders were supportive of the Government’s action however, they argued that further measures could and should be taken.¹²⁴ They pointed to the success of the Launceston wood heater program in arguing for similar measure in Victoria. The Lung Health Centre noted the clear health benefits achieved in Launceston demonstrated the potential for significant health and associated economic gains.¹²⁵ Communities for Clean Air Network noted the combination of education and targeted communications delivered with the subsidy scheme was much more effective than rebates alone.¹²⁶

One way to achieve emissions reduction is to require wood heaters be removed when houses are sold. A 2011 consultancy report commissioned by the New South Wales EPA concluded that a wood heater phase-out, which banned the installation new wood heaters and required existing ones to be removed when houses are offered for sale, would yield the greatest cost-benefit of all wood smoke control measures.¹²⁷

Dr Robinson discussed this idea at a public hearing:

the idea first came from a study commissioned by the New South Wales EPA...simply not allowing new heaters and requiring existing ones to be phased out when houses were sold would reduce the health costs by 75 per cent. So it was a big improvement because most houses are sold every six, seven or eight years, and it really does create a big relief

¹²⁰ Dr Rob Phair, *Submission 96*, p. 1.

¹²¹ Environmental Justice Australia, ‘The People’s Clean Air Action Plan for Victoria, 2021, p. 20 (with sources)’, *Submission 110*, p. 41.

¹²² Ibid.

¹²³ Victorian Government, *Submission 113*, p. 21.

¹²⁴ Asthma Australia, *Submission 39*, p. 8.

¹²⁵ The Lung Health Research Centre, University of Melbourne, *Submission 100*, p. 18.

¹²⁶ Communities for Clean Air Network, *Submission 82*, p. 9.

¹²⁷ Environmental Justice Australia, ‘The People’s Clean Air Action Plan for Victoria, 2021, p. 21 (with sources)’, *Submission 110*, p. 42.

to the people living nearby. My argument would be really, when houses are sold most people spend thousands on upgrading the houses anyway so why not just encourage them to spend it on upgrading the heating systems well? Rather than a new, fancy kitchen, let us have better health instead. It would be much better for all concerned.¹²⁸

Communities for Clean Air Network called for a package of measures that set meaningful targets for reduction of wood heater smoke that reflected the urgency of the problem in terms of impacts on health and climate change. It recommended a phase-out program with a target date:

- **No new wood heaters installed:** legislation should be enacted to prevent wood heaters/fireplaces being installed and remove existing wood heaters/fireplaces upon the sale of a house.
- **Replacement scheme:** current subsidy programs that encourage households to switch to healthier heating options should be directed to target households with wood heaters as a first priority.
- **Public education campaign to support phase-out:** an education campaign should be developed to highlight the health risks posed by wood heater smoke to raise levels of health literacy in the general population in relation to particle pollution; the campaign should include targeted education to wood heater/fireplace owners about harms to health from wood heater smoke.¹²⁹

Similar calls for a phase-out of wood heaters in Victoria came from other stakeholders including Asthma Australia,¹³⁰ Doctors for the Environment Australia,¹³¹ Australian Parents for Climate Action,¹³² Clean Air Communities,¹³³ and numerous others.¹³⁴ While Environmental Justice Australia's *People's Clean Air Action Plan* recommended implementation of a plan to phase-out wood heaters, including the following elements:

- progressive restrictions on the use of wood heaters during periods of increased air pollution risk and/or unfavourable weather conditions
- require the removal of wood heaters from homes upon sale
- subsidise insulation upgrades and heat pump installations for houses that remove wood heaters
- phase-out the installation of wood burning heaters.¹³⁵

¹²⁸ Dr Robinson, *Transcript of evidence*, p. 27.

¹²⁹ Communities for Clean Air Network, *Submission 82*, p. 10.

¹³⁰ Asthma Australia, *Submission 39*, p. 8.

¹³¹ Doctors for the Environment Australia, *Submission 68*, pp. 4, 14.

¹³² Australian Parents for Climate Action, *Submission 58*, pp. 11-12.

¹³³ Clean Air Communities, *Submission 112*, p. 35.

¹³⁴ See for example: Darryl Johnston, *Submission 84*, pp. 1-2; Karina Kanepe, *Submission 89*, pp. 1-2; Liz Poole, *Submission 91*, p. 6; Dr Rob Phair, *Submission 96*, p. 3; Tobias Dacy, *Submission 104*, p. 1; Adam Menary, *Submission 108*, p. 2; Kate Forster, *Submission 115*, p. 4.

¹³⁵ Environmental Justice Australia, 'The People's Clean Air Action Plan for Victoria, 2021, pp. 21-22 (with sources)', *Submission 110*, pp. 42-43.

Dr Phair, who also supported a phase-out of all wood heaters, suggested working with major retailers that prominently sell all types of wood-burning devices, as well as small, local retailers who are often family-run businesses in rural areas with loyal clientele to develop a strategy to transition from wood heaters towards cleaner options.¹³⁶ He further submitted that small businesses that offered employment related to wood burning (including firewood supplies) had to be supported in any transition to providing clean, sustainable heating sources.¹³⁷

RECOMMENDATION 19: The Victorian Government develop and implement a public community education and awareness campaign to actively inform the community about the dangers of wood heaters and adverse health impacts caused by exposure to smoke, especially in built-up areas, including targeted education for households with a wood heater.

RECOMMENDATION 20: The Victorian Government consider a targeted rebate scheme to assist people from a low socioeconomic background to transition away from reliance on domestic wood heaters as their only source heating to more modern and efficient reverse cycle air conditioning. The scheme should be extended to people who live in a rental property and who do not have a choice of heating options.

RECOMMENDATION 21: The Victorian Government consider the development of and implement a supported rebate program to assist with the progressive phase-out and removal of wood heaters from dwellings in urban and built-up areas by vendors at the point of sale of a property.

As noted at the end of Section 6.3.3 above, the Lung Health Research Centre recommended the creation of a task force to improve the current approach regulation and enforcement of, and education regarding, neighbourhood wood heater smoke emissions. Specifically, with objectives to:

- formulate and provide a clear and consistent recourse for action for people who are unduly affected by woodsmoke
- penalise wood heater polluters in a manner that deters the polluter and strongly promotes the core legal objective of equivalent protection from air pollution wherever people live
- liaise with local governments to educate and assist the implementation of policies related to wood heaters
- campaign to raise public awareness of the health impacts of wood heater emissions.¹³⁸

¹³⁶ Dr Rob Phair, *Transcript of evidence*, pp. 21–22.

¹³⁷ Dr Rob Phair, *Submission 96*, p. 3.

¹³⁸ The Lung Health Research Centre, University of Melbourne, *Submission 100*, p. 19.

The Committee considers this proposal has particular merit that could be expanded beyond the scope of improvements to regulation and enforcement. In the Committee's view a taskforce mechanism such of this nature, with appropriate resourcing and expertise, would be well placed to inform and monitor actions and interventions to reduce domestic wood smoke impacts and evaluate their effectiveness in a wholistic manner.

RECOMMENDATION 22: The Victorian Government consider the creation of a taskforce to monitor and evaluate impacts of and issues relating to woodsmoke, including provision for ongoing monitoring and evaluation of the effectiveness of woodsmoke reduction measures, and associated improvements to air quality and human health.

7 Vehicle emissions

As noted in Chapter 2, one of the key drivers of air pollution globally are the emissions from internal combustion engine (ICE) vehicles, both petrol and diesel powered. In this Chapter, the Committee has considered some of the specific concerns related to vehicle emissions raised during the Inquiry, as well some of the perceived mitigation strategies that could be put in place to reduce emissions and thereby reduce the impact of air pollution in Victoria.

A number of concerns were raised in submissions and in evidence at public hearings about vehicle emissions and the impact they have on the lives of Victorians, particularly in Melbourne's western suburbs and near major roads.

While it needs to be noted that air pollution from vehicles is not a localised problem—it is responsible for a considerable percentage of air pollution globally—the Inquiry heard that it is of particular concern in the west and inner west of Melbourne. The Maribyrnong Truck Action Group (MTAG), which is a resident-based community group campaigning to reduce truck numbers on residential streets in Melbourne's inner west, submitted:

The City of Maribyrnong has some of the country's highest levels of diesel pollution due to 22,000 trucks a day, driving within metres of homes, schools and childcare centres. These trucks service the Port of Melbourne, Australia's busiest container port, generating over 5 million truck movements each year on our narrow residential streets. Due to expansion of the Port of Melbourne, forward projections show that container movements will still double by 2050, even with best case truck productivity and rail infrastructure improvements.¹

In this Chapter, the Committee outlines some of concerns expressed about high levels of pollution in residential areas caused by truck routes and high traffic volumes, and the placement of facilities for vulnerable people such as childcare centres in areas of high traffic volume. It then considers some of the mitigation strategies that have been proposed or undertaken to address these concerns, including the transitioning away from ICE vehicles and some other policy options such as anti-idling regulations.

7.1 Vehicle emissions pollution

Vehicle emissions are one of the largest sources of air pollutants in Victoria and across the world; the impact of vehicle emissions is likely to grow as populations increase, particularly in urban and urban-growth areas where vehicle usage is higher and public transport usage is decreasing.

¹ Maribyrnong Truck Action Group, *Submission 42*, p. 1.

According to a study undertaken by Transport Energy/Emission Research Pty Ltd in 2020, the ‘contribution of motor vehicle emissions to population exposure and associated health effects is substantially greater than one would expect on the basis of their emissions alone’. The study’s report stated that:

International studies have found that motor vehicles are the largest single contributor to human health effects (PM, ozone), and that emission levels are leveraged by about a factor of three to four when population exposure is considered.²

Vehicle emissions mostly come from motor vehicle tail pipes. The major pollutants emitted through tail pipes are nitrogen oxides and carbon monoxide. There are also non-tail pipe emission sources, such as brake, tyre and road-wear particles. According to the *Australia State of the Environment 2016* report:

As at 31 October 2014, the annual vehicle kilometres travelled for all road vehicles in Australia were estimated at 244 billion kilometres. Of this, 179 billion occurred in capital city and urban areas. Furthermore, total metropolitan vehicle kilometres travelled are projected to increase by 41 per cent from 2015 to 2030.³

In Victoria, the *Scientific Assessments* produced by the Commissioner for Environmental Sustainability as part of the *Victorian State of the Environment 2018 (VSoE 2018)*, suggested that ‘motor vehicles and large industry are estimated to account for the majority of carbon monoxide, oxides of nitrogen and sulphur dioxide emissions across Victoria’.⁴

The Commissioner found, from work completed at the time, that motor vehicles contribute most of the carbon monoxide and oxides of nitrogen. As a proportion of total emissions across the State, motor vehicles were estimated to account for about 70% of carbon monoxide and 60% of nitrogen oxide emissions in 2016.⁵ These emissions have been increasing as the population of Melbourne and the consequent number of vehicles has grown. The Scientific Assessments stated:

Victoria’s population has increased from 4.8 million in 2001 to 5.9 million in 2016. This population expansion has been reflected in increased motor vehicle use, with the total kilometres travelled by motor vehicles registered in Victoria increasing by 15% from 2007 to 2016.⁶

In terms of climate change impact, too, vehicle emissions continue to have a significant impact. The Scientific Assessments suggested:

² Robin Smit, *Motor Vehicle Engine Idling in Australia – a critical review and initial assessment*, Transport Energy/Emission Research Pty Ltd (TER), June 2020, p. 5.

³ Australia State of the Environment 2016, ‘Motor vehicles’, *Ambient air quality (2016)*, 2016, <<https://soe.environment.gov.au/theme/ambient-air-quality/topic/2016/motor-vehicles>> accessed on 9 September 2021

⁴ Commissioner for Environmental Sustainability Victoria, *Victorian State of the Environment 2018 Report – Scientific Assessments*, Melbourne, 2018, p. 78, <<https://www.ces.vic.gov.au/sites/default/files/SoE-2018-scientific-assessments.pdf>>.

⁵ *Ibid.*, p. 99.

⁶ *Ibid.*, p. 592.

the transport sector contributed 20% of Victoria's GHG emissions in 2016, with transport emissions increasing in-line with population growth since 2009. Transport emissions have grown by 39% since 1990, and the sector has had the highest proportional increase in emissions in Victoria over the period.⁷

Supporting the view that vehicle emissions are having a serious impact on air quality in Melbourne, Doctors for the Environment Australia (DEA), in its submission, suggested that the poor air quality in urban areas in Victoria were the direct result of vehicle emissions.⁸

DEA stated that diesel exhaust is particularly toxic and is classified by the World Health Organisation (WHO) and the International Agency for Research on Cancer (IARC) as a Class 1 carcinogen, increasing the risk of lung cancer. Diesel powered vehicles also emit higher amounts of fine particulates and NO_x than petrol engines.⁹

In his submission to the Inquiry, Keith Loveridge, previously of RMIT, stated that 'one in four light vehicles on the road is now diesel powered' and that '[d]iesel engines contribute a disproportionate amount of fine particles into the atmosphere, with up to 100 times the emissions from a petrol vehicle'. The submission stated that:

In 2017, 377,423 diesel-powered SUVs, LCVs and passenger vehicles were sold in Australia. Sales of diesel vehicles in these three classes accounted for nearly 32 per cent of all new vehicle sales, and this does not include the sale of 37,000 heavy commercial vehicles. Diesel powered vehicles constituted 25.6% per cent of the national fleet in 2020 and continues to climb.¹⁰

Inner west communities in particular are exposed to high levels of air pollution, including dust and odour. Industrial and transport emissions are primary contributors. A significant cause of this pollution is from vehicle emissions. This is partly due to the geographic location of the suburbs, 'which 'funnels' large numbers of vehicles through the inner west, to and from the CBD, the Port of Melbourne, and the eastern, northern and southern suburbs'. It is also caused by the large number of diesel-fuelled vehicles on the roads.¹¹

In the Inner West Air Quality Community Reference Group's (IWAQCRG) submission, a personal testimonial made very real the impact the air pollution caused by vehicle emissions has on people's lives:

Our family has loved living in Melbourne's Inner West—a diverse, interesting and welcoming community, located close to the beach and city. Really, the only bad thing about living here is something serious and life threatening—the terrible air quality. As the health impacts of diesel pollution become more well known, I am astounded that this problem has taken so long to gain political recognition. I am sick of worrying about

7 Ibid., p. 599.

8 Doctors for the Environment Australia (DEA), *Submission 68*, p. 8.

9 Ibid.

10 Keith Loveridge, *Submission 40*, p. 5.

11 Inner West Air Quality Community Reference Group, *Air Pollution in Melbourne's Inner West*, Report March 2020, p. xii.

what the long-term consequences will be for my children, sick of fighting an issue that residents have fought for decades and sick of trying to make others understand the serious environmental injustice taking place here. It's well and truly time for action.¹²

According to the Public Transport Users Association, in its submission, the significance of motor vehicle pollution is highlighted by a range of studies with findings including:

- Living near a busy road is associated with increased risk of dementia.
- NO₂ from traffic pollution is implicated in millions of cases of childhood asthma around the world each year.
- Children's lung growth is stunted and the risk of lung cancer is increased when living near a busy road.
- Traffic pollution is associated with reduced birth weights, even at relatively low concentrations.
- Exposure to traffic pollution is associated with increased risk of leukemia and other childhood cancers.
- Exposure to traffic pollution is associated with increased risk of heart attack.¹³

7.2 High traffic areas

A key area of concern is the disproportionate air pollution burden carried by certain residential areas. This is largely due to nearby facilities, such as the Port of Melbourne and other industrial areas, and the resultant heavy vehicle traffic that constantly fills the roads. This impact is made worse by the high proportion of diesel powered trucks.

These trucks service the Port of Melbourne, Australia's busiest container port, generating over 5 million truck movements each year on narrow residential streets. MTAG claimed in its submission that, due to expansion of the Port of Melbourne, forward projections show that container movements will double by 2050, even with best case truck productivity and rail infrastructure improvements.¹⁴ MTAG submitted:

The impacts of these trucks have had a devastating impact on the health of the communities in the City of Maribyrnong with alarmingly high rates of diseases that are commonly attributed to toxic air pollution and are consistent with heavy exposure to poor air quality.¹⁵

Concerns about air pollution caused by heavy vehicles accessing the Port of Melbourne, as well as other activities within the Port, were echoed by the IWAQCRG. It submitted that the Port of Melbourne's operations:

¹² Ibid., p. xi.

¹³ Public Transport Users Association, *Submission 107*, p. 4.

¹⁴ Maribyrnong Truck Action Group, *Submission 42*, p. 1.

¹⁵ Ibid., p. 2.

generate large volumes of particulate matter and sulphur dioxide from shipping, onshore diesel machinery and inward and outbound trucks. The port's proximity to the Inner West and its future expansion plans mean it will continue to have major impacts on our communities.¹⁶

In its submission to the Inquiry, the Government highlighted that investment in major projects such as the West Gate Tunnel was a way of providing more direct connection to the Port of Melbourne, which is expected to remove thousands of trucks off surrounding residential streets and reduce congestion.¹⁷

The MTAG submission suggested that while the West Gate Tunnel will, on completion, reduce the truck traffic on certain streets and new truck restrictions will be implemented, the problem of heavy vehicle traffic in the inner west will not be resolved. The submission states:

the traffic and pollution impacts will become worse for some Inner West locations. In the City of Maribyrnong, Williamstown Road in Yarraville, Seddon and Kingsville will become one of the primary north-south truck routes in the Inner West. Homes and community facilities (including recreation reserves, childcare centres and schools) are located on and very close to the road. Truck movements along Williamstown Road between Somerville Road and Geelong Road are expected to more than double, to almost 5,000 a day.¹⁸

This concern was echoed by the IWAQCRG, which submitted that while access restrictions for heavy vehicles were planned for some inner west roads once the West Gate Tunnel opened, there were likely to be increases in truck traffic on other roads in the area and 'there is also a risk that drivers will choose new routes through Spotswood, Williamstown, Newport and Yarraville to avoid tunnel tolls'.¹⁹

In addition to the poor air quality in inner city areas surrounded by facilities such as the Port of Melbourne and industrial precincts, air quality on major roads elsewhere is also an ongoing issue.

The population exposure to poor air quality is likely to dramatically increase in line with population growth and a tendency to locate higher population centres near metropolitan activity centres. According to the *VSoE 2018 Scientific Assessments*, 'this means that many more people are likely to be living near major roads, which might reduce travel times, but could increase exposure to air pollution from motor vehicles and the risk of respiratory illness.' According to the Assessments:

The risk of asthma increases by 50% for Australians that live within 200 m of a major road. EPA Victoria currently monitors air quality alongside only one major roadway

¹⁶ Inner West Air Quality Community Reference Group, *Submission 14* – Attachment 1, p. 8.

¹⁷ Victorian Government, *Submission 113*, p. 20.

¹⁸ Maribyrnong Truck Action Group, *Submission 42*, p. 11.

¹⁹ Inner West Air Quality Community Reference Group, *Submission 14* – Attachment 1, p. 8.

in Victoria (in Melbourne's CBD), which is insufficient to understand the impact of air pollution in Victoria associated with motor vehicles²⁰

There is limited localised and up-to-date data on the air pollution levels caused by vehicles in metropolitan Melbourne or even in Australia more broadly.

Mr Loveridge's submission pointed to a major international study on vehicle air pollution and health research, carried out by the United States (US) based Health Effects Institute (HEI). He referred to the findings of this study that indicated there was 'a clear health risk for those living near arterial roads or highways'.²¹ The study, *Traffic-Related Air Pollution: A Critical Review of the Literature on Emissions, Exposure, and Health Effects A Special Report of the HEI Panel on the Health Effects of Traffic-Related Air Pollution* was undertaken in 2010.²²

While the study was conducted 11 years ago and, therefore, many of its specific findings may not be as valid given the technological advances in motor vehicles over the past decade, it still provides very useful context in considering the impact of vehicles on air pollution levels.

The study identified that an exposure zone fell within a range of up to 300–500 metres from a highway or a major road as the area was most highly affected by traffic emissions. It estimated that 30% to 45% of people in large North American cities lived within such zones, slightly below the estimated Australian population percentage.²³

Despite its age and the resultant caveats that places upon its findings, the detail and breadth of the HEI study is impressive and provides substantial and compelling evidence about both the scale of the impact of air pollution and the role played by motor vehicles. The study found that:

Pollutants from motor vehicles number in the thousands and include toxic, mutagenic, and carcinogenic compounds that vary greatly in their physical and chemical properties. Pollutants from vehicle emissions are related to vehicle type (e.g., light- or heavy-duty vehicles) and age, operating and maintenance conditions, and exhaust treatment.²⁴

It further found that:

Traffic-related emissions contribute to both primary and secondary ambient pollutant concentrations against a background of similar contaminants emitted from stationary

20 Commissioner for Environmental Sustainability Victoria, *Victorian State of the Environment 2018 Report – Scientific Assessments*, p. 603.

21 Keith Loveridge, *Submission 40*, p. 6.

22 Health Effects Institute Special Report 17, 'Executive Summary', *Traffic-Related Air Pollution: A Critical Review of the Literature of Emissions, Exposure, and Health Effects*, January 2010, <https://www.healtheffects.org/system/files/SR17TrafficReview_Exec_Summary.pdf> accessed 14 September 2021.

23 Health Effects Institute Special Report 17, 'Executive Summary', *Traffic-Related Air Pollution: A Critical Review of the Literature of Emissions, Exposure, and Health Effects*, p. 5.

24 Health Effects Institute Special Report 17, *Traffic-Related Air Pollution: A Critical Review of the Literature of Emissions, Exposure, and Health Effects*, January 2010, <<https://www.healtheffects.org/system/files/SR17TrafficReview.pdf>> accessed 14 September 2021, p. 3-3.

(point and area) sources. Traffic-related emissions also contribute to pollutant concentrations found in microenvironments.²⁵

One of the issues in Victoria with regards to the impact of major roads on air pollution levels is that monitoring is not sufficient to provide the necessary data. In her submission to the Inquiry, the Commissioner for Environmental Sustainability told the Committee:

Coverage of air monitoring near major transport hot spots (for example, near major roads) remains inadequate. Within the Government response to the SoE 2018 Report recommendations, no specific examples were listed in relation to the part of Recommendation 17 that called for EPA to increase the number of roadside air-monitoring stations.²⁶

Despite this concern, the Commissioner noted that the EPA was taking steps through ‘citizen science and source apportionment projects to enhance knowledge of inner-city air pollution issues and sources. It is important that these projects are completed and lead to improvements to the air quality network’.²⁷

Further discussion about air quality data and monitoring can be found in Chapter 8.

7.3 Heavy vehicles

One of the key concerns raised during the Inquiry was the issue of heavy vehicles, particularly in relation to the inner west of Melbourne. The concerns centred around a number of issues, including: the volume of traffic heading to and from industrial sites, including the Port of Melbourne; the almost universal use of diesel fuel in these heavy vehicles; and the age of heavy vehicles and lack of adequate pollution controls in older vehicles.

The IWAPRG submitted that ‘an increasing number of trucks are moving throughout the Inner West each day, many of them using residential streets and going through community areas—past schools, kindergartens, aged-care facilities, shops and recreational facilities’.²⁸

This high heavy vehicle traffic volume and the resultant risk to health is greatly exacerbated by the high percentage of diesel vehicles. As suggested by MTAG, ‘one in four Australian vehicles – and almost all heavy vehicles – uses diesel fuel’.²⁹ The MTAG submission stated that ‘diesel exhaust emissions pose a serious health risk: they are classified as a Group 1 carcinogen and there is no safe level of exposure to them’.³⁰ The submission stated:

²⁵ Ibid.

²⁶ Commissioner for Environmental Sustainability, *Submission 28*, p. 11.

²⁷ Ibid.

²⁸ Inner West Air Quality Community Reference Group, *Submission 14 – Attachment 1*, p. 7.

²⁹ Maribyrnong Truck Action Group, *Submission 42*, p. 2.

³⁰ Ibid.

Emission sources often contain a cocktail of pollutants, and this can create additional risks. An example is diesel engine exhaust, a particular concern in the Inner West because of the presence of high numbers of vehicles, especially heavy vehicles.³¹

According to the submission, diesel engine exhaust has been implicated in elevated risks of cancers of the lung, bladder, liver, stomach and other organs.³²

MTAG also suggested that many heavy trucks are older, more polluting vehicles. It submitted that 'the average age of Australia's heavy vehicle fleet is 14.8 years' and suggested that it was essential that heavy vehicle emission standards were strengthened by:

- requiring that all new heavy vehicles meet, at a minimum, Euro VI equivalent standard.
- monitoring in-service heavy vehicles in the Inner West to make sure they continue to meet air emission standards³³

This issue is one that has been recognised by governments at both the Victorian and Commonwealth levels. The Environment Protection Authority Victoria (EPA) advised the Committee that 'the Australian Government recently released draft Regulation Impact Statements assessing the need to mandate the introduction of more stringent motor vehicle standards (Euro 6/VI for light vehicles and heavy vehicles respectively)'.³⁴ The EPA suggested that:

Without the introduction of Euro VI standards for heavy vehicles nitrogen oxides and PM2.5 emissions are projected to decline in the 2020s before increasing out to 2050.³⁵

Australian emissions standards for heavy vehicles are currently regulated by the Third Edition Australian Design Rules (ADRs), which are analogous to the Euro V Standards. They include parameters for CO, HC, NO_x, and PM emissions. The Australian Government's Ministerial Forum on Vehicle Emissions³⁶ is currently reviewing the option to adopt the Euro VI standard for heavy vehicles.³⁷

³¹ Ibid., p. 8.

³² Ibid.

³³ Ibid., p. xxii.

³⁴ Victorian Government, *Submission 113*, p. 19.

³⁵ Ibid.

³⁶ Department of Infrastructure, Transport, Regional Development and Communications (Cth), 'Ministerial forum on vehicle emissions', (n.d.), <<https://www.infrastructure.gov.au/infrastructure-transport-vehicles/vehicles/vehicle-safety-environment/ministerial-forum-emissions>> accessed 1 October 2021.

³⁷ [TransportPolicy.net](https://www.transportpolicy.net), *Australia: Heavy-duty: Emissions*, (n.d.), <<https://www.transportpolicy.net/standard/australia-heavy-duty-emissions>> accessed 1 October 2021.

Euro VI emission standards were introduced by Regulation (EC) No 595/2009³⁸ and implemented by Regulation (EU) No 582/2011,³⁹ the latter establishing all technical details. The regulations have been amended several times since their original adoption to introduce additional elements for the various implementation steps.

Compared to the previous emission standards (Euro V), Euro VI adjusts the emissions limits, extends the durability provisions, and introduces several important new elements. These include:

- New transient and stationary duty cycles. The World Harmonized Transient Cycle (WHTC) and the World Harmonized Stationary Cycle (WHSC).
- Particle number (PN) emission limits.
- New testing requirements—including off-cycle and in-use portable emissions measurement systems (PEMS) testing.
- Stricter on-board diagnostic (OBD) requirements.
- Ammonia (NH₃) concentration limits.⁴⁰

It is hoped that the adoption of the equivalent of Euro VI standards will have a positive impact on emissions levels, at least until the development of zero emissions heavy vehicles technology, which is gaining pace, becomes a viable alternative to diesel fuel.

RECOMMENDATION 23: That the Victorian Government work with industry to ensure that heavy vehicles, such as trucks are brought up to modern standards. Industry is actively encouraged and assisted to transition their fleets to modern, green, zero emission heavy vehicles. This work should commence as soon as possible with the development of clear targets for industry to achieve. The Victorian Government is encouraged to liaise and work with the Commonwealth Government to achieve this goal.

7.4 Location of facilities

A further issue related to the heavy traffic flows on major roads is the frequency with which public facilities are placed along these roads and major intersections. This is of particular concern in relation to facilities that service vulnerable groups, such as children. A number of submitters and witnesses raised significant concerns about placing childcare centres and schools in locations that have very heavy traffic, particularly heavy diesel-powered vehicles.

³⁸ EUR-Lex, 'Document 02009R0595-20200901, Regulation (EC) No 595/2009 of the European Parliament and of the Council of 18 June 2009 on type-approval of motor vehicles and engines with respect to emissions from heavy duty vehicles (Euro VI) and amending Regulation (EC) No 715/2007 and Directive 2007/46/EC and repealing Directives 80/1269/EEC, 2005/55/EC and 2005/78/EC', version 01/09/2020, <<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02009R0595-20200901>> accessed 1 October 2021.

³⁹ Ibid.

⁴⁰ TransportPolicy.net, *EU: Heavy-duty: Emissions*, (n.d.), <<https://www.transportpolicy.net/standard/eu-heavy-duty-emissions>> accessed 1 October 2021.

Ms Clare Walter, Honorary Research Fellow and PhD Candidate at the Lung Health Research Centre, told the Committee in a public hearing that the EPA published some air pollution data from one of Melbourne's most polluted intersections where a childcare centre was proposed to be built. The data revealed an annual average at this corner of 15 micrograms per cubic metre of PM_{2.5}. This compares to the annual threshold of 8 micrograms, so was almost double the annual recommended threshold. Ms Walter told the Committee:

If we apply the risk coefficient from a large meta-analysis of traffic related pollution and children, that risk coefficient is equivalent to a 60 per cent increase in the risk of childhood asthma. It does not take a genius to work out that this is really not a great place for a childcare centre to be built.⁴¹

The same intersection (Williamstown Road and Francis Street in Yarraville) was raised in MTAG's submission, which stated '[t]his childcare centre will be metres from a road that carries upwards of 5,000 dirty diesel trucks each day...this would not be allowed in many other jurisdictions around the world such as in California'.⁴²

MTAG reiterated the concerns of the Lung Health Research Centre, telling the Committee that the results of monitoring carried out by the Queensland University of Technology International Laboratory for Air Quality were 'staggering', with PM_{2.5} levels being more than double the standard.⁴³

This is not an isolated case. According to Associate Professor Louis Irving, Clinical Director of the Lung Health Research Centre, the placement of childcare centres on main roads is not only common, but can be a preferred option. He told the Committee that:

in Victoria, we actively plan for childcare centres to be on main roads because, the logic was, if you have them in backstreets it reduces the amenity of the people living in the backstreets...and you only need to drive down Punt Road/Hoddle Street or the Nepean Highway, and it is childcare centre after childcare centre. And we have done measurements showing that those childcare centres—these are ones that are actually built rather than the one on Francis Street, where there is a planning permit—actually have higher than average pollution levels.⁴⁴

The concerns about the location of facilities that cater to vulnerable groups such as children were echoed by Environmental Justice Australia in its *People's Clean Air Action Plan for Victoria*. The Plan states that:

Melbourne planning policies actively encourage the siting of childcare centres on or near major roads, thereby placing the most vulnerable subset of population (children

⁴¹ Ms Clare Walter, Honorary Research Fellow and PhD Candidate, Lung Health Research Centre, public hearing, Melbourne, 28 June 2021, *Transcript of evidence*, p. 45.

⁴² Maribyrnong Truck Action Group, *Submission 42*, p. 16.

⁴³ *Ibid.*, p. 2.

⁴⁴ Associate Professor Louis Irving, Clinical Director, Lung Health Research Centre, public hearing, Melbourne, 28 June 2021, *Transcript of evidence*, p. 46.

0–4 years) in the areas with highest traffic-related air pollution (TRAP). A recent study showed over 10 percent of Melbourne metropolitan childcare centres were within 60 metres of a major road.⁴⁵

In its submission MTAG suggested that thousands of children in the City of Maribyrnong were ‘heavily impacted while at schools, kinder or childcare’, and recommended that the Government fund schools on heavy trucking routes to develop and implement mitigation measures to reduce children’s exposure. Mitigation measures could include installing air filtration systems, roadside barriers (including vegetative barriers), establishing anti-idling policies and banning trucks that don’t meet certain standards from the area.⁴⁶

In evidence at a public hearing, Mr Martin Wurt, President of MTAG, said that there needed to be a multi-pronged approach to reducing traffic-related air pollution and that the location of facilities was a key element:

We need a range of solutions that include phasing out older trucks, establishing low-emission zones to protect key community areas such as schools, more truck bans and curfews, more freight on rail and changes to land use policy to stop schools and childcare centres being built on heavily polluted roads...⁴⁷

MTAG submitted that the Government should introduce air pollution buffer zones into the planning scheme, ‘at the very least for “sensitive uses” such as schools and childcare centres’. Such buffer zones would ‘ensure future road use planning and development includes mechanisms to reduce or eradicate people’s exposure to vehicle pollution’.⁴⁸

The Lung Health Research Centre also raised the prospect of buffer zones. In its submission the Centre suggested a range of recommended actions, including the creation of a ‘clean air zone around schools’ with anti-idling policies, encouragement of active transport, staggered drop offs, and buffer zones where possible.⁴⁹

In evidence given at a public hearing, the Government acknowledged the importance of the placement of schools and childcare centres in managing the impact of air pollution. Ms Carolyn Jackson, Acting Deputy Secretary, Environment and Climate Change with the Department of Environment, Land, Water and Planning (DELWP), told the Committee that the Government understood that reducing the exposure to air pollution of sensitive sites such as schools and childcare centres was important. She said that it needed a number of actions to reduce motor vehicle emissions and outlined some of the actions that were already being taken, including:

ZEVs [zero emissions vehicles], the greater uptake of public transport and other forms of active transport, and advocating for tighter emission control and fuel quality

⁴⁵ Environmental Justice Australia, ‘People’s Clean Air Action Plan for Victoria, 2021, p. 19’, *Submission 110*, p. 40.

⁴⁶ Maribyrnong Truck Action Group, *Submission 42*, p. 7.

⁴⁷ Mr Martin Wurt, President, Maribyrnong Truck Action Group, public hearing, Melbourne, 29 June 2021, *Transcript of evidence*, p. 35.

⁴⁸ Maribyrnong Truck Action Group, *Submission 42*, p. 8.

⁴⁹ The Lung Health Research Centre, University of Melbourne, *Submission 100*, p. 17.

standards at the national level. In addition, local measures such as transport-orientated design, walkable neighbourhoods, traffic calming, tree-planting et cetera can help.⁵⁰

Ms Jackson also drew the Committee's attention to *Plan Melbourne 2017–2050*, which 'recognises the importance of appropriate urban design for sensitive uses, and guidelines to support this will be developed'. She said 'it is something that the planning portfolio within the department is currently working on, and they are looking to release guidelines to support some of that consideration going forward.'⁵¹

DELWP further advised that:

The Department of Environment, Land, Water and Planning (DELWP) is currently developing guidance on siting and design measures for new sensitive uses such as childcare centres, aged care facilities and residential developments being proposed near busy transport corridors (road and rail) – particularly those carrying high volumes of diesel vehicle traffic that is likely to persist in our transport system beyond the period the passenger vehicle fleet transitions to electric or hydrogen drives.⁵²

DELWP pointed out there are 'existing planning measures to achieve suitable separation between sensitive land uses and industrial land uses that reduce air amenity in the *Victoria Planning Provisions - Policy 13.06-1S Air quality management and Clause 53.10 Uses and Activities with Potential Adverse Impacts*, but no guidance is currently available relevant to minimising air pollution exposure along transport corridors'.⁵³

FINDING 7: Placement of sensitive facilities such as schools and childcare centres in high traffic areas represents a risk to both the short- and long-term health outcomes for children.

RECOMMENDATION 24: The Victorian Government consider amending the *Planning and Environment Act 1987 (Vic)* to require the risks posed by traffic-related air pollution to be included as a key criterion in any planning decision (including by relevant planning authorities and the Victorian Civil and Administrative Appeals Tribunal where relevant) related to the location of childcare centres and schools and that all Planning Schemes be amended to ensure that the impacts of air pollution are considered in any relevant applications.

RECOMMENDATION 25: That the Victorian Government develop and introduce clean air zones around facilities such as schools and childcare centres.

⁵⁰ Ms Carolyn Jackson, Acting Deputy Secretary, Environment and Climate Change, Department of Environment, Land, Water and Planning, public hearing, via video conference, 10 August 2021, *Transcript of evidence*, p. 10.

⁵¹ Ms Carolyn Jackson, *Transcript of evidence*, p. 11.

⁵² Department of Environment, Land, Water and Planning, *Inquiry into the Health Impacts of Air Pollution in Victoria*, response to questions on notice received 23 August 2021, p. 2.

⁵³ *Ibid.*, p. 3.

Air pollution levels near facilities such as schools and childcare centres are not only affected by location and proximity to major roads and heavy traffic. They are also impacted by driver behaviour, particularly running the car while stationary—idling—when stopped for short periods for example, when dropping-off or picking-up children from schools. The issue of idling another recurring theme through the Inquiry and is addressed in the next section.

7.5 The impact of idling

The impact on air quality of vehicles idling was raised by a number of submitters and witnesses to the Inquiry. It was seen as problematic particularly when people picked-up and dropped-off children at schools and other facilities. It has been estimated that idling for more than 10 seconds uses more fuel and produces more emissions that contribute to smog and climate change than is used for stopping and restarting an engine.⁵⁴

US research has estimated that idling from personal vehicles generates around 30 million tons of CO₂ every year. The research suggests that while the impact of idling may be small on a per-car basis, the impact of the 250 million personal vehicles in the US adds up and that for ‘saving fuel and reducing emissions, eliminating the unnecessary idling of personal vehicles would be the same as taking 5 million vehicles off the roads’.⁵⁵

Research undertaken in 2020 by Transport Energy/Emission Research in its report *Motor Vehicle Engine Idling in Australia – a critical review and initial assessment* (the TER report), suggested that if it was assumed that every passenger vehicle in the Australian on-road fleet idled for 5 minutes per day, it would result in an additional CO₂ emission load of approximately 1,600 kt per year. This assumption for cars would make up about 4% of total national CO₂ emission loads.⁵⁶

It is necessary to distinguish between two different types of idling. The first form of idling happens all the time in heavy city traffic, such as the stopping at traffic lights or intersections and the stop-start nature of driving in traffic. While any reduction of congestion on roads would reduce this form of idling, it is largely unavoidable and is not the focus here.

The second, more relevant form of idling is discretionary and happens in places that create a greater risk to vulnerable people. When parents drop-off and pick-up their children from school they will often idle rather than switch off their engines. This often happens in a queue, thus increasing the density of emissions in a confined space. The popularity of large SUVs, and particularly diesel SUVs, exacerbates this problem. As

⁵⁴ United States Department of Energy, *Idling Reduction for Personal Vehicles*, May 2015, <https://afdc.energy.gov/files/u/publication/idling_personal_vehicles.pdf> accessed 12 September 2021.

⁵⁵ Ibid.

⁵⁶ Robin Smit, *Motor Vehicles Engine Idling in Australia – a critical review and initial assessment*, report for Transport Energy/Emission Research Pty Ltd, 12 June 2020, p. 18.

already suggested in this chapter, diesel emissions have more harmful impacts. The TER report stated:

diesel exhaust is classified as a carcinogen by the International Agency for Research on Cancer (IARC). This was based on sufficient evidence that exposure to diesel exhaust causes lung cancer. Exacerbation of existing asthma and new-onset asthma has been demonstrated to be associated with traffic-related air pollution exposure overseas, as well as in Australia.⁵⁷

Comparing the benefits of turning off the engine against idling is not totally straightforward as there are multiple factors that may affect the equation. The TER report suggested that '[w]ith progressive strengthening of vehicle emission standards, emission control systems have become increasingly sophisticated over time, often combining different types of emission control'. The TER report stated:

Vehicle emission control today is a complex, computer-controlled and optimised system with a high efficiency for pollutant removal. Factors such as the age of the vehicle, vehicle maintenance, the type of engine (diesel or petrol), catalyst type and formulation, and ambient conditions (e.g. temperature, humidity) all affect air pollution emissions at idling.⁵⁸

It suggests that limited research has been published on the net emission effect for modern vehicles, i.e. excess start emissions versus emissions avoided due to engine shutdown. However, 'for older technology vehicles the benefits of idle reduction on air pollutant emissions were clearer'. The TER report stated:

cold start emissions have been shown to be significantly lower than emissions from extended idling for diesel trucks.⁵⁹

The TER report noted that a research study in the Netherlands had measured idling emissions from diesel and petrol cars (Euro 3 and 4) after 1-, 2- and 5-minute engine stop intervals. The measurements showed that an engine shut down reduced emissions for short stops for CO₂ in all cars and for NO_x and PM in diesel cars, but also showed that idling may be beneficial for NO_x, CO and VOC emissions in petrol cars due to catalyst cooling. For long stops (more than one hour) engine shut down was always beneficial.⁶⁰

Despite the lack of extensive studies, it is acknowledged that 'exposure of school-age children to traffic emissions is of particular concern'. The TER report stated:

They are especially vulnerable considering the effect of air pollution on the growth of lung function and the fact that immunological systems undergo major developments. An important finding in these studies is that health impacts are observed at low levels, and

57 Ibid., p. 5.

58 Ibid., p. 4.

59 Ibid.

60 Ibid., p. 5.

that exposure reduction by emission reduction measures, such as engine idle reduction, will potentially generate measurable benefits.⁶¹

The TER report also stated that ‘diesel idling has been identified as a significant factor in elevated concentrations of elemental carbon and PM near schools’.⁶² It indicated that as children spend a significant amount of their time at schools where exposure to traffic-related air pollutants may be elevated due to idling buses:

air quality measurements show that anti-idling campaigns are effective in significantly reducing PM_{2.5}, EC [elemental carbon] and particle number concentrations at schools with significant amounts of buses and passenger cars.⁶³

The TER report identified three key options for reducing the impacts of idling on emissions, including:

- driver behaviour change
- idle reduction technologies
- idle reduction regulation.⁶⁴

It noted that in Australia almost no idle reduction initiatives or anti-idling legislation were identified. Eco-driving has received some attention and includes the recommendation to reduce idling while parked.⁶⁵

The tendency of people idling their vehicles when picking children up from school was a common theme during the Inquiry. DEA agreed that the air pollution that children commuting to and from schools are exposed to, particularly when schools are located on or adjacent to major roads, was heightened due to idling of cars at school drop-off and pick-up points. In its submission, DEA told the Committee that many states in the US have anti-idling regulations, and these could be introduced in Victoria. It submitted:

These should be applicable to all vehicle types in all city areas, although this is particularly important around schools. DEA supports increased public education around the harms of idling, along the lines of that provided by the “Idle Off” campaign.⁶⁶

In its *People’s Clean Air Action Plan for Victoria* Environmental Justice Australia supported this view, stating that in the US, idling had been identified as a significant factor in higher pollution levels in and around schools and that:

More than 23 US states limit vehicle idling by some or all vehicles. Eighteen US states implement schemes involving grants, loans, or tax credits to provide incentives for adopting idle reduction technologies for heavy vehicles. Significant child health

⁶¹ Ibid.

⁶² Ibid., p. 6.

⁶³ Ibid.

⁶⁴ Ibid.

⁶⁵ Ibid., p. 10.

⁶⁶ Doctors for the Environment Australia (DEA), *Submission 68*, p. 9.

improvements have been associated with the Californian EPA policies that reduced children's exposure to traffic-related air pollution (TRAP).⁶⁷

In a public hearing, Ms Walter told the Committee that if it did nothing else, it should recommend anti-idling legislation or policies be implemented. She said that the 'long line of parents in their SUVs idling in cars' increases exposure almost 300%, and it only takes a couple of minutes exposure to precipitate an asthma attack. She said:

There is absolutely no cogent reason why it is okay for people to leave their cars idling outside childcare centres and outside schools. It does not butt against, you know, significant economic problems for the Victorian government to implement this. You are not having to deal with energy issues or any of that sort of stuff, and children's biggest exposure to air pollution is at drop-off and pick-up time.⁶⁸

FINDING 8: Despite a lack of local empirical data quantifying the negative health impacts of discretionary idling, particularly around schools and facilities catering for vulnerable populations, the Committee considers that it is highly likely that the practice has the potential to cause harm, both in the short and long term.

RECOMMENDATION 26: That the Victorian Government develop and deliver a public education program raising awareness of the potential harm of idling, particularly when dropping-off and picking-up children from schools.

RECOMMENDATION 27: That the Victorian Government explore other interventions, including but not limited to the reduction of vehicle idling when stationary, including regulatory options.

RECOMMENDATION 28: That the Victorian Government continues to advocate with the Commonwealth Government to stop importation of vehicles that do not have idling cut-off technology.

7.6 Electric vehicles

The take-up of electric vehicles in Australia is acknowledged as lagging behind that of most developed nations. This is not necessarily a Victoria-specific issue, but is consistent across Australia. While Australia has been one of the world's leading adopters of rooftop solar (PV) energy generation, it has been much slower to adopt electric vehicles compared with Europe and the US.

⁶⁷ Environmental Justice Australia, 'People's Clean Air Action Plan for Victoria, 2021, pp. 18-9', *Submission 110*, pp. 39-40.

⁶⁸ Ms Clare Walter, *Transcript of evidence*, pp. 52-53.

Overall, Europe's car market contracted 22% in 2020 yet, new electric car registrations more than doubled to 1.4 million, representing a sales share of 10%.⁶⁹ This compares to 0.7% in Australia.

A number of reasons have been suggested for this, including: high upfront vehicle purchasing costs; few low-cost long-range electric vehicle (EV) options; range anxiety in a country with large distances; a lack of charging infrastructure and government policies that have not been seen to be conducive to transitioning; and a general belief that there are few electric car choices and that they are too expensive.

The range anxiety issue has somewhat changed over recent years, with many EVs now having ranges similar to or greater than many petrol vehicles. With vehicles able to be charged at home, and the vast majority of trips being well within the range available on a single charge, EVs would be a low-cost commuting option for most people.

The issue of a charging network that enables Australians to use EVs more fully is, in many ways, the product of government policies around the country that have not given it the priority it has been given in other developed countries. Infrastructure Australia estimates that there are fewer than 2,500 charging stations in Australia, with only 350 of these being fast charging facilities.⁷⁰

In contrast, it is estimated there are now more than 42,000 charge point connectors across the United Kingdom (UK) in over 15,500 locations, with around 7,000 charge point connectors added in 2020 alone. This has resulted in there being more public places to charge than there are petrol stations.⁷¹

According to Infrastructure Australia, establishing a network of fast charging stations on, or in proximity to, the national highway will:

help to overcome the 'access to charging facilities' barrier and reduce consumer anxiety about EV range.⁷²

Infrastructure Australia expects that the distance EVs can travel on a single charge will continue to improve with technological advancements, and that vehicle prices will reduce as production scale increases and the cost of batteries reduces. As an example, while a number of EVs now have a real-world range of around 600 kilometres, a model due for release in early 2022 will have a range in the near future that will take it from Melbourne to Sydney on a single charge.⁷³

⁶⁹ International Energy Agency, 'Trends and developments in electric vehicle markets', *Global EV Outlook 2021*, (n.d.), <<https://www.iea.org/reports/global-ev-outlook-2021/trends-and-developments-in-electric-vehicle-markets>> accessed 7 September 2021.

⁷⁰ Infrastructure Australia, *National highway electric vehicle fast charging*, 2019, <<https://www.infrastructureaustralia.gov.au/map/national-highway-electric-vehicle-fast-charging>> accessed 7 September 2021.

⁷¹ EDF Energy, 'Electric car charging points', (n.d.), <<https://www.edfenergy.com/electric-cars/charging-points>> accessed 7 September 2021.

⁷² Infrastructure Australia, *National highway electric vehicle fast charging*.

⁷³ InsideEVs, 'Fully Charged Checks Out The NIO ET7', 23 May 2021, <<https://insideevs.com/news/509141/fully-charged-nio-et7>> accessed 15 September 2021.

Australia lags well behind other markets. According to the Australian National University's RE100 Group, EV purchases were 0.7% of total car sales in 2020. Only 182 more EVs were sold in 2020 compared to 2019, representing a 2.7% increase in total sales.⁷⁴

The RE100 Group submission states that in Europe, many countries and cities have placed outright bans on new petrol or diesel vehicles. The UK originally banned petrol vehicles from 2040, but has since moved the date forward to 2035, and again to 2030. Japan is considering banning all non-hybrid ICE vehicles from 2035. Norway will ban them from 2025.⁷⁵

The RE100 Group suggested that that the Government should be supporting and accelerating a transition away from ICEs. Possible policies include:

- electrifying the government fleet (see for example recently announced plans for the electrification of the US government fleet)
- grants or low interest loans for the purchase of electric vehicles
- waiving on-road and registration costs for electric vehicles
- increasing on-road and registration costs for ICE vehicles
- requiring all new residential and commercial buildings with parking to design for EVs, for example by installing cables for EV charging and upgrading switchboards/ grid connections if necessary
- if possible, implementing state-level fuel economy standards (ideally in conjunction with other states).⁷⁶

Another concern about the choice of available EVs is also one that is no longer supported by current realities. The International Energy Agency's (IEA's) estimates that, worldwide, about 370 electric car models were available in 2020, which was a 40% increase from 2019.⁷⁷ This increase is leading to more choice and much less expensive options becoming available. While the price of even the cheapest electric cars in Australia are higher than their petrol equivalents, this is likely to simply be based around the relatively limited number of available EVs in Australia due to lower take-up rates; this will change as more manufacturers see Australia as a viable market.

In areas of high air pollution levels in Melbourne, the issue of vehicle type is of particular concern. The IWAQCRG stated in its submission that the Government should prioritise the development of a comprehensive policy to drive uptake of low and no emission vehicles, and reduce transport emissions with a focus on the inner west, including establishing low emission zones, and incentivising business to change their fleets to low

⁷⁴ Australian National University – RE100 Group, *Submission 95*, p. 5.

⁷⁵ *Ibid.*

⁷⁶ *Ibid.*, p. 6.

⁷⁷ International Energy Agency, 'Trends and developments in electric vehicle markets'.

emission vehicles, and only entering public transport contracts with bus operators that stipulate use of low or no emissions vehicles.⁷⁸

Policy developments announced by the Government earlier this year along these lines are discussed later in this section.

In the *VSoE 2018 Scientific Assessments*, the Commissioner for Environmental Sustainability suggested that the transition to electric vehicles would see both carbon monoxide and nitrogen dioxide concentrations gradually reduce.⁷⁹

However, this is not simply a State issue; a national approach is necessary. One of the recommendations of the IWAQCRG is for the Commonwealth Government to implement measures including promoting and enabling greater use of alternative fuels and low and no emission vehicles to replace use of diesel and petrol powered vehicles through, for example, a national plan, incentives and/or disincentives for manufacturers and end-users.⁸⁰ This could entail the coordination a national network of fast charging stations to enable seamless movement across Australia, as well as national incentives for the import of electric and low emission vehicles and the manufacture of components, such as batteries.

FINDING 9: The transition to zero and low emission vehicles is an essential step in the reduction of air pollution and greenhouse gas emissions and the rapid development of electric vehicle technology. The consequent proliferation of electric vehicles in the worldwide market is removing many of the obstacles to the take-up of electric vehicles in Australia.

FINDING 10: The development of a network of fast charging stations needs to be a priority and will lead to a naturally faster uptake of zero emissions vehicles.

7.6.1 *Victoria's Zero Emissions Vehicle Roadmap*

In May 2021, the Government released its *Victoria's Zero Emissions Vehicle Roadmap*, its strategy for bringing Victoria into line with the rest of the world in transitioning to zero emissions vehicles.

In the Roadmap, the Government suggests that it is aiming for zero-emission vehicles (ZEVs) to make up 50% of all new light vehicle sales by 2030. It intends to provide \$46 m in direct subsidies to cut the cost of buying a ZEV. In addition, the Government announced it will invest \$19 m in the rollout of charging infrastructure across the State.⁸¹

⁷⁸ Inner West Air Quality Community Reference Group, *Submission 14* – Attachment 1, p. 14.

⁷⁹ Commissioner for Environmental Sustainability Victoria, *Victorian State of the Environment 2018 Report – Scientific Assessments*, p. 84.

⁸⁰ Inner West Air Quality Community Reference Group, *Submission 14* – Attachment 1, p. 15.

⁸¹ Victorian Government, *Victoria's Zero Emissions Vehicle Roadmap*, May 2021, <https://www.energy.vic.gov.au/_data/assets/pdf_file/0014/521312/Zero-Emission-Vehicle-ZEV-Roadmap-FINAL.pdf> accessed 7 September 2021.

Some of the targets laid out in the Roadmap include:

- 400 vehicles in VicFleet to be replaced by ZEVs by 2023
- electric vehicle charging stations to be installed across regional Victoria by 2024
- all public transport bus purchases to be ZEVs from 2025
- 50% of light vehicle sales to be ZEVs by 2030.⁸²

The financial commitment the Government is making to the transition is outlined in the Roadmap as:

- \$46 m for Australia's first public ZEV subsidy program supporting the purchase of more than 20,000 ZEVs
- \$20 m for a ZEV public transport bus trial
- \$10 m to replace 400 vehicles in VicFleet with 400 ZEVs
- \$5 m to establish a Commercial Sector Zero Emissions Vehicle Innovation Fund
- \$19 m to accelerate the rollout of EV charging infrastructure.⁸³

The Government was criticised in 2020 when it announced plans to tax EV owners through a road usage fee. Under the new tax arrangements, a 2.5 cents/km charge will apply to electric and other zero-emission vehicles, including hydrogen vehicles, and a 2.0 cents/km charge will apply to plug-in hybrid-electric vehicles. The totality of revenue raised under this charge will go toward the roll out of electric vehicle charging infrastructure in Victoria.⁸⁴

Australian drivers pay a Commonwealth fuel excise when they purchase petrol, LPG and diesel vehicles. This funds the development and maintenance of Australian roads. The fuel excise is currently charged at 42.3 cents/litre of petrol or diesel, and 13.8 cents/litre of LPG. For every 60 L tank of petrol, vehicle owners contribute \$25.38 fuel excise to the road network.

VicRoads has stated that because zero and low emission vehicle (ZLEV) drivers pay little or no fuel excise because they are primarily powered by electric or alternative fuel sources, the new charge will ensure that all road users will pay their fair share.

At the time of the announcement of the new charge, several manufacturers and other environmental and transport groups criticised the Government on the basis that it was premature to tax a fledgling industry before it had been established and noted that no other jurisdiction had introduced such a targeted tax on EVs without significant incentives to balance it out. The argument was put that this new tax means the world's

⁸² Ibid.

⁸³ Ibid.

⁸⁴ Victoria, Legislative Assembly, 18 March 2021, *Parliamentary debates*, p. 1183.

manufacturers are far less likely to send Victorians their best, most affordable, zero emission vehicles.⁸⁵

Victoria's Zero Emissions Vehicle Roadmap represents a balancing of incentives to improve the take up of ZLEVs. The Victorian Treasurer said at the time of the new charge announcement of that 'the revenue raised would be "more than offset" by measures to encourage electric car use, such as creating new charging stations'.⁸⁶

It was anticipated that the road users charge would raise about \$30 m per year, with \$45 m set aside for EV incentives in the State Budget.⁸⁷

FINDING 11: Government has a significant role to play in encouraging greater take-up of electric and low-emissions vehicles in Victoria, both in the purchase of vehicles and in the development of supporting infrastructure, including charging points.

FINDING 12: *Victoria's Zero Emissions Vehicle Roadmap*, announced in 2021, will offset some concerns about the road user charge and initiatives announced in the Roadmap will encourage greater take-up of electric and low emission vehicles.

7.7 Public transport

While changes to the forms of vehicles will, in the medium to long term, lead to lower emissions, the current transport fleet is predominantly driven by internal combustion engines burning fossil fuels. It has been suggested that a significant reduction in harmful emissions that lead to poor air quality can be achieved immediately by a greater emphasis on public transport.

According to the Climate Council, travel on all forms of public transport involves fewer emissions per person per kilometre than the average Australian car (see Table 7.1 below). The Council has stated that:

Expanding access to high quality public transport is a proven way to reduce car use and its associated emissions. People who live in communities with accessible public transport tend to own fewer vehicles, drive less and rely more on public transport than other areas.⁸⁸

⁸⁵ ABC News, *Victoria has 'worst electric vehicle policy in the world', business and environmental groups say*, 22 April 2021, <<https://www.abc.net.au/news/2021-04-22/victoria-electric-vehicle-levy-road-users-opposed-by-industry/100086872>> accessed 7 September 2021.

⁸⁶ Ibid.

⁸⁷ Ibid.

⁸⁸ Climate Council, Factsheet, *Transport Emissions: Driving down car pollution in cities*, (n.d.), <<https://www.climatecouncil.org.au/wp-content/uploads/2017/09/FactSheet-Transport.pdf>> accessed 12 September 2021.

Table 7.1 Emissions for different forms of transport

Transport	Average emissions per kilometre (gCO ₂ /km)
Metro train systems	3–21 (per person)
Light rail	4–22 (per person)
Bus rapid transport systems	14–22
Average car sold in 2015	184

Source: Climate Council, Factsheet, *Transport Emissions: Driving down car pollution in cities*.

A number of witnesses to the Inquiry pointed to an increase in both the use of public transport and the electrification of public transport as a viable way of reducing air pollution. Increasing public transport use would reduce emissions simply because it would reduce the number of vehicles on the roads and, by converting public transport fleets into zero or low emission vehicles, the emissions will be drastically reduced from vehicle traffic.

The Public Transport Users Association (PTUA) in its submission stated that although EVs will be a vital feature of a cleaner transport system, electrification of existing travel patterns will be inadequate for achieving required emissions reductions. It submitted:

Government support for EV uptake should focus on expanding and renewing public transport fleets with electric vehicles that are each driven orders of magnitude more kilometres each year than typical private vehicles and that have the capacity to serve dozens or hundreds of zero-emissions journeys each day.⁸⁹

The PTUA did not diminish the importance of low or zero emissions vehicles but suggested that it will take a very long time before they become the predominant form of private vehicles. It suggested that it would like to see a shift of focus away from private vehicles and towards public transport:

[The PTUA] supports increasing the proportion of EVs in the Victorian private vehicle fleet and increasing the proportion of motorised travel undertaken by EV. However we emphasise that substantial contributions to these goals can be achieved by retiring ICE vehicles from the fleet without replacement and by replacing a proportion of private ICE vehicle journeys with journeys by active transport and/or electric public transport (whether or not the traveller's own ICE vehicle is retired).⁹⁰

The reduction of emissions with a greater emphasis on public transport was reflected in recommendations made by the PTUA:

⁸⁹ Public Transport Users Association, *Submission 107*, p. 8.

⁹⁰ Ibid.

- Rapidly expand and renew the public transport fleet, including DDA⁹¹-compliant trams and electric buses, to provide fast, frequent public transport services that better serve emerging travel patterns.
- Electrification of Victoria's regional and freight rail networks, with overhead line electrification of the busier sections (the V-Line commuter network, Seymour–Shepparton and busier freight lines) and battery or hydrogen powered trains for the quieter sections.
- Expand heavy and light rail networks where needed to enhance network effect.
- Rapidly expand safe active transport networks to better serve local journeys and access to public transport.
- Impose vehicle emissions and fuel quality standards to European standards to encourage supply of cleaner vehicles and fuels to the Victorian market.
- Introduce periodic emissions testing for vehicles older than 10 years.
- Establish technical and open access standards for EV charging infrastructure, preferably on a national level.
- Place a moratorium on new major road construction and expansion due to induced traffic that would be largely undertaken by ICE vehicles for the foreseeable future.⁹²

While the focus of the PTUA was away from private vehicles to mass transport, it also considered that a shift away from ICE vehicles of all types was crucial.

The RE100 Group supported this view. It submitted that, when compared with conventional buses, 'electric buses greatly reduce local emissions including particulate matter, NO_x, SO₂, and carbon dioxide emissions'. It noted '[p]oor local air pollution is a problem in many cities, and electric bus fleets are being deployed in part to improve air quality'. The RE100 Group cited examples of shifts to electric bus fleets, including:

- New York City's recent launch of 15 electric buses
- London's fleet of 200 electric buses with expectation this will increase
- Paris will soon have a fleet of 800 electric buses.⁹³

The most significant example of a shift to electrified buses is the city of Shenzhen in China, which has completely electrified its 16,000-strong bus fleet.⁹⁴

The City of Melbourne, in its *Transport Strategy 2030*, noted that motor vehicles are a major source of pollution with carbon dioxide, particulates, nitrogen oxides and volatile organic compounds forming part of their emissions. As part of a suite of policies and planned actions, the City of Melbourne has announced its support for the introduction

⁹¹ *Disability Discrimination Act 1992* (Cth).

⁹² Public Transport Users Association, *Submission 107*, p. 11.

⁹³ Australian National University – RE100 Group, *Submission 95*, p. 6.

⁹⁴ *Ibid.*

of zero emission buses in the central city, following the Government's budget announcement of \$20 million for a trial of zero emission buses.⁹⁵

The City of Melbourne suggested that one of the major central city bus routes on Lonsdale Street, with more than 1,000 bus movements each day on Lonsdale Street serving 16 bus routes, would be a suitable candidate:

Converting the Lonsdale Street bus corridor to zero emissions would be a significant step towards reducing the harm caused by air pollution in the city.⁹⁶

According to the Government, the electric bus trial is currently in its second trial phase—running on Route 251 between Melbourne city and the Northland Shopping Centre—clocking up more than 32,900 km and travelling nearly 1,000 km on just two charges, demonstrating the efficiency and range of the 324 kw lithium phosphate batteries. It has been claimed that in 300 days on the road, the buses have saved 61 tonnes of carbon dioxide emissions.⁹⁷

In its *Transport Strategy 2030*, the City of Melbourne also supports a number of other strategies to reduce air pollution in the City, including encouraging walking and bicycle use and supporting the transition to electric power for private vehicles.⁹⁸

Dr Lai Heng Foong, Chair, Public Health and Disaster Committee, Australasian College for Emergency Medicine, at a public hearing argued that, in addition to shifting towards electric vehicles for government fleets, governments should shift to electric public transport and noted the City of Sydney's commitment to transition its entire fleet to electric buses by 2030.⁹⁹

The Government's ZEV Roadmap includes a \$20 m investment in a zero emission public transport bus trial to:

explore the merits of ZEVs, operational capability and supporting infrastructure requirements for a future zero-emissions fleet. The trial will ensure that procurement of zero emissions buses from 2025 are appropriate and continue to deliver a quality service.¹⁰⁰

The ZEV bus trial will run over three years, trialling different technologies on buses across the State. The Government has stated that:

Achieving zero emissions across the bus fleet is critical to Victoria meeting its legislated commitment of zero net emissions by 2050.¹⁰¹

⁹⁵ City of Melbourne, *Submission 81*, p. 2.

⁹⁶ Ibid.

⁹⁷ Premier of Victoria, Hon Daniel Andrews, *Investing In The Buses Of The Future*, media release, Victorian Government, Melbourne, 15 November 2020, <<https://www.premier.vic.gov.au/investing-buses-future> <https://www.premier.vic.gov.au/investing-buses-future>> accessed 15 September 2021.

⁹⁸ City of Melbourne, *Submission 81*, p. 2.

⁹⁹ Dr Lai Heng Foong, Chair, Public Health and Disaster Committee, Australasian College for Emergency Medicine, public hearing, Melbourne, 28 June 2021, *Transcript of evidence*, p. 27.

¹⁰⁰ Victorian Government, *Victoria's Zero Emissions Vehicle Roadmap*, p. 66.

¹⁰¹ Andrews, *Investing In The Buses Of The Future*, media release.

There are currently 40 hybrid buses operating in Melbourne and eight in the Latrobe Valley.¹⁰²

FINDING 13: The further expansion of a zero emission public transport system represents a significant step in reducing air pollution and supports the transition to a 100% zero emission vehicle public transport fleet.

102 Ibid.

PART THREE

8 Air quality monitoring in Victoria

The Environment Protection Authority Victoria (EPA) is responsible for monitoring, assessing and reporting on air quality in Victoria. Air quality monitoring enables the EPA to provide information on Victoria's air quality via the EPA AirWatch website (see below). Monitoring data is also used to inform air quality management strategies and allows for effective evaluation of air pollution management activities.¹

8.1 Overview of Victoria's air quality monitoring network

Victoria's State Environment Protection Policy (Ambient Air Quality) and the EPA's Monitoring Plan require the EPA to put in place a monitoring network that provides a representative measure of the quality of air that Victorians are likely to experience.

The EPA monitors air quality in Victoria in accordance with national and international standards. The EPA's air quality monitoring program comprises a network of monitoring stations located around Victoria that collect data and information on pollutant concentrations in their respective locations.² Monitoring sites collect data on the six criteria air pollutants.

To monitor ambient air quality, EPA maintains a network of fixed ambient air monitoring sites that provide hourly data to the Victorian community via the AirWatch website.³

EPA also conducts air monitoring campaigns where there is potential exposure to air toxics in line with the National Environment Protection (Air Toxics) Measure. These campaigns have typically shown that air toxics are generally well below corresponding short term or long-term air quality guideline values and in many cases below the detectable limits.⁴

Monitoring can also be used to assess changes to air pollutants because of chemical and physical processes in the atmosphere. This includes the formation of ozone as well as the formation or transformation of secondary aerosol particles such as sulfur dioxide to sulfates and oxides of nitrogen to nitrates.⁵

1 Department of Environment, Land, Water and Planning (Vic), *Air Quality Monitoring: factsheet, 2018*, <https://www.environment.vic.gov.au/_data/assets/pdf_file/0023/391127/Air-Quality-Monitoring-online.pdf>.

2 Ibid.

3 Victorian Government, *Submission 113*, p. 31.

4 Ibid.

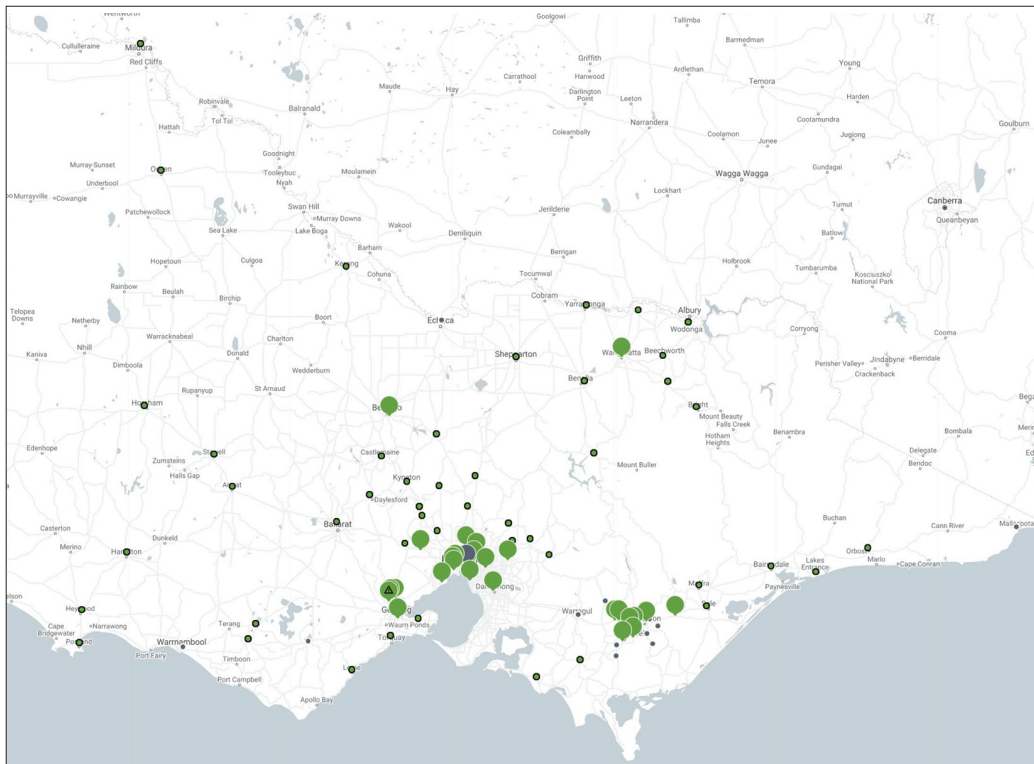
5 Environment Protection Authority Victoria, *Air pollution in Victoria – a summary of the state of knowledge*, August 2018, p. 26.

The EPA uses three types of monitoring equipment to gather information on air quality:

- **General condition monitors** provide information on ambient air quality and pollution over a large area; they are the foundation of the EPA’s monitoring network. There is a mix of fixed and mobile monitors.
- **Local condition monitors** measure local air quality. These are often placed in communities where there are specific pollution concerns.
- **Incident air monitors** deployed in response to a major pollution event.⁶

Maps of Victoria’s air quality monitoring network are shown in Figures 8.1, 8.2 and 8.3 below.

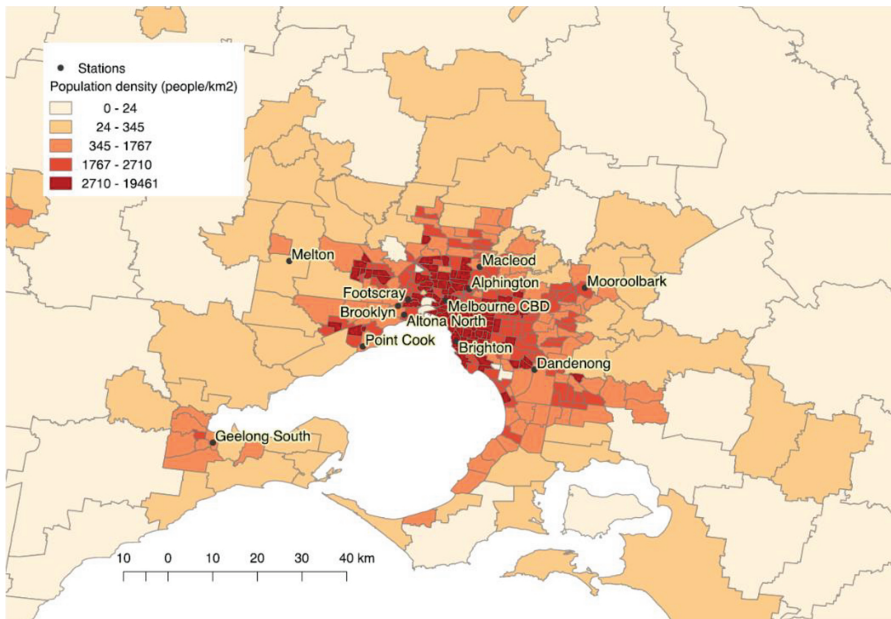
Figure 8.1 EPA’s monitoring network: Victoria



Source: Environment Protection Authority Victoria, *Inquiry into Health Impacts of Air Pollution in Victoria*, public hearing presentation, 10 August 2021.

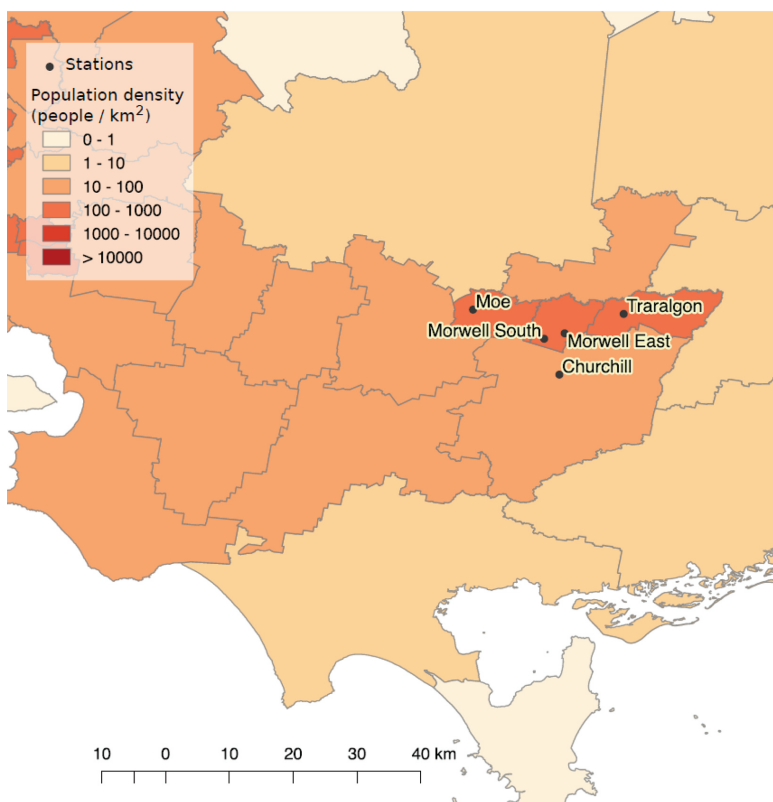
⁶ Department of Environment, Land, Water and Planning (Vic), *Air Quality Monitoring: factsheet*.

Figure 8.2 General and local condition monitors: Port Phillip Region



Source: Department of Environment Land Water and Planning (Vic), *Clean Air Fact Sheet*, 2018, p. 5
 <https://www.environment.vic.gov.au/_data/assets/pdf_file/0023/391127/Air-Quality-Monitoring-online.pdf>.

Figure 8.3 General and local condition monitors: Latrobe Valley Region



Source: Department of Environment Land Water and Planning (Vic), *Clean Air Fact Sheet*, 2018, p. 5
 <https://www.environment.vic.gov.au/_data/assets/pdf_file/0023/391127/Air-Quality-Monitoring-online.pdf>.

The air monitoring network comprises 24 fixed ambient air quality sites in metropolitan and regional locations and 60 air quality sensors that are widely distributed across the State.⁷ In addition to the ambient network, the EPA has worked with the Latrobe Valley community through a co-design process to enhance existing air monitoring in the Latrobe Valley. The Latrobe Valley co-design network includes:

- 6 additional air monitoring sites
- 11 sensors to form a Latrobe Valley PM_{2.5} sensor network
- 3 web cameras that provide a visual representation of air in the Latrobe Valley.⁸

Two other air quality monitoring networks in the Latrobe Valley that operate separate from the EPA's network are the industry-run Latrobe Valley Air Monitoring Network and the Council-provided Latrobe Valley Information Network. These are covered in Chapter 5.

A full list of EPA air monitoring locations appears in Table 8.1. Issues relating to air quality in the Latrobe Valley are covered in detail in Chapter 5.

Table 8.1 Metropolitan and regional and Latrobe co-design air monitoring locations

Region	Location	Site type monitoring
Metropolitan	Alphington	Ambient monitoring site
	Altona North	Ambient monitoring site
	Box Hill	Ambient Portable ADR (PM _{2.5}) only site
	Brighton	Ambient Portable ADR (PM _{2.5}) only site
	Brooklyn	Ambient monitoring site
	Campbellfield	Temporary Beta Attenuation Monitor (PM _{2.5}) only site
	Dandenong	Ambient monitoring site
	Footscray	Ambient monitoring site
	Macleod	Ambient monitoring site & particle sensor
	Melbourne CBD	Portable Beta Attenuation Monitor (PM _{2.5}) only site
	Melton	Ambient monitoring site
	Mooroolbark	Ambient monitoring site
	Point Cook	Ambient monitoring site

⁷ Mr Lee Miezis, Chief Executive Officer, Environment Protection Authority, public hearing, via video conference, 10 August 2021, *Transcript of evidence*, pp. 4–5.

⁸ Victorian Government, *Submission 113*, p. 32.

Region	Location	Site type monitoring
Regional	Bendigo	Temporary Beta Attenuation Monitor (PM _{2.5}) only site
	Echuca	Particle PM _{2.5} sensor site—Regional Sensor Network
	Geelong South	Ambient monitoring site
	Healesville	Portable DustTrak (PM _{2.5}) only site—Campaign monitoring
	Healesville	Particle PM _{2.5} sensor site
	Horsham	Particle PM _{2.5} sensor site—Regional Sensor Network
	Mildura	Particle PM _{2.5} sensor site—Regional Sensor Network
	Traralgon	Ambient monitoring site
	Wangaratta	Portable ADR (PM _{2.5}) only site
	Warburton	Portable DustTrak (PM _{2.5}) only site—Campaign monitoring
	Warrnambool	Particle PM _{2.5} sensor site—Regional Sensor Network
	Latrobe co-design network	Boolarra
Boolarra South		Particle PM _{2.5} sensor site
Callignee		Camera only site
Churchill		Ambient monitoring site
Flynn		Particle PM _{2.5} sensor site
Flynns Creek		Particle PM _{2.5} sensor site
Glengarry		Particle PM _{2.5} sensor site
Hazelwood Pondage		Particle PM _{2.5} sensor site—not active ^a
Moe		Ambient monitoring site
Morwell East		Ambient monitoring site & DustTrak (PM _{2.5})
Morwell South		Ambient monitoring site
Newborough		Portable Beta Attenuation Monitor (PM _{2.5}) only site
Rosedale		Particle PM _{2.5} sensor site
Rosedale		Portable DustTrak (PM _{2.5}) only site
Traralgon East		Particle PM _{2.5} sensor site
Traralgon South		Particle PM _{2.5} sensor site
Tyers		Camera only site
Tyers North		Particle PM _{2.5} sensor site
Willow Grove		Particle PM _{2.5} sensor site
Yallourn (Hernes Oak)		Camera only site
Yallourn North	Particle PM _{2.5} sensor site	
Yinnar	Particle PM _{2.5} sensor site	
Yinnar	Portable DustTrak (PM _{2.5}) only site	

a. The EPA is making enquiries to locate the missing sensor at Hazelwood Pondage.

Source: Adapted from Victorian Government, *Submission 113*, pp. 31–33.

8.1.1 EPA AirWatch and provision of data

EPA AirWatch provides publicly accessible, air quality information up to 48-hours old from Victoria's monitoring network. It also presents information by region on five categories of pollutant-type based on an assessment of criteria air pollutants (carbon monoxide is excluded). Figure 8.4 shows the AirWatch concentration ranges for different pollutant categories.

Figure 8.4 Concentration ranges for air quality categories

Pollutant	Measurement	Good	Fair	Poor	Very poor	Extremely poor
Ozone	ppb	Less than 50	50–100	100–150	150–300	300 and above
Nitrogen dioxide	ppb	Less than 60	60–120	120–180	180–360	360 and above
Sulfur dioxide	ppb	Less than 100	100–200	200–300	300–600	600 and above
PM ₁₀	µg/m ³	Less than 40	40–80	80–120	120–300	300 and above
PM _{2.5}	µg/m ³	Less than 25	25–50	50–100	100–300	300 and above
Carbon monoxide	ppm	Less than 30	N/A	30–70	N/A	70 and above

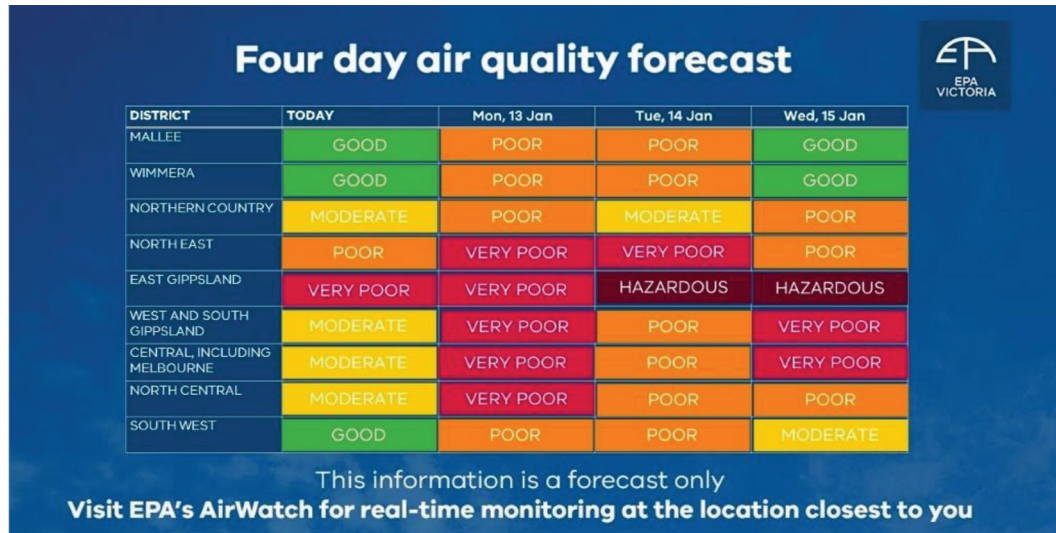
Source: Environment Protection Authority Victoria, 'How we calculate air quality categories', January 2021, <<https://www.epa.vic.gov.au/for-community/monitoring-your-environment/about-epa-airwatch/calculate-air-quality-categories>> accessed 20 September 2021.

EPA AirWatch is used to report data from both fixed network, campaign and short-term incident air monitoring. It provides general health advice for the community, including sensitive populations, when air quality is poor. AirWatch provides an interactive map, graphs and tabulated data showing air quality information measured at stations around Victoria with location data updated each hour, and air quality forecasts.⁹

⁹ Ibid., p. 34.

Daily air quality forecasts for the Melbourne, Geelong and Latrobe Valley regions have been provided by the EPA for over a decade. As a result of increased impacts on air quality across Victoria during the 2019/2020 bushfires, the EPA expanded its forecasting range to provide forecasts for 12 regions and extended the outlook period to 4 days. Air quality forecast regions align with the nine Bureau of Meteorology weather district regions for Victoria (e.g. see Figure 8.5 below).¹⁰

Figure 8.5 Four-day air quality forecast issued via Twitter on 12 January 2020



Note: This figure displays the old air quality categories, which were updated in January 2021.

Source: Victorian Government, *Submission 113*, p. 34.

The EPA reports on current air quality in 1-hour and 48-hour rolling averages via the EPA AirWatch website. Data collected during an air pollution incident is also shared. Yearly reporting occurs in the EPA's annual report, scientific publications, and through the National Environmental Protection Council.¹¹

The expectations of the community regarding the accessibility of air quality information in their local area have increased significantly since the start of electronic air monitoring in 1979. In November 2019, the EPA updated the AirWatch website as part of its transformation program in response to community feedback on the accessibility of information on the site. The EPA has also started making annual datasets available via the Victorian Government web-portal.¹²

Many stakeholders called for AirWatch data provision and accessibility to be expanded significantly further (see Section 8.2 below).

¹⁰ Ibid.

¹¹ Environment Protection Authority Victoria, *Air pollution in Victoria – a summary of the state of knowledge*, p. 27.

¹² Victorian Government, *Submission 113*, p. 34; Environment Protection Authority Victoria, *Air pollution in Victoria – a summary of the state of knowledge*, p. 27.

8.1.2 Network improvement

The EPA advised that it continually evaluates Victoria's air quality monitoring program to determine which sites and pollutants need to be monitored. The EPA's Chief Executive Officer, Mr Lee Miezis, told the Committee:

EPA is continually working to update its air monitoring network and improve all of its monitoring across all environmental segments, which include air.¹³

The EPA is currently assessing the adequacy of its air monitoring network, in line with Government commitments as part of reforms to Victoria's environment protection framework. The review will identify actions to improve quality, coverage, data sharing, analysis, accessibility and community engagement.¹⁴

The EPA informed the Committee:

- Since 2014, the EPA has increased its ambient air monitoring capability to add a further three criteria monitoring stations (increasing from 12 in 2014 to 15 in 2020).
- The EPA has reconfigured its equipment fleet to enable shorter term monitoring and deployed additional temporary particle monitoring stations in Bendigo, Campbellfield, Healesville, and Warburton.
- The EPA regularly renews and upgrades equipment to ensure compliance with Australian Standards. Over the past five years this has included:
 - replacement of the aging TEOM¹⁵ fleet, which monitors PM₁₀
 - replacement of carbon monoxide and sulfur dioxide analysers
 - upgrade of PM_{2.5} analysers to reference equivalent equipment and shelters that house air monitoring analysers
 - replacement and upgrades to the EPA's data acquisition system.¹⁶

Mr Miezis further advised the EPA had recently expanded its air quality monitoring network across the State with the installation of 49 regional sensors to provide more localised information, especially around particulates. He told the Committee:

We see the expansion of our air sensor network into not just regional communities but communities across Victoria as being critically important to giving communities the information that they need to make decisions in terms of protecting their own health but equally informing EPA, DELWP and other parts of government in terms of the strategies we are taking to monitor or to reduce or improve air quality and equally the effectiveness of the actions that we take. So that is the long way of saying, yes, I think

¹³ Mr Lee Miezis, *Transcript of evidence*, p. 5.

¹⁴ Department of Environment Land Water and Planning (Vic), *Clean Air Fact Sheet*, 2018, p. 3 <https://www.environment.vic.gov.au/_data/assets/pdf_file/0023/391127/Air-Quality-Monitoring-online.pdf>.

¹⁵ Tapered element oscillating microbalance.

¹⁶ Victorian Government, *Submission 113*, pp. 35–36.

more air quality monitors localised is a good thing. Better information will result in better outcomes.¹⁷

8.1.3 Citizen science initiatives

In its submission to the Inquiry, the EPA informed the Committee of the work it has undertaken to expand and progress several citizen science programs aim and enhance Victoria's air quality monitoring capabilities. Projects include:

- The Bendigo Air Monitoring project, a collaboration with La Trobe University and the City of Greater Bendigo, for which the EPA has set up a PM_{2.5} air monitoring station at Bendigo's La Trobe University campus with data being available live on EPA's AirWatch. Work is currently focussed on deployment of a network of indicative PM_{2.5} sensors that will provide spatial information about the concentrations of PM_{2.5} in Bendigo. There is potential to expand this air monitoring model further in regional Victoria.
- The Inner Melbourne Air Monitoring project, which is focused on understanding air pollution from shipping and heavy traffic regions in Melbourne's inner west. This project uses indicative sensors to address community concern about traffic and industrial emissions. This project will support EPA's source apportionment assessment which will identify significant sources of air pollution in Melbourne's inner west. The objective of the study will be to identify the significant sources of fine particles (PM_{2.5}) expected in the region.¹⁸

The EPA advised it is also working with citizen scientists and the Beacon Cove Neighbourhood Association in Port Melbourne to investigate the dispersal of shipping emissions using indicative PM_{2.5} sensors.¹⁹

Professor Mark Taylor, Chief Environmental Scientist at the EPA, spoke to the value of citizen science initiatives at a public hearing:

They are really important for many reasons. Firstly, it gives the local community an understanding about what is happening in real time at their locations. It allows them to be able to respond. It empowers the individuals to be able to respond to events, and that might mean coming indoors or thinking about taking relevant medications that they may use if they are prone to respiratory problems—an asthma attack, for example. It also helps industry to understand what its impacts are...So it allows people to understand, educate and manage.²⁰

¹⁷ Mr Lee Miezis, *Transcript of evidence*, pp. 14–15.

¹⁸ Victorian Government, *Submission 113*, p. 52.

¹⁹ Ibid.

²⁰ Professor Mark Taylor, Chief Environmental Scientist, Environment Protection Authority Victoria, public hearing, via video conference, 10 August 2021, *Transcript of evidence*, p. 15.

8.2 Limitations and criticisms of the network

8.2.1 Commissioner for Environmental Sustainability Victoria

In her submission, the Commissioner for Environmental Sustainability Victoria highlighted two key recommendations from her *State of the Environment 2018* report that were relevant to this Inquiry:

- **Air—SoE Recommendation 3:** That EPA Victoria prioritise the implementation of the EPA Inquiry Recommendations 6.3 and 7.2 to develop a publicly accessible, real-time assessment of air quality across Victoria that incorporates air-quality monitoring data, citizen science observations, air-quality modelling and an up-to-date air-pollution inventory. Future monitoring and assessments would also be expanded to include ultrafine particles and data on indoor air quality.
- **Air—SoE Recommendation 4:** That Victoria’s Chief Environmental Scientist, supported by relevant government agencies and research partners, lead the establishment of a contemporary pollen monitoring network to enable community access to information on pollen levels in the air in a timely manner, through actions including increasing the number of locations monitored, the frequency of the monitoring, and automating the monitoring process (Air quality monitoring of pollen is covered in Section 8.2.4 below).²¹

The Commissioner considered Victoria’s current air monitoring was limited, with less than 30 permanent air quality monitoring stations in Victoria, mostly located in Melbourne and the Latrobe Valley, routinely measuring air quality. The Commissioner submitted that inadequate air monitoring coverage needs to be remedied. Air monitoring should be complemented by air modelling that, combined, provide a blended state-wide map of air quality in Victoria. She submitted:

the following items should be used together to form an air pollution assessment tool:

- real-time air quality data measured by a comprehensive network of air-quality monitoring sensors across Victoria;
- an air pollution inventory of major air emission sources (for example, air emissions from industrial facilities);
- real-time information on activity data for emission sources in the air pollution inventory (for example, live traffic network data that can inform motor vehicle pollution or satellite images that detect smoke plumes from bushfires or planned burns);
- real-time meteorological data to inform the transport of air pollution; and
- chemical transport models that predict the behaviour (for example, chemical transformation and deposition) of the air pollution as it is transported.

²¹ Commissioner for Environmental Sustainability, *Submission 28*, p. 9.

Combining these tools would enable an accurate map of real-time air quality for all of Victoria to be constructed and communicated to all Victorians.²²

The Commissioner noted findings from a number of reviews, including a 2018 report from the Victorian Auditor-General (covered further below), that also considered Victoria's monitoring network was inadequate. She submitted:

Victoria's current air-monitoring network is inadequate and needs to be expanded to cover more of regional Victoria and the growth areas of Melbourne, and have the flexibility to target hotspots such as major roadsides and industrial areas. This is an opportunity to ensure adequate air-monitoring in disadvantaged communities, and by working with the Victorian community, design a comprehensive and targeted monitoring network. Monitoring must be expanded to include ultrafine particles and should include consultation with the National Environment Protection Council to determine whether an ambient air-quality standard is required for ultrafine particles.²³

The Commissioner further submitted that the EPA was still developing implementation plans and monitoring and assessment frameworks, and there had only been limited activity to increase the comprehensiveness of the air quality network across Victoria. The Commissioner considered that coverage of monitoring near major transport hot spots (for example, near major roads) remained inadequate.²⁴

The Commissioner noted a limitation associated with the availability and communication of air quality data related to long-term assessment of air quality objectives. Some local hotspot monitoring was deemed inappropriate for ambient air compliance reporting meaning there was no routine and detailed assessments of Brooklyn, the location in Victoria that most frequently records poor air quality (air quality in Brooklyn is covered in detail in Chapter 4).²⁵

However, the Commissioner was encouraged by progress in other areas including the EPA's citizen science projects (see Section 8.1.3 above) and upgrades to the AirWatch site to improve use and accessibility.²⁶

The Commissioner also looked at how the monitoring network compared to other jurisdictions, pointing to a 2019 review of international best practice in air quality monitoring network design commissioned by the New South Wales Government. The Review observed that some international jurisdictions had implemented more structured procedures for air quality management that could improve on the current, formally adopted approach under the National Environment Protection (Ambient Air Quality) Measure (NEPM AAQ), and which might ultimately provide a mechanism for a more efficient, multi-purpose and integrated air quality monitoring network.²⁷

²² Commissioner for Environmental Sustainability Victoria, *Submission 28*, p. 10.

²³ *Ibid.*, p. 13.

²⁴ *Ibid.*, pp. 16–17.

²⁵ *Ibid.*

²⁶ *Ibid.*

²⁷ *Ibid.*, pp. 17–18.

The Commissioner noted:

- Victoria currently has 26 standard air monitoring sites around the State, far fewer than the 56 standard air monitoring sites in New South Wales.
- In both States, the sites that comply with Australian Standards for monitoring equipment are complemented by a network of sensors that provide indicative measurements.
- New South Wales has an additional 39 active sites measuring indicative air quality with sensors, compared to 19 in Victoria.
- For an international comparison, the United States has more than 4,000 air monitoring sites, while Canada has 286 monitoring stations located in 217 communities across the country.

Table 8.2 below shows that, by comparison, Victoria is slightly off the pace on a per capita basis compared to some of the networks considered to be international best practice.

Table 8.2 Number of air monitoring sites per capita for selected jurisdictions

Jurisdiction	Air monitoring sites (number)	Population (million)	Air monitoring sites (per capita)
Victoria	26	6.695	-258,000
New South Wales	56	8.164	-146,000
United States of America	4,000	330.1	-83,000
Canada	286	38.01	-133,000

Source: Commissioner for Environmental Sustainability Victoria, *Submission 28*, pp. 18-19.

8.2.2 2018 Audit: *Improving Victoria's Air Quality*

In 2018 the Victorian Auditor General's Office (VAGO) published an audit report titled *Improving Victoria's Air Quality*. Among other things VAGO looked at the Victoria's monitoring of and reporting on air quality.

In its report, VAGO concluded that the EPA's annual air quality monitoring and reports were generally satisfactory for parts of the Port Phillip (greater Melbourne and Geelong) and Latrobe Regions. However, it was highly critical of the EPA's limited air monitoring coverage for the rest of the State. The audit found:

- The EPA's air monitoring coverage failed to provide information on air quality (both ambient and localised) for most of the State, including many parts of metropolitan Melbourne.
- The utility of the EPA's air quality reports is considerably diminished because EPA has not been able to demonstrate that the air quality data it collects and reports on is also representative of those areas it does not monitor.

- The EPA had failed to provide a better understanding of air quality outside the Port Phillip and Latrobe Valley regions, contrary to the intent of its 2001 *Ambient Air Quality NEPM Monitoring Plan Victoria* (Monitoring Plan).
- The EPA had not updated or adjusted the Monitoring Plan over the last 17 years to reflect the changing risk profiles that accompany both considerable population growth and changes in industrial activities across the State.
- Some inaccurate assessments against PM air quality standards—all of which overstated air quality—while infrequent, were so severe as to undermine confidence in publicly reported data.²⁸

The audit made five recommendations, two of which directly addressed failings in air quality monitoring and reporting:

- **Recommendation 1:** That the EPA expand its air monitoring network by:
 - reviewing and updating its current Monitoring Plan to reflect its riskbased approach to environmental regulation
 - in addition to its ambient air quality monitoring for purposes of the NEPM AAQ, designing and implementing an air monitoring program that better aligns coverage with air pollution risks that Victorian communities are exposed.
- **Recommendation 2:** That the EPA improve its reporting on air quality by:
 - introducing a rigorous quality review process to ensure the accuracy and reliability of the state’s air quality data and assessments against NEPM AAQ standards as presented across its various reporting, including on its AirWatch website
 - developing readable and easily accessible annual reports on the results collected from all air monitoring across the state, highlighting assessments against standards and recorded exceedances.²⁹

The EPA accepted both recommendations in its response to the audit.³⁰ It advised the Committee that it had made improvements to its air quality monitoring program to better reflect point sources of pollution, population centres and community risk, and to enhance air quality reporting to improve accessibility.³¹

8.2.3 Stakeholder criticisms

A significant amount of stakeholder criticism around the EPA’s air quality monitoring and reporting referenced the findings of the VAGO audit, including submissions

²⁸ Victorian Auditor-General’s Office, *Improving Victoria’s Air Quality*, March 2018, pp. 7–8.

²⁹ *Ibid.*, p. 15.

³⁰ *Ibid.*, p. 66.

³¹ Victoria Government, *Submission 113*, p. 36.

from the Climate and Health Alliance,³² Environmental Justice Australia,³³ Asthma Australia,³⁴ Anti-Toxic Waste Alliance,³⁵ Victorian Council of Social Service,³⁶ Clean Air Communities,³⁷ and Communities for Clean Air Network.³⁸

Complaints and arguments about and recommendations to address inadequacies of the network canvassed a range issues:

- Improve air quality monitoring to effectively measure the health of at-risk communities.³⁹
- Improve measuring and monitoring in rural areas.⁴⁰
- Ongoing issues with gaps in coverage despite recent expansion of AirWatch monitoring facilities, including in Warburton, Healesville and Maroondah.⁴¹
- Not enough pollution monitoring undertaken at roadsides in Melbourne where traffic is heavy and causes poor air quality in front of schools, kindergartens, residential facilities, aged-care facilities and hospitals.⁴²
- Inadequate capture of air pollution data from wood heaters.⁴³
- Need for improved and expanded infrastructure to enable real-time air quality monitoring of, particularly, P.M_{2.5} and ozone, across all metropolitan areas and major regional centres.⁴⁴
- Greater localisation of AirWatch information to better target health protection advice and to meet the needs of growing populations in outer metropolitan areas.⁴⁵
- Need for local air quality information to be available to all communities where wood heater smoke and vehicle emissions are problematic and for communities located near major industrial pollution sources.⁴⁶

³² Climate and Health Alliance, *Submission 79*, pp. 5–6.

³³ Environmental Justice Australia, *Submission 110*, p. 17.

³⁴ Asthma Australia, *Submission 39*, p. 11.

³⁵ Anti-Toxic Waste Alliance, *Submission 77*, pp. 7–8.

³⁶ Victorian Council of Social Service (VCOSS), *Submission 74*, p. 6.

³⁷ Clean Air Communities, *Submission 112*, p. 11.

³⁸ Communities for Clean Air Network, *Submission 82*, p. 8.

³⁹ Environmental Justice Australia, *Submission 110*, p. 17.

⁴⁰ Professor Sotiris Vardoulakis, Rural Doctors Association of Victoria, public hearing, via video conference, 11 August 2021, *Transcript of evidence*, p. 14; Dr Rob Phair, President, Rural Doctors Association of Victoria, public hearing, via video conference, 11 August 2021, *Transcript of evidence*, p. 20.

⁴¹ Dr Rob Phair, *Transcript of evidence*, p. 20; Warburton Environment, *Submission 101* – attachment 1, p. 7; Maroondah Friends of the Forrest, *Submission 111*, p. 1.

⁴² Environmental Justice Australia, *Submission 110*, p. 18; The Lung Health Research Centre, University of Melbourne, *Submission 100*, p. 8; Kate Forster, *Submission 115*, p. 4; Victorian Council of Social Service (VCOSS), *Submission 74*, p. 6.

⁴³ Environmental Justice Australia, *Submission 110*, p. 18; Communities for Clean Air Network, *Submission 82*, pp. 6–8; Clean Air Communities, *Submission 112*, p. 11.

⁴⁴ Australasian College Emergency Medicine (ACEM), *Submission 26*, p. 3.

⁴⁵ Ibid.

⁴⁶ Asthma Australia, *Submission 39*, p. 11; Climate and Health Alliance, *Submission 79*, p. 8.

- Increase the number of air quality monitoring stations, including the number of portable stations deployed during extended air pollution events.⁴⁷
- Improve the monitoring network with a focus on experience of air pollution, and use of more relevant siting of monitors, including collaboration with citizen science networks.⁴⁸
- Establish low-cost monitoring across the State through the use of PurpleAir⁴⁹ and similar units.⁵⁰

In addition to these issues, stakeholders expressed concern about problems with the adequacy and accuracy of air quality data provided by the EPA.

The Climate and Health Alliance and Environmental Justice Australia both asserted that Victoria lagged behind New South Wales in relation to the provision of real-time, accessible information about air pollution, including downloadable datasets with parameters chose by the user. By comparison, EPA AirWatch, they argued, was inadequate because it did not offer download of real-time data and only displayed information for hourly averages and a 48-hour rolling average, while historical hourly air quality tables only allowed users to scroll through hour-by-hour.⁵¹

The Climate and Health Alliance recommended the Government develop an air quality and monitoring plan to increase the level of and access to air quality monitoring information, including provision of real-time monitoring data and the ability to download current and historical datasets.⁵²

In its submission, Latrobe City Council emphasised the importance of improving air quality monitoring and providing real-time information. It noted that the New South Wales' Office of Environment and Heritage is an effective model:

the Office of Environment and Heritage in NSW provides real-time air pollution information, including the Upper Hunter Air Quality Monitoring Network. Victoria has no similar data capture or reporting systems, rather it is understood that the EPA AirWatch displays air quality information on a 48hour and 1-hour rolling average.⁵³

Environmental Justice Australia also noted the disparity between New South Wales and Victoria in relation to reporting of monitoring information by power stations. It submitted:

Under their pollution licences, power stations in NSW are required to upload monitoring information on a monthly basis onto their websites...No industry in Victoria, including coal-fired power stations, is legally obliged to make its stack emissions monitoring data

⁴⁷ Asthma Australia, *Submission 39*, p. 11; Anti-Toxic Waste Alliance, *Submission 77*, pp. 7–8.

⁴⁸ Kate Forster, *Submission 115*, p. 4; Dr Rob Phair, *Submission 96*, p. 3.

⁴⁹ A type of air quality monitoring system commonly used by individuals and citizen scientists.

⁵⁰ Communities for Clean Air Network, *Submission 82*, p. 8.

⁵¹ Climate and Health Alliance, *Submission 79*, pp. 5–6; Environmental Justice Australia, *Submission 110*, p. 18.

⁵² Climate and Health Alliance, *Submission 79*, p. 8.

⁵³ Latrobe City Council, *Submission 57*, attachment 1, p. 11

publicly available. Access to stack emissions monitoring data is subject to a Freedom of Information request which is a lengthy and cumbersome process, subject to review, and often results in important pollution information being redacted on the basis that it is “commercially sensitive”. This is an opaque process that discourages the community from exercising their right to know what they are exposed to and in what quantities.⁵⁴

Clean Air Communities’ submission claimed that comparisons of real-time particulate matter levels reported by EPA AirWatch to those monitored by citizen science networks consistently revealed that AirWatch downplayed real pollution levels. It also considered that AirWatch forecasts did not provide adequate warnings of real pollution threats. Further, Clean Air Communities noted that because EPA Victoria did not provide data to the National Pollution Inventory (NPI) on PM_{2.5} emissions from domestic wood-heaters, this resulted in misrepresentative data that understated actual amounts wood heater emissions.⁵⁵

The Australasian College of Emergency Medicine (ACEM) suggested that improved integration of routine health service data in Victoria could enable real-time monitoring and reporting of health service usage in the context of prolonged smoke events—akin to the New South Wales Public Health Rapid Emergency Diseases and Syndromic Surveillance (PHREDSS) system—to enable near real-time monitoring of emergency department presentations and Ambulance 000 calls, which are monitored daily and enable early activation of risk assessment and public health action. ACEM argued that improvements to integrated data systems would support translational research activities to better understand the impact of hazardous air quality events in Victoria and to evaluate the effect of policy and programming.⁵⁶

In the Committee’s view, current methods for measuring poor air quality and notifying residents could be improved. Current methods capture air quality data which are averaged over a 1-hour period and do not adequately show the highest reading point. There are also delays in reporting air quality meaning that people do not receive real-time information on poor air quality days. This could impede them in mitigating their exposure and taking actions to protect their health.

The Committee believes that access to live and localised air quality information, including concentration levels and movement, would better equip people to take mitigation activities when they are at risk of pollution exposure. As discussed in Chapter 5, the Latrobe Valley Information Network is a good example of a live network approach which could be implemented state-wide to improve Victorian’s access to real-time and localised air quality information. A live network approach to air monitoring could also allow agencies to actively track concentration levels and pollution paths so that they could better target real-time notifications to affected residents.

⁵⁴ Environmental Justice Australia, *Submission 110*, p. 18.

⁵⁵ Clean Air Communities, *Submission 112*, p. 11.

⁵⁶ Australasian College Emergency Medicine (ACEM), *Submission 26*, p. 6.

Provision of real-time air quality data in relation to emergency events is further discussed in Chapter 9.

RECOMMENDATION 29: That the Victorian Government completes the implementation of the recommendations in the Victorian Auditor-General's report *Improving Victoria's Air Quality* (March 2018) as a matter of priority.

RECOMMENDATION 30: That the Victorian Government consider upgrades and improvements to the Victorian air quality monitoring network and AirWatch. Considerations should include:

- providing more monitoring stations across Victoria, particularly in more densely populated areas that have been identified as air quality problem hot spots
- siting of monitoring stations near priority communities and locations, such as childcare centres, kindergartens, and schools, in particularly where they are in close proximity to main roads (500–800 metres)
- investigating the viability of implementing technology which provides live and localised air quality information, like the Latrobe Valley Information Network
- providing continuously updated air quality data on AirWatch in real-time
- enabling current and historical air monitoring data to accessible for download from AirWatch.

8.2.4 Pollen monitoring

On 21 November 2016, Melbourne experienced the 'world's largest epidemic thunderstorm asthma event, which was unprecedented in size, severity and impact'.⁵⁷ As a result of the thunderstorm asthma:

- 12,723 patients presented at Victorian emergency departments (44% increase from normal rates during same period)
- 672% increase in respiratory-related presentations at emergency departments within a 30-hour period
- 3,841 more people than usual were admitted to hospital for respiratory distress and asthma
- 10 people died.⁵⁸

⁵⁷ Health.Vic, 'Response to the November 2016 thunderstorm asthma event', (n.d.), <<https://www2.health.vic.gov.au/public-health/environmental-health/climate-weather-and-public-health/thunderstorm-asthma/response>> accessed 15 March 2021.

⁵⁸ Commissioner for Environmental Sustainability, 'Thunderstorm asthma', 2018, <<https://www.ces.vic.gov.au/reports/state-environment-2018/air>> accessed 15 March 2021.

A study published in medical journal, *The Lancet*, examined the environmental triggers which contributed to the 2016 thunderstorm asthma event. The study determined it was a combination of environmental factors, including:

- a line of thunderstorms sweeping eastward
- wind gusts
- sudden temperature drops
- increase in humidity
- extremely high levels of airborne pollen.⁵⁹

As noted in Section 8.2.1 above, the Commissioner for Environmental Sustainability, in her submission, highlighted Recommendation 4 of the *State of the Environment 2018* report for the establishment of a contemporary pollen-monitoring network to enable community access to information on pollen levels in the air in a timely manner, through actions including increasing the number of locations monitored, the frequency of the monitoring, and automating the monitoring process.⁶⁰

The Commissioner noted that the Government did not support this recommendation as it considered its intent had been met through the pollen monitoring and community awareness program established after the epidemic thunderstorm asthma event in November 2016. It also reported that development of the pollen monitoring network beyond its current scope was not considered necessary to improve the comprehensive information already available about protective actions people can take during the grass pollen season.⁶¹

However, the Commissioner argued that, while the Government had made improvements to the forecasting, monitoring and communication of pollen since the 2016 thunderstorm asthma event, Victorians could not access information on real-time pollen levels or the times of the day when pollen levels were likely to be at their worst. The Commissioner suggested enhanced monitoring would help scientists develop a profile of pollen levels and gain a greater understanding of the impact of meteorological parameters on pollen, which would lead to more accurate pollen forecasts. The Commissioner recommended that, at a minimum, a business case should be completed to determine the costs and benefits of implementing automatic pollen monitors in Victoria.⁶²

RECOMMENDATION 31: That the Victorian Government reconsider its response to recommendation 4 of the Victorian *State of the Environment 2018* report and implement a contemporary pollen monitoring network.

⁵⁹ Professor Francis Thien et. al., 'The Melbourne epidemic thunderstorm asthma event 2016: an investigation of environmental triggers, effect on health services, and patient risk factors', *The Lancet*, June 2018, doi: [https://doi.org/10.1016/S2542-5196\(18\)30120-7](https://doi.org/10.1016/S2542-5196(18)30120-7)

⁶⁰ Commissioner for Environmental Sustainability Victoria, *Submission 28*, p. 23.

⁶¹ *Ibid.*, pp. 24–25.

⁶² *Ibid.*

9 Public communication and education

9.1 Public communication during air pollution events

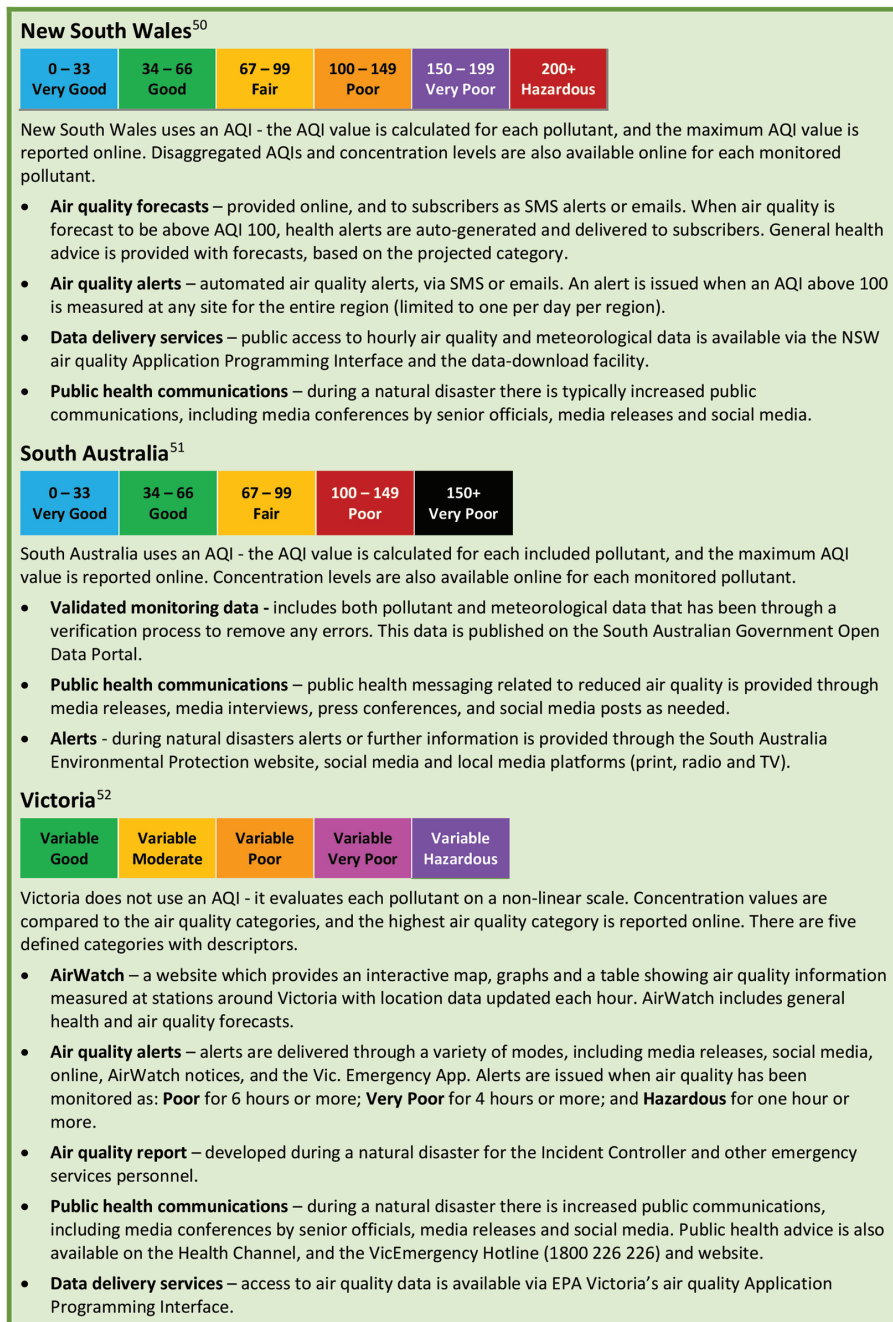
Exposure to dangerous levels of air pollution can pose significant health and safety risks, with air pollution associated with a myriad of health impacts (see Chapter 2 for an overview of the health risks associated with air pollution). Therefore, it is essential that the public has readily available information during poor air quality events to empower them to make better decisions to protect their and their families' health.

This Section considers:

- Real-time communication during poor air quality days, including the accessibility of the AirWatch website and whether a dedicated smartphone app that tracks air quality data is needed.
- Public communication during major air pollution events, particularly bushfires.

The *Royal Commission into National Natural Disaster Arrangements* compared air quality information methods used across different states and territories. Figure 9.1 below compares air quality information in New South Wales, South Australia and Victoria.

Figure 9.1 Air quality information in New South Wales, South Australia and Victoria



Source: Royal Commission into National Natural Disaster Arrangements, Final Report, October 2020, p. 318.

9.1.1 Real-time communication during poor air quality days

Real-time communication during poor air quality days or in areas with ongoing issues with air pollution was raised by many stakeholders throughout this Inquiry.

In its submission, the Australasian College for Emergency Medicine (ACEM) discussed the need for better risk communication and questioned the efficacy of current health advice:

Improved risk communications to enable the delivery of nuanced and tailored public health advice is vital to improving the health response to acute air quality emergencies. Common public health recommendations for prolonged smoke-events include shelter-in-place advice. These recommendations focus on remaining indoors and reducing exposure to outdoor air by closing windows. However, little is understood about the efficacy of this advice, particularly in the Australian context where housing quality may not be adequate to ensure effective sealing to prevent infiltration of air pollutants over prolonged periods.¹

Some stakeholders provided specific examples of where public communication was not sufficient during an air pollution event. In its submission, Environmental Justice Australia discussed submission discussed the lack of public communication about air quality breaches at Latrobe Valley power stations:

According to power station contractors who conducted air modelling for Latrobe Valley during the 2018 power station licence review, NEPM standards for SO₂, PM₁₀ and PM_{2.5} are routinely breached and/or routinely reaching the standard in Latrobe Valley. Yet, where exceedances are captured by industry-run monitors, nothing is done to reduce poor air quality by EPA. There is no communication to the community that the breaches have occurred, no investigation by EPA as to why the breaches occurred, and no requirement that industrial operators reduce their pollution by installing reduction technologies or undertaking better operations.²

The ACEM argued that effective communication needs to empower the community to make decisions or provide tailored advice. It used the 2019/2020 Victorian bushfires as an example:

It is especially important to continue to expand capacity to rapidly establish temporary emergency air monitoring in areas affected by bushfire smoke or other air quality hazards. This must be accompanied by an effective communication strategy to empower individuals, community organisations, and employers to enact tailored advice to prevent exposures to poor air quality. For example, even during prolonged smoke events such as those associated with the 2019–20 bushfires there were periods of the day where air quality was relatively improved, and outdoor physical activity and employment might be considered safer.³

Several stakeholders discussed the accessibility of information about air pollution by considering the reliability and usefulness of the Environment Protection Authority Victoria's (EPA's) AirWatch.

¹ Australasian College for Emergency Medicine (ACEM), *Submission 26*, p. 5.

² Environmental Justice Australia, *Submission 110*, p. 17.

³ Australasian College for Emergency Medicine (ACEM), *Submission 26*, p. 3.

AirWatch

The EPA monitors air quality in Victoria in accordance with national and international standards. The EPA's air quality monitoring program comprises six monitoring stations located around Victoria, which collect data and information on pollutant concentrations in their respective locations.⁴ The monitoring sites collect data on the six criteria air pollutants.

The EPA uses three types of monitoring equipment to gather information on air quality:

- **General condition monitors:** provide information on ambient air quality and pollution over a large area; the foundation of the EPA's monitoring network. There is a mix of fixed and mobile monitors.
- **Local condition monitors:** measure local air quality; often placed in communities where there are specific pollution concerns.
- **Incident air monitors:** respond to a major pollution event.⁵

Air monitoring in Victoria is discussed in further detail in Chapter 8, including issues identified with the location of existing air monitoring stations.

Air quality monitoring enables the EPA to provide accurate information on the State's air quality through EPA AirWatch. It also informs air quality management strategies and allows for effective evaluation of air quality management activities.⁶

EPA AirWatch provides publicly accessible air quality information up to 48-hours old from Victoria's monitoring network. It also presents information by region on five categories of pollutant-type based on an assessment of criteria air pollutants. Table 9.1 below shows the AirWatch concentration ranges for different pollutant categories.

4 Department of Environment, Land, Water and Planning (Vic), *Air Quality Monitoring: factsheet 2018*, <https://www.environment.vic.gov.au/_data/assets/pdf_file/0023/391127/Air-Quality-Monitoring-online.pdf> accessed 23 April 2020.

5 Ibid.

6 Ibid.

Table 9.1 Concentration ranges for air quality categories, AirWatch

Pollutant	Time Basis	Measurement	Good	Fair	Poor	Very Poor	Extremely poor
Ozone	1 hr	ppb ^a	Less than 50	50–100	100–150	150–300	300 and above
Nitrogen dioxide	1 hr	ppb	Less than 60	60–120	120–180	180–360	360 and above
Sulfur dioxide	1 hr	ppb	Less than 100	100–200	200–300	300–600	600 and above
PM ₁₀	1 hr	µg/m ^{3b}	Less than 40	40–80	80–120	120–240	300 and above
PM _{2.5}	1 hr	µg/m ³	Less than 25	25–50	50–100	100–300	300 and above
PM _{2.5}	24 hr	µg/m ³	Less than 12.5	12.5–25	25–50	50–150	150 and above
Carbon monoxide	1 hr	ppm ^c	Less than 30	N/A	30–70	N/A	70 and above

a. ppb = parts per billion.

b. µg/m³ = micrograms per cubic metre of air.

c. ppm = parts per million.

Source: Victorian Government, *Submission 113*, p 35.

In its contribution to the Victorian Government’s submission, the EPA explained the purpose of AirWatch in relaying air quality data to the public:

EPA AirWatch is used to report data from both fixed network, campaign and short-term incident air monitoring. AirWatch also provides general health advice for the community, including sensitive populations, when air quality is poor. AirWatch provides an interactive map, graphs and tabulated data showing air quality information measured at stations around Victoria with location data updated each hour, and air quality forecasts.⁷

The EPA further explained that during the 2019/2020 bushfires it expanded its air quality forecasting range to a total of 12 regions and extended the outlook period to 4 days. The expanded capability of air quality forecasting commenced on 10 January 2020. In the Government’s submission to the Inquiry, the EPA stated:

This expanded forecasting capability has been retained by EPA since and has significantly increased the spatial area covered by EPA’s daily air quality forecasts. These forecasts are displayed on AirWatch and updated every day by 5pm. They apply to every day of the year, including public holidays. During the 2019–20 Victorian bushfires, AirWatch was viewed by 3.9 million people, peaking at 190,000 visitors on 6 January 2020.⁸

⁷ Victorian Government, *Submission 113*, p. 34.

⁸ Ibid.

Additional improvements to AirWatch were made in January 2021 following recommendations from the Royal Commission into National Natural Disaster Arrangements, changes included:

- changing 'moderate' category to 'fair'
- changing 'hazardous' category to 'extremely poor'
- change to some category values to reflect impact of low level PM_{2.5} pollution
- minor edits to wording of advice.⁹

The purpose of these changes was to ensure there is consistent air quality categories and associated advice across jurisdictions.¹⁰

The Committee heard that whilst AirWatch is a valuable tool for the public to access real-time information about air quality around the State, there are issues. In its submission, Environmental Justice Australia explained that AirWatch data should be downloadable:

The EPA AirWatch displays air quality information on a 48-hour rolling average and hourly average, but the data cannot be downloaded and the user cannot see information outside the 1-hour or 48-hour period. There is an historical hourly air quality table maintained by EPA which the user can scroll through hour by hour, but again none of the data is downloadable.¹¹

Another issue identified related to AirWatch was the reliability of the data. The Stop AkzoNobel Pollution Action Group (SANPAG) noted that for residents in Sunshine North the only pertinent air quality information for them was readings taken at the West Footscray air monitoring station. Sunshine North and West Footscray are approximately 7.5 km apart. In its submission, SANPAG stated that this is:

nowhere near close enough to accurately detect industrial pollution in Sunshine North. This absence of reliable data should not be represented on the EPA website as an indication of 'good' air quality as this misleads the community.¹²

ACEM believed that the existing AirWatch network could be better localised so that targeted health advice on poor air quality days is better communicated:

the existing network must be further localised to enable targeted health protection advice and expanded with a view to ensuring coverage of growing populations in outer metropolitan areas. This must be accompanied by an effective communication strategy that better prevents exposure for vulnerable populations through coordinated responses to even moderately hazardous air quality days.¹³

⁹ Ibid., p. 35.

¹⁰ Ibid.

¹¹ Environmental Justice Australia, *Submission 110*, p. 18.

¹² Stop Akzonobel Pollution Action Group (SANPAG), *Submission 98*, p. 6.

¹³ Australasian College for Emergency Medicine (ACEM), *Submission 26*, p. 3.

This was reiterated by Dr Lai Heng Foong, Chair, Public Health and Disaster Committee, ACEM at a public hearing, who further added that the network could be better utilised/expanded in ‘areas that are more at risk, that are close to a coalmine or close to factories’.¹⁴

In its submission, Yarra Ranges Council also discussed that AirWatch data is not reliable for their residents as the closest monitoring stations are too far away:

The nearest monitoring station is in Mooroolbark, over 40 km away from Warburton and 28km from Healesville. The EPA advises that any distance greater than 15 km reduces the accuracy/relevance of the AirWatch rating so this station is useless for our communities. The advice on the EPA website regarding using line of sight visibility to assess air quality is irrelevant also to our communities as we live in a valley, surrounded by large mountains and many do not have even a 1 km line of sight.¹⁵

The EPA’s AirWatch website is an important communication tool for providing real-time air quality data to the public. Victorians around the State utilise the tool to determine if the air quality in their area is safe, particularly during significant events such as bushfires which pose a substantial risk to air quality. However, the poor geographical coverage of existing air monitoring stations means that the usefulness of AirWatch is impeded. For some areas, the data provided for their area is not accurate because of being too far away from an air monitoring station. In the Committee’s view, the EPA could improve the reliability of AirWatch through the provision of more monitoring stations better spread around the State, particularly in rural and regional Victoria. This issue is discussed further in Chapter 8.

FINDING 14: Due to poor geographical coverage of air quality monitoring stations, AirWatch may not provide the most up to the minute, reliable picture of air quality in some areas around Victoria.

The need for an air quality app

The Inner West Community Reference Group’s report into *Air Pollution in Melbourne’s Inner West* recommended that the Government create a phone app ‘to alert local populations of levels of air pollution and specific actions that can be taken, depending on severity’.¹⁶ The rationale for this recommendation was based on findings in the report which showed that:

- due to limited number of reporting formats, residents are not able to effectively obtain air quality information
- the current reporting formats do not adequately consider the needs of community sectors such as culturally and linguistically diverse groups or older residents

¹⁴ Dr Lai Heng Foong, Chair, Public Health and Disaster Committee, Australasian College for Emergency Medicine (ACEM), public hearing, Melbourne, 28 June 2021, *Transcript of evidence*, p. 26.

¹⁵ Warburton Environment, *Submission 101*, received 23 April 2021, p. 7.

¹⁶ Inner West Air Quality Community Reference Group, *Air Pollution in Melbourne’s Inner West: taking direct action to reduce our community’s exposure*, 2020, p. xviii.

- there is limited consolidation of information, with detailed analysis available across a variety of sources
- reporting should be aligned with targeted education campaigns as well as specific actions residents should take on bad air quality days.¹⁷

Several stakeholders provided copies of the Inner West Community Reference Group's report as part of their submission, including:

- Maribyrnong Truck Action Group (Submission 42)
- Anti-Toxic Waste Alliance (Submission 77)
- Carmen Largaiolli (Submission 53)
- Barry Watson (Submission 4).

The report was also referenced in a number of other submissions.

In its submission, the ACEM also recommended the utilisation of platforms such as phone apps to relay real-time information and health warnings:

Localised real-time monitoring and communication via platforms like apps, social media and websites for rapid communication should be implemented, promoted, and evaluated for their potential health impacts.¹⁸

In the context of real-time information during bushfires or planned burns, Doctors for the Environment Australia recommended that the Government, via a smartphone app, 'Make available to the public easily understandable and consistent information on air quality ... including smoke alerts and real time air quality data'.¹⁹ Real-time communication during a bushfire is discussed further in Section 9.1.2 below.

In 2016, the Government launched the VicEmergency app, which replaced the FireReady app, to provide Victorians easy access to warnings and incidents for emergency events, such as fires, floods, storms, or earthquakes. The Committee considered the VicEmergency app in its *Inquiry into recycling and waste management*. It found that:

- there is a strong reliance on the app in rural and regional Victoria, particularly in areas prone to bushfires
- in metropolitan areas, residents are less likely to have the app on their phone and therefore have limited access to information.²⁰

¹⁷ Ibid., p. 21.

¹⁸ Australasian College for Emergency Medicine (ACEM), *Submission 26*, p. 3.

¹⁹ Doctors for the Environment Australia, *Submission 68*, p. 4.

²⁰ Parliament of Victoria, Legislative Council Environment and Planning Committee, *Inquiry into Recycling and Waste Management*, November 2019, pp. 7–8.

In its Final Report, to improve community uptake of the VicEmergency app the Committee recommended:

BOX 9.1: Recommendation 2 of the Final Report into the *Inquiry into recycling and waste management*

The Committee recommends that the Victorian Government run a publicity campaign to encourage metropolitan residents to download the VicEmergency app to supplement other communication methods. Information provided around incidents such as the Coolaroo, West Footscray and Campbellfield fires should include any specific health risks and details of where further information can be obtained.

Source: Parliament of Victoria, Legislative Council Environment and Planning Committee, *Inquiry into Recycling and Waste Management*, November 2019, p. 8.

The Government Response to the Final Report supported this recommendation in full:

BOX 9.2: Government Response to Recommendation 2 of the Final Report into the *Inquiry into recycling and waste management*

Response: Support in full

The Department of Justice and Community Safety, in close consultation with Emergency Management Victoria and fire agencies, delivers the annual statewide Victorian Fire Season campaign. The campaign runs over several months and one of its primary calls to action is for audiences to ‘download the VicEmergency app or visit emergency.vic.gov.au’. The Vic Emergency channel is currently advertised as ‘all emergencies’ which reflects the broad range of incidents captured.

Source: Government of Victoria, Response to the Parliament of Victoria, Legislative Council Environment and Planning Committee, *Inquiry into Recycling and Waste Management*, 28 May 2020, p. 2.

In its submission, Murrindindi Shire Council contended that the information on the VicEmergency app, and website, around prescribed burning ‘is not always consistent or widespread’. It stated that:

This creates confusion and potential concerns for communities that have historically been severely impacted by fire as they have been in Murrindindi Shire. Further work on timely and targeted messaging and warnings of prescribed burning would be beneficial to support these communities. It helps community members to know when, for how long, from which direction and the potential intensity of particulate and toxin emissions for a prescribed burn, so that those with health concerns can take adequate mitigation measures to avoid unnecessary exposure.²¹

²¹ Murrindindi Shire Council, *Submission 48*, pp. 2-3.

The app includes a series of icons to communicate what type of emergency has occurred in an area, including icons for:

- evacuation or emergency warning
- fire (controlled versus uncontrolled) and many other incident-types
- community information, containing updates for communities affected by an emergency.

However, the app does not include a specific warning icon for air pollution; the closest icon is for reports of hazardous material. The hazardous material icon encompasses incidents where a spill or leak of hazardous liquid, gas or solid has been reported. The app notes that where the hazardous material symbol is shown, 'In most cases, the location of the icon depicts where the hazardous material is reported to be located and may not show how far it has spread'.

The purpose of the VicEmergency app is to provide real-time information on emergencies for affected residents in a manner which is easily accessible and clearly communicated. This does not include general air quality information. The Committee notes that some parts of the State experience poor air quality days or are exposed to air pollution on an ad-hoc basis where pollutants are not being caused by an emergency event. It acknowledges that Victorians can access air quality information via the AirWatch website, which has been developed to be phone friendly, however, information may be more readily available if there was a specific app for air quality data.

However, the usefulness of any publicly available air quality data is contingent on proper monitoring coverage to ensure the information is accurate for all Victorians no matter where they are. This issue is discussed further in Chapter 8.

FINDING 15: The VicEmergency app is an important communication tool which allows Victorians to access real-time information on emergencies and what actions should be taken, including bushfires. However, the app does not include a warning symbol for air pollution.

RECOMMENDATION 32: That the Victorian Government consider the inclusion of a symbol for air pollution on its VicEmergency app to warn affected residents when there is significant air pollution due to an emergency event, controlled/planned burns, pollen and dust events.

RECOMMENDATION 33: That the Victorian Government investigate the need for creating a fit for purpose air quality app which provides real-time air quality information in conjunction with upgrading the Air Quality monitoring network. The app should also be used to relay important health and safety announcements during poor air quality days. The app should include:

- the ability for users to input personal health information
- access to real-time air quality data
- public health messaging that can be personalised based on the information a user has inputted
- health alerts/warnings about bushfire or other significant air pollution events, such as industrial fires.

RECOMMENDATION 34: The Victorian Government provide better co-ordination across available platforms for people to ascertain real-time information about smoke and fire-related events, and to harmonise across the Vic Emergency App to include information about planned burns via Forest Fire Management Victoria.

9.1.2 Public communication during bushfires

Another issue raised by stakeholders was public communication during major air pollution events, particularly bushfires.

In its submission, the Victorian Council of Social Service (VCOSS) described what it believed should be the focus of communication during fires:

Communication during bushfires and industrial fires must address community concern by clearly outlining the potential health impacts of smoke and explaining how residents can minimise their exposure. Messages should be tailored to different at-risk cohorts to ensure that health advice is practical and meets specific needs.

Information must be easy to understand, translated into all necessary languages, and communicated through multiple channels. Apps and opt-in services are useful but need to be complemented by targeted communications for broad coverage, particularly so people with low digital literacy do not miss out.

The Emergency Alert System can also be utilised to improve communication about smoke. Although it is currently restricted to situations with a clear threat to life, alerts could provide an initial warning for all significant incidents and direct recipients to accurate sources of information.²²

²² Victorian Council of Social Service (VCOSS), *Submission 74*, pp. 2-3.

The Commissioner for Environmental Sustainability's submission noted that many Victorians relied on AirWatch during the 2019/2020 fire season.²³ It recommended that:

An upgraded air assessment tool with predictive capability could enable, for example, air quality forecasts to be routinely included in weather bulletins during the nightly TV news broadcasts. This would enable community members to be more informed of the air quality risks and enable them to take proactive actions to mitigate any personal health effects.²⁴

The Centre for Urban Research advocated for the introduction of a low-cost sensor network for real-time air pollution measuring to improve public communications during events such as bushfires, it said:

that low-cost sensors networks [should] be deployed to provide real-time measurements of air pollutants. These could be based on similar networks in other cities that provide data to inform decision makers and help communities reduce exposure to air pollutants. Ideally, sensor networks should be used to monitor both outdoor and indoor levels of pollutants.²⁵

In its submission, the Centre referenced a journal article by Sotiris Vardoulakis et al which examined *Bushfire smoke: urgent need for a national health protection strategy*. The article considered the need for better 'risk communication' that is 'nuanced and balanced public health communication that takes into account people's concerns and the effectiveness and practicality of protective measures'.²⁶ The authors argued that risk communication should include:

- bushfire smoke alerts
- real time air quality data and forecasts
- related health protection advice (see Figure 9.2 below for an example of risk-based protection advice for the public).²⁷

The article also explained the importance of good environmental health literacy, particularly around bushfires:

Environmental health literacy and a better understanding of the causes and effects of bushfires, and of the health consequences of air pollution more broadly, are important. There may be a misconception that smoke from burning wood or other organic fuels is "natural", hence not harmful to health. There is no consistent scientific evidence supporting this belief.²⁸

²³ Commissioner for Environmental Sustainability, *Submission 28*, p. 5.

²⁴ Ibid.

²⁵ Centre for Urban Research (RMIT University), *Submission 18*, p. 5.

²⁶ Sotiris Vardoulakis et al., 'Bushfire smoke: urgent need for a national health protection strategy', *The Medical Journal of Australia*, vol. 212, no. 8, 2020, <<https://www.mja.com.au/journal/2020/212/8/bushfire-smoke-urgent-need-national-health-protection-strategy>> accessed 22 July 2021.

²⁷ Ibid.

²⁸ Ibid.

The need for better public education about air pollution is discussed further in Section 9.2.

Figure 9.2 Factsheet: Bushfire smoke and health protection



Source: Research School of Population Health (Australian National University), *How to protect yourself and others from bushfire smoke*, 2020, <<https://rsph.edu.au/phxchange/communicating-science/how-to-protect-yourself-and-others-bushfire-smoke>> accessed 22 July 2021, cited in Sotiris Vardoulakis et al., 'Bushfire smoke: urgent need for a national health protection strategy', *The Medical Journal of Australia*, vol. 212, no. 8, 2020, <<https://www.mja.com.au/journal/2020/212/8/bushfire-smoke-urgent-need-national-health-protection-strategy>> accessed 22 July 2021.

Doctors for the Environment Australia recommended that to improve public communication during bushfires (and hazard reduction burns) the Government should:

- Provide more detailed health advice based on location-specific air quality data and forecasts, allowing planning of daily activities including outdoor exercise.
- Make available to the public easily understandable and consistent information on air quality during bushfires and hazard reduction burning, including smoke alerts and real time air quality data (e.g., via a smartphone app).
- Increase the number of air quality monitoring stations, both portable and fixed, and low-cost sensors that can be rapidly deployed in a bushfire emergency.²⁹

The 2020 Royal Commission into National Natural Disaster Arrangements discussed the need for effective public communication during the 2019/2020 bushfires:

During the 2019–2020 bushfires, there was demand within the community for 'real-time' air quality information. However, at the time, many state and territory governments based air quality information for PM_{2.5} and PM₁₀, both major components of bushfire smoke, on levels averaged over 24 hours, consistent with the NEPM AAQ. Victoria and Tasmania had adopted shorter averaging periods for PM_{2.5} and PM₁₀ prior to the 2019–2020 bushfires.

...

²⁹ Doctors for the Environment Australia, *Submission 68*, p. 5.

The ability to access near real-time information is important for the public and is crucial for high-risk individuals. Vulnerable individuals can experience deterioration in their health as the result of modest changes in air quality – and well before a 24 hour standard is exceeded. Early notification of worsening air quality enables the community to take preventative action, such as seeking cleaner air spaces, sealing an indoor environment, or taking preventative medication.³⁰

Other jurisdictions have also identified issues with real-time public communications during bushfires. An independent inquiry into the 2019/2020 New South Wales bushfires commissioned by the New South Wales Government found that:

Effective public health messaging in bush fire events is critical to reduce the associated health and economic costs. In the 2019–20 bush fire season, communities did not have adequate access to information and/or received messaging which was inconsistent and not sufficiently detailed or nuanced for different community groups. NSW requires clearer, more detailed information to be made easily available to the public.³¹

The Inquiry also found that during a bushfire or other fire event that people need better access to accurate and real-time air quality data, as well as evidence-based health messaging to help manage exposure. It considered that public communication during a bushfire could be improved through tools such as an air quality app. The Inquiry specifically examined the 'AirRater' app, which was developed by the University of Tasmania. AirRater is a smartphone app that assists people with asthma or other lung-health conditions to manage their symptoms during air pollution events/exposure. The AirRater app allows users to identify potential health risks that could occur due to air pollution exposure by:

- inputting personal health symptoms or conditions
- combine this information with local air quality data, to assess when health risks may exist.

The app can alert a user when 'poor air quality is likely to occur to empower [them] to take steps to limit their exposure to air pollution'.³²

The New South Wales Bushfire Inquiry commented on the usefulness of the AirRater app for improving public awareness of the risks during a bushfire, particularly for vulnerable such as those with pre-existing lung health issues. It noted:

Changes to increase effective public engagement on smoke exposure could include the use of tools such as the AirRater app which allows users to access information in a form they relate to. Developed in 2015 through collaboration between several public research and health agencies to support vulnerable segments of community to reduce their exposure to environmental health hazards, AirRater provides local information in near-real time. This includes the provision of location specific hourly PM₁₀ and PM_{2.5}

³⁰ Royal Commission into National Natural Disaster Arrangements, (Final Report, October 2020), p. 319.

³¹ Dave Owens APM and Professor Mary O'Kane AC, *Final Report of the NSW Bushfire Inquiry*, report for Government of New South Wales, 2020, p. 237.

³² Commissioner for Environmental Sustainability, *Submission 28*, p. 6.

pollution information from government monitoring networks. The Inquiry understands that DPIE currently supports AirRater through data access and provision arrangements.

The app allows users to input their symptoms and is useful for individuals with pre-existing respiratory conditions such as asthma, hay fever or other lung conditions. The Inquiry received evidence that, during the 2019–20 bush fire season, over 30,000 people in NSW downloaded AirRater, which suggests community members were seeking information not readily available or sufficiently user-friendly from government agencies.³³

The New South Wales Bushfire Inquiry recommended that the New South Wales Government implement an ‘improved air quality alert system such as an enhanced AirRater app’ to improved evidence-based public health messaging during a bushfire event.

In its submission, the Commissioner for Environmental Sustainability also discussed the AirRater app as an example of ‘holistic air pollution assessment tool for community and industry’.³⁴ At the time of writing, the AirRater was only operating in Tasmania, the Australian Capital Territory and the Northern Territory.

The Commissioner for Environmental Sustainability described the importance of air quality forecasting during a significant event such as bushfires. She noted that it allows people to better manage their exposure to pollution and mitigate the health risks:

The improving coverage of EPA’s routine air quality forecasting that has recently been extended beyond Melbourne, as well as the maturing role EPA plays to provide air quality forecasts for the smoke impacts during significant fires (for example, bushfires and large industrial fires), is a critical component empowering the Victorian public to minimise exposure to peak periods of pollution. Furthermore, publications such as the trio released by EPA in January 2020 that provided guidance on how to minimise the potential health impacts of smoke, are examples of the excellent proactive resources that are becoming increasingly available to empower the Victorian community to manage their own exposure to smoke.³⁵

During major air pollution events there is a greater need for people to accessible real-time information about air quality so that they have a greater understanding of the risks posed to their health and safety. The Committee found that during bushfires there is greater public interest in air quality data. Therefore, this data needs to be easily obtainable, accessible and accurate so that the Victorian community is properly informed. In the Committee’s view, there is a need to improve real-time air quality information which is more pressing during events such as bushfires.

The Committee has recommended the development of an air quality smartphone app (see Recommendation 2 above), alongside improved air monitoring, so that every Victorian has access to reliable to accurate information about the levels of air pollution in their area. Whilst the Committee’s recommendation is broader than just accessing

³³ Dave Owens APM and Professor Mary O’Kane AC, *Final Report of the NSW Bushfire Inquiry*, p. 238.

³⁴ Commissioner for Environmental Sustainability, *Submission 28*, p. 6.

³⁵ *Ibid.*, p. 15.

information in times of crisis, the provision of an air quality app in Victoria could make a huge difference in public information during bushfires where the need for accurate and real-time data is more pressing.

FINDING 16: Accessible and real-time air quality information during major air pollution events, such as bushfires, is an important public communication tool. It allows people to:

- make informed decisions on how to best prevent exposure to smoke or air pollutant materials
- better mitigate the health risks by increasing their understanding of the real risks posed to health during an air pollution event, such as bushfires.

9.1.3 Other major air pollution events

The Committee also heard about the need for real-time public communications during other major air pollution events, such as during industrial fires like the 2018 West Footscray. Stakeholders explained to the Committee that poor communication with an affected community, particularly around appropriate and clear health advice, can cause significant stress and anxiety for residents.

In its submission, the Anti-Toxic Waste Alliance commented on the feeling of residents during the 2018 West Footscray fire. It noted the feelings of anxiety many residents experienced due to a perceived disconnect between what they could see from the affected site and the communications coming from authorities:

As the smoke plume and contaminated air billowed from the site – anyone within 500 metres of the fire was advised to stay indoors and 20 suburbs were given “watch and act” advice. Firefighters and first responders bore the brunt of this toxic firestorm.

Imagine the stress for residents watching this stream across the sky. Strong metallic odours created further anxiety - what are we breathing in? Poor communication to the community on the day of the fire and immediately after added to the anxiety levels.³⁶

Dr Roderick McRae, President of the Australian Medical Association Victoria, believed that early alerts were important where there is risk of air pollution exposure, not just when the risk has come from a fire:

We have certainly got all of the hazardous materials identified, so if an alert can go out very early—not waiting for the 6 o’clock news, but really it is almost down to microphones in the street to alert people to be careful—then a decision needs to be made about: is it reasonable to stay in your house with the windows closed or go to a relative or a friend or another location because this is a big bad fire? I said ‘fire’, because it is generally the perception that I have. The same could apply for leakage of bad materials into waterways and that sort of thing, and people downstream need to be made alert.

³⁶ Anti-Toxic Waste Alliance (ATWA), *Submission 77*, p. 5.

Also there needs to be a mechanism to notify nearby public hospitals, particularly the emergency departments, that something is afoot—to be alert. Now, somebody will need to make a call that actually we need to cancel all elective surgery for the next three days because we expect these resources to be overwhelmed, whether it is just a bed for, typically, oxygen administration to assist people.³⁷

9.2 Public education about air pollution and associated health risks

There are numerous health impacts associated with air pollution exposure, ranging from mild symptoms—like itchy eyes or a sore throat—to serious health consequences such as respiratory disease or death. The degree to which an individual’s health may be impacted by exposure to air pollution depends on a variety of factors, such as:

- the type of pollutants
- length and acuteness of exposure
- an individual’s medical history, particularly if they already have or are predisposed to illnesses that could be exacerbated by exposure to air pollution.

Chapter 2 discusses the health impacts of air pollution in more detail.

The health risks posed by air pollution means that appropriate and effective public education is even more important. The Committee heard that, generally there is a lack of public awareness about air pollution, including:

- the types and sources
- the risks of exposure, including what is considered an unsafe level of exposure
- ways to properly mitigate exposure during poor air quality days or events
- how to identify symptoms of air pollution exposure.

Many stakeholders to the Inquiry supported the idea of implementing a public education campaign on the health impacts of air pollution (either generally or on specific issues, see Section 9.2.1 below).³⁸ These stakeholders believed that the wider community would benefit from improved health literacy around air quality. This would

³⁷ Dr Roderick McRae, President, Australian Medical Association Victoria, public hearing, Melbourne, 28 June 2021, *Transcript of evidence*, pp. 25–26.

³⁸ List of submissions which supported implementing a public education campaign (either generally or on specific issues): Banyule City Council, *Submission 10*; Inner West Air Quality Community Reference Group, *Submission 14, Attachment 1*; Environmental Justice Australia, *Submission 110*; Asthma Australia, *Submission 39*; Keith Loveridge, *Submission 40*; Australian Home Heating Association, *Submission 50*; Centre for Air Pollution, Energy and Health Research, *Submission 65*; Doctors for the Environment Australia, *Submission 68*; Healthy Futures, *Submission 70*; Australian Air Quality Group (AAQG), *Submission 75*; Anti-Toxic Waste Alliance (ATWA), *Submission 77*; Communities for Clean Air Network, *Submission 82*; Darryl Johnston, *Submission 84*; Doug McKenzie, *Submission 85*; Geraldine McClure, *Submission 87*; Karina Kanepe, *Submission 89*; Ms Liz Poole, *Submission 91*; Samantha Esposito, *Submission 97*; Stop Akzonobel Pollution Action Group (SANPAG), *Submission 98*; Yarra Climate Action Now (YCAN), *Submission 103*; Clean Air Communities, *Submission 112*; Anthony Polack, *Submission 20*; Carly Dober, *Submission 52*; Climate and Health Alliance (CAHA), *Submission 79*; Dr Rob Phair, *Submission 96*; The Lung Health Research Centre (University of Melbourne), *Submission 100*; Kate Forster, *Submission 115*.

enable the public to make informed health decisions on how to protect themselves when they are exposed, whether this be from a major polluting event (e.g., bushfires) or in their day-to-day lives.

In its submission, Asthma Australia provided data from a survey it conducted during the 2019/2020 bushfires. Some of the key points raised in related to the survey were that:

- the survey involved 12,000 people
- majority of respondents with asthma experienced adverse health impacts despite taking actions to protect themselves, such as closing windows and staying inside
- results clearly showed that a public education campaign on the health impacts of air pollution was needed.³⁹

Asthma Australia emphasised that health information and literacy should not ‘be left to times of crisis’. Rather, there needs to be ongoing efforts to educate people so that they are prepared:

the provision of health information about air pollution should not be left to times of crisis. Instead, information about air quality should be provided year-round, with a focus on improving environmental health literacy so the community is able to interpret health advice when it is provided in times of crisis. During times of crisis, such as bushfire smoke events, there is a need to increase health advice and ensure the messaging is targeted to vulnerable groups.⁴⁰

It recommended that that an ‘AirSmart’ public education campaign be developed, like the Government-funded SunSmart campaign. Asthma Australia recommended that this campaign:

- provide year-round information to improve environmental health literacy, and that the information is—
 - culturally appropriate
 - conveyed in a variety of formats and languages
- include targeted health information for people with asthma
- increase its messaging during major air pollution events, such as bushfires.⁴¹

Ms Michele Goldman, Chief Executive Officer, Asthma Australia explained to the Committee the guiding principles and key messages of its proposed AirSmart campaign:

So the fundamental premise of AirSmart is to do for air quality what SunSmart did for UV. No-one understood the dangers, no-one understood what UV was, let alone the dangers, and just as that helped build the community’s understanding around ultraviolet rays, the risk to health and the strategies that you could take to protect yourself, we

³⁹ Asthma Australia, *Submission 39*, p. 10.

⁴⁰ Ibid.

⁴¹ Ibid.

are seeking to do the same with AirSmart so it can build the environmental health literacy of the community, they can understand what is in the air, they can understand its impacts on health but more importantly they have got tools and strategies to help them minimise their exposure when there are high air pollution events. So it would include a public education campaign, and it would also include an app which enables people to tell what the local air quality is at any point in time, and over time, if they are recording their symptoms, using smart algorithms can provide them with personalised notifications to warn them before they are symptomatic that they should take steps to avoid being outdoors when pollution reaches certain levels.⁴²

In comparing educational campaigns, the Committee notes that campaigns like SunSmart educate the public about UV exposure and harms that can be directly addressed through behaviour change, for example, upon 'being educated' the person can avoid sun exposure. A public education campaign that educates about the harms of air pollution without the 'educated' person being able to directly mitigate exposure, may cause anxiety.

Several other stakeholders supported the implementation of an 'AirSmart' campaign, including:

- Environmental Justice Australia (Submission 110)
- Climate and Health Alliance (Submission 79)
- Doctors for the Environment Australia (Submission 68)
- Anthony Polack (Submission 20)
- Carly Dober (Submission 52).

As well as supporting the introduction of an 'AirSmart' campaign, Doctors for the Environment Australia emphasised the need to improve community awareness on best practice protective behaviours during a smoke emergency:

There is a profound lack of community awareness of protective behaviours during a smoke emergency. People with smoke sensitive conditions like asthma, chronic obstructive pulmonary disease or heart disease should limit smoke exposure by staying indoors, closing windows, wearing appropriate masks, filtering indoor air, or sheltering at refuges such as suitable public buildings where there is clean air.⁴³

Ms Bronya Lipski, Lawyer with Environmental Justice Australia, contended that access to air pollution information has improved in some ways. However, she believed that further improvement was needed around public understanding. In particular, she noted that beyond bushfires there is limited community knowledge around the risks posed by air pollution, especially in day-to-day life:

The EPA has tried to make some gains with, say, community access to air pollution information from coal-fired power stations, but what has been implemented is a traffic

⁴² Ms Michele Goldman, Chief Executive Officer, Asthma Australia, public hearing, Melbourne, 11 August 2021, *Transcript of evidence*, p. 6.

⁴³ Doctors for the Environment Australia, *Submission 68*, p. 14.

light system as opposed to helping people understand what those emissions actually are on a 24-hour basis. So certainly improving people's access to information is a way forward: helping people to understand that air pollution is a very real thing and it does have adverse health outcomes regularly, not just when there is a big bushfire event. Helping people to understand that there are measures they can take during those times is important, but when it comes to the mundane day-to-day reality of people's exposure, the education needs to be in where those pollution sources come from and not just putting the onus on the individual in order to change their behaviour to mitigate their exposure to these types of pollutants.⁴⁴

Mr Ben Latham, Policy Advisor for the Victorian Council of Social Service said that access to health information does need to be improved as well as community awareness of the risks of air pollution:

Perhaps a barrier is something that we have seen during the pandemic, and that is access to health information. I think there are a lot of people who do not know that air pollution is dangerous, or they might, but they might not understand quite how dangerous. They also might not know how to best protect their health.⁴⁵

Mr Latham reflected on learnings from the COVID-19 pandemic which demonstrated people's willingness and desire to access and act upon reliable and clear health advice. He noted that public communication needs to be clearly understood by a variety of audiences and offered in multiple formats:

I think in the pandemic we saw that people are happy to take those steps to protect themselves and their families, but they need access to that information. And if it is just online in English, it might not reach everyone it has to. So that might be one of the barriers there—making sure this information has that cut-through and is really disseminated out into communities.⁴⁶

In its submission, the ACEM recommended that community awareness should be improved as part of a broader air quality strategy:

In particular, engagement through primary care and communications campaigns to ensure that at risk individuals have an up-to-date asthma management plan and optimised routine respiratory disease management. Strengthening community response can also include the dissemination of P2/N95 masks, alongside careful risk communication and advice on appropriate use.⁴⁷

ACEM further noted that it was important to ensure that any education or health messaging is tailored to specific communities to ensure that it is reaching as many people as possible. In its submission it commented that:

⁴⁴ Ms Bronya Lipski, Lawyer, Environmental Justice Australia, public hearing, Melbourne, 29 June 2021, *Transcript of evidence*, p. 7.

⁴⁵ Mr Ben Latham, Policy Advisor, Victorian Council of Social Service, public hearing, Melbourne, 29 June 2021, *Transcript of evidence*, p. 15.

⁴⁶ Ibid.

⁴⁷ Australasian College for Emergency Medicine (ACEM), *Submission 26*, p. 5.

Notably, Asian or Indian ethnicity was a specific risk factor in the November 2016 thunderstorm asthma event. Ensuring priority populations, including First Nations and Culturally and Linguistically Diverse communities are able to access culturally appropriate health information to improve preparedness for these events should be prioritised.⁴⁸

At a public hearing, Dr Lai Heng Foong from ACEM reiterated the need to improve public education:

I think there is definitely a lot more scope to target communication strategies, especially to vulnerable members of the community. We certainly have enough sophisticated technology now so that we know when we are getting periods of bad air pollution. When we have a bushfire, we are definitely measuring these indicators, and we should be telling people to wear N95 masks and P2 masks, really. I have experience trying to spread that kind of messaging. It is something that needs to be done, and our college would definitely support that.⁴⁹

Box 9.3 below is an example of a current air pollution campaign which includes public education initiatives, the BreatheLife campaign co-run by the World Health Organization, United Nations Environment Programme and the Climate & Clean Air Coalition.

BOX 9.3: BreatheLife Campaign

BreatheLife is an ongoing global campaign (established in 2016), co-run by the World Health Organization, UN Environment Programme and the Climate & Clean Air Coalition, aiming to mobilise action to reduce air pollution. The campaign seeks to involve governments, the health sector and individuals in taking action to ‘dramatically reduce the 7 million deaths annually from air pollution by 2030 and slow the pace of climate change’.

Part of the campaign is focused on building public awareness about the health and environmental impacts of air pollution. The campaign has produced information materials on:

- health impacts of air pollution
- sources of air pollution
- impact of air pollution on climate change and the environment
- what measures governments, cities, the health sector and individuals can take to reduce air pollution.

(Continued)

⁴⁸ Ibid.

⁴⁹ Dr Lai Heng Foong, *Transcript of evidence*, p. 28.

BOX 9.3: Continued

The campaign also aims to educate the public about specific air pollution issues, such as:

- specific pollutant sources, like
 - cookstoves
 - energy production
 - agricultural burning
 - open burning
 - transportation
- tips for reducing and preventing exposure to air pollution during pregnancy
- effective air pollution mitigation strategies, including case studies from around the world.

Alongside the development of educational materials on an array of issues, BreatheLife campaign activities include:

- social media activities and conversations, including the development of the #BreatheLife hashtag
- development of a dedicated campaign website—BreatheLife2030.org—which includes air pollution data for over 4,000 cities pulled from ground station monitoring and satellite data
- creation of a BreatheLife network of cities, regions and countries who want to demonstrate their commitment to improving air quality.

At the time of writing, Mount Barker (South Australia) was the only Australian city involved in the BreatheLife network, joining the campaign in 2018.

Source: BreatheLife, *BreatheLife: A global campaign for clean air*, <<https://breathelife2030.org>> accessed 23 July 2021.

In the Committee's view, public education is an important tool to ensure that people are aware of the health risks associated with air pollution and ways they can mitigate or manage any exposure. There was strong support amongst Inquiry stakeholders to introduce a public education campaign on air pollution, either generally or for specific issues such as wood smoke. The Committee believes this is worth considering. It recommends that the Victorian Government consider implementing a state-wide education campaign on air pollution and associated health risks.

RECOMMENDATION 35: That the Victorian Government implements a state-wide education campaign around the risks of air pollution which includes relevant health information and best practice advice on mitigating exposure. In developing this campaign, the Government should look at ways to:

- tailor this information so that it targets specific at-risk cohorts
- offer materials in a variety of formats, including in ways that are culturally appropriate and accessibility friendly
- focus parts of the campaign on specific issues or sources of pollution.

9.2.1 Issue-specific public education

Stakeholders to the Inquiry also discussed the need for education around specific issues, whether that be about specific sources of pollution or industry-tailored advice.

Numerous stakeholders raised the issue of air pollution from wood smoke, particularly pollution associated with wood heaters. Many of these stakeholders recommended that wood heaters be phased-out or banned, and that a public education campaign on the health risks of wood smoke be implemented.⁵⁰

In its submission, the Communities for Clean Air Network stated that community education about the harms of wood smoke is ‘inadequate’. It said:

The Victorian EPA has not implemented any proactive education campaigns to inform the public about the harms of woodsmoke. Rather, the EPA’s education approach is passive and provides only basic information on its website. Thus, most Victorians who own a wood heater, as well as their neighbours and the community are unaware of the health impacts of wood smoke exposure (see case study 2 [Box 9.4]). The failure to proactively inform the public about these risks puts both wood heater owners and the broader community at risk of harm.⁵¹

⁵⁰ For example, see: Banyule City Council, *Submission 10*; Environmental Justice Australia, *Submission 110*; Asthma Australia, *Submission 39*; Doctors for the Environment Australia, *Submission 68*; Healthy Futures, *Submission 70*; Australian Air Quality Group (AAQG), *Submission 75*; Anti-Toxic Waste Alliance (ATWA), *Submission 77*; Communities for Clean Air Network, *Submission 82*.

⁵¹ Communities for Clean Air Network, *Submission 82*, p. 6.

BOX 9.4: Case Study 2 from Communities for Clean Air Network's submission

I've lived on the edge of Emerald Village in the Dandenong Ranges for 35 years, and a wood stove was my only heating for over 25 years. I used to burn off yearly following CFA directions for fuel reduction, until I got expert advice this was ineffective and unnecessary. Then I googled woodsmoke. I feel very let down by council failure to communicate the known serious health impacts of wood smoke to me and my community, and to adequately regulate it.

Over 4 years I have given information on biomass smoke to my two local governments Cardinia and Yarra Ranges. This has mostly been ignored and never shared with residents as requested. There is no smoke health risk assessment for open air burning local laws, or CFA fuel reduction burns, and no EPA engagement in their design.

I now have mild small airway impairment and frequently end up gardening in a smoke mask to complete tasks. Smoke restricts my activities outside and seeps inside my house. My neighbours' response to my health concerns is 'I have a right to burn'.

Source: Communities for Clean Air Networks, *Submission 82*, p. 3.

Chapter 6 discusses the issue of wood heaters and smoke in more detail, including the need for better education around the risks they pose.

Another issue some stakeholders believed should be addressed through a public education campaign is vehicle idling. Several of these stakeholders recommended an anti-idling campaign be introduced to raise awareness about the environmental and health impacts of emissions generated when a vehicle is idle.⁵²

In its submission, The Lung Health Research Centre made several recommendations on how to mitigate traffic emissions. However, it stated that its recommendation to introduce an anti-idling campaign was:

the easiest to implement and perhaps the simplest way to gain the impetus required to achieve the rest of the recommendations. If the public were made aware that leaving their engine running was tantamount to smoking a cigarette around a non-smoker, it is easy to envisage behaviours and attitudes rapidly changing. Raising awareness is imperative to the success of any of the mitigation strategies that require behavioural change.⁵³

Some stakeholders also discussed the issue of vehicle emissions in school zones or near early childhood centres. In its submission, Doctors for the Environment Australia contended that children commuting to and from school are 'exposed to high levels of vehicle-related air pollution especially when schools are located next to major roads'.

⁵² For example, see: The Lung Health Research Centre (University of Melbourne), *Submission 100*; Yarra Climate Action Now (YCAN), *Submission 103*; Keith Loveridge, *Submission 40*; Doctors for the Environment Australia, *Submission 68*.

⁵³ The Lung Health Research Centre (University of Melbourne), *Submission 100*, p. 17.

It noted that vehicle emissions increase at school drop-off and pick-up points due to idling vehicles.⁵⁴

Doctors for the Environment Australia supported the introduction of a public education campaign focused on the air pollution risks of idling. In its submission, it pointed to the 'Idle Off' campaign as an example initiative that could be introduced.⁵⁵ Box 9.5 below summarises the 'Idle Off' campaign, an example education campaign focused on issue-specific air pollution.

BOX 9.5: Example of an issue-specific public education campaign—the 'Idle Off Project'

The 'Idle Off Project' is an education initiative that was launched in Australia and New Zealand. The initiative is targeted at high school students to raise awareness around the issue of vehicle emissions around schools, particularly emissions generated when vehicles are idle.

According to the Idle Off website, the project has four objectives for students to achieve:

1. To understand the danger of vehicle emissions to human health.
2. To discover how much air pollution is around schools.
3. To help students, teachers, parents and bus drivers understand the risks of idling vehicles to student health.
4. To help the school community to 'Idle Off!'.

The Idle Off campaign has created project resources for students to complete to help them understand the health risks of vehicle emissions and to think about ways to limit or stop idling around school zones in their community.

Source: Idle Off, *The Idle Off Project*, <<https://www.idleoff.com.au>> accessed 3 August 2021.

Ms Brooke McKail, Manager, Policy and Research at VCOSS, discussed the need to ensure that early learning childhood centres are not located near high pollutant sources; and that parents or educators may not be aware of the risk of air pollution. At a public hearing, Ms McKail noted that:

it is around the ability for them to monitor air quality in a real-time way and also easy access and affordable access to things like HEPA filters and air purifiers that can make a difference for those facilities, and also, again, just the communication element of it. I just personally am very informed in this area, but I was the chair of my children's early learning service not that far from a major road and had not thought about it. I just had not considered it. And if I had not, I suspect that most of the parent-led childcare

⁵⁴ Doctors for the Environment Australia, *Submission 68*, p. 9.

⁵⁵ Ibid.

centres across the state have also not thought about what that means, because, you know, they just have not had that easy access to information. So I think there is a public health kind of campaign that needs to sit alongside it.⁵⁶

Vehicle emissions, including those generated during idling, is discussed further in Chapter 7.

**Adopted by the Legislative Council Environment and Planning Committee
Parliament of Victoria, East Melbourne
20 October 2021**

⁵⁶ Ms Brooke McKail, Manager, Policy and Research, Victorian Council of Social Service, public hearing, Melbourne, 29 June 2021, *Transcript of evidence*, p. 18.

Appendix A

About the Inquiry

A.1 Submissions

1	Jane Glover	29	Dr Greg Moore
2	Mark Gordon	30	Guillermo Narsilio
3	Jennifer Williams	31	John Sullivan
4	Barry Watson	32	Nigel Fox
5	Claudette Saifert	33	Rhys Jones
6	Wendy Magee	34	Rob Charles
7	Frank Whillans	35	Rob Muston
8	Ben Dawson	36	Robert Prideaux
9	Veronique Hamilton	37	Tracey Brewer
10	Banyule City Council	38	Voices of the Valley
11	Rob Gell	39	Asthma Australia
12	Elizabeth Cox	40	Keith Loveridge
13	Dr Freya Headlam	41	Lachlan Shaw
14	Inner West Air Quality Community Reference Group	42	Maribyrnong Truck Action Group
15	Thomas Ellis	43	Moreland City Council
16	Adrian Wortley	44	Nicholas Ryan
17	Caroline Citarelli	45	Zeromow
18	Centre for Urban Research, RMIT University	46	Brett Russell
19	Meredith Kidby	47	Marcus Wigan
20	Anthony Polack	48	Murrindindi Shire Council
21	Bendigo and District Environment Council Inc	49	The Thoracic Society of Australia and New Zealand
22	Matt Youd	50	Australian Home Heating Association
23	Per Nystrom	51	Rodney Lloyd
24	Perran Cook	52	Carly Dober
25	Angelos Kenos	53	Carmen Largaiolli
26	Australian College for Emergency Medicine	54	Judy Chandley
27	Christine Alexander	55	Jane Hildebrant
28	Commissioner for Environmental Sustainability	56	Kalena Hynes
		57	Latrobe City Council

58	Australian Parents for Climate Action	94	Phillip Edwards
59	Daniell Flood	95	RE100 Group
60	Angelique Stefanos	96	Dr Rob Phair
61	Ariane Armstrong	97	Samantha Esposito
62	Viktoria Flavel	98	Stop AkzoNobel Pollution Action Group
63	Audrey van den Berg	99	Stop North East Link Alliance
64	Catherine Roadknight	100	The Lung Health Research Centre, University of Melbourne
65	Centre for Air Pollution Energy and Health Research	101	Warburton Environment
66	Carolyn Boothman	102	Yarra Ranges Council
67	Christopher James	103	Yarra Climate Action Now
68	Doctors for the Environment Australia	104	Tobias Dacy
69	Goulburn Murray Climate Alliance	105	ALiVe Inc
70	Healthy Futures	106	Leanne Norwood
71	Pela Soupourzis	107	Public Transport Users Association
72	Ray Peck	108	Adam Menary
73	Ross Kingston	109	Sally Avery
74	Victorian Council of Social Service	110	Environmental Justice Australia
75	Australian Air Quality Group	111	Maroondah Friends of the Forest
76	Australian Medical Association (Victoria) Limited	112	Clean Air Communities
77	Anti-toxic Waste Alliance	113	Victorian Government
78	Bruce Buckheit	114	John Young
79	Climate and Health Alliance	115	Kate Forster
80	City of Boroondara	116	Marian Pham
81	City of Melbourne	117	John Whadcoat
82	Communities for Clean Air Network	118	Phillip Jamieson
83	Community Over Mining	119	Jamie Chircop
84	Darryl Johnston	120	Name Withheld
85	Doug McKenzie	121	Name Withheld
86	Extinction Rebellion Darebin	122	Name Withheld
87	Geraldine McClure	123	Name Withheld
88	Julia Karas	124	Name Withheld
89	Karina Kanepe	125	Name Withheld
90	Lesley Walker	126	Name Withheld
91	Liz Poole	127	Name Withheld
92	Mario Zanoni	128	Confidential
93	Newlands Friends of the Forest	129	Name Withheld

130	Name Withheld	138	Confidential
131	Name Withheld	139	Confidential
132	Name Withheld	140	Confidential
133	Confidential	141	Confidential
134	Name Withheld	142	Name Withheld
135	Name Withheld	143	Name Withheld
136	Name Withheld	144	Confidential
137	Name Withheld	145	Name Withheld

A.2 Public Hearings and site visits

Monday, 28 June 2021

Meeting Rooms G1 & G2, 55 St Andrews Place, East Melbourne (and via Zoom)

Name	Title	Organisation
Steven Piasente	Chief Executive Officer	Latrobe City Council
Stephen Meloury	Unit Manager, Building Services and Environmental Health	Moreland City Council
Dr Roderick McRae	President	Australian Medical Association Victoria
Dr Lai Heng Foong	Chair, Public Health and Disaster Committee	Australasian College for Emergency Medicine
Professor Michael Abramson	Chief Investigator	Centre for Air Pollution, Energy and Health Research
Associate Professor Fay Johnson	Chief Investigator	Centre for Air Pollution, Energy and Health Research
Clare Walter	Honorary Research Fellow and PhD Candidate	The Lung Health Research Centre, University of Melbourne
Associate Professor Louis Irving	Clinical Director	The Lung Health Research Centre, University of Melbourne
Professor Gary Anderson	Director	The Lung Health Research Centre, University of Melbourne
Associate Professor Robyn Schofield	Director, Environmental Science Hub	University of Melbourne
Dr Harry Jennens	Co-founder and Co-ordinator	Healthy Futures
Geraldine McClure	Latrobe Valley Organiser	Healthy Futures
Veronique Hamilton	Registered Nurse	Healthy Futures

Tuesday, 29 June 2021

Meeting Rooms G1 & G2, 55 St Andrews Place, East Melbourne (and via Zoom)

Name	Title	Organisation
Bronya Lipski	Lawyer	Environmental Justice Australia
Brooke McKail	Manager, Policy and Research	Victorian Council of Social Service
Ben Latham	Policy Advisor	Victorian Council of Social Service
Dr Dorothy L Robinson		Australian Air Quality Group
Arabella Daniel		Clean Air Communities
Liz Poole		Communities for Clean Air Network
Kate Forster		
Clare Sheppard		Inner West Air Quality Community Reference Group
Patsy Toop OAM		Inner West Air Quality Community Reference Group
Bert Boere		Inner West Air Quality Community Reference Group
Martin Wurt	President	Maribyrnong Truck Action Group
Caroline Cittarelli		
Maggie Jones	Secretary	Advocating for the Latrobe Valley – ALiVe Inc
Wendy Farmer	President	Voices of the Valley
Marianne Robinson	Secretary	Voices of the Valley
Thomas Michael Ellis		
Eunsil Hwang	Adviser	Australian Home Heating Association
Ashley Stride	Deputy Chair	Australian Home Heating Association
Colleen Hartland	Chair	Anti-toxic Waste Alliance

Tuesday, 10 August 2021

Via Zoom

Name	Title	Organisation
Carolyn Jackson	Acting Deputy Secretary, Environment and Climate Change	Department of Environment, Land, Water and Planning
Hamish Webb	Director, Knowledge, Planning and Risk in Forest, Fire and Regions	Department of Environment, Land, Water and Planning
Lee Miezis	Chief Executive Officer	Environment Protection Authority
Professor Mark Taylor	Chief Environmental Scientist	Environment Protection Authority
Dr Martine Dennekamp	Senior Environmental Epidemiologist	Environment Protection Authority
Dr Paul Torre	Senior Applied Scientist	Environment Protection Authority
Professor Brett Sutton	Chief Health Officer	Department of Health

Wednesday, 11 August 2021

Via Zoom

Name	Title	Organisation
Angela Cartwright	Policy and Advocacy Manager	Asthma Australia
Michele Goldman	Chief Executive Officer	Asthma Australia
Dr Rob Phair	President	Rural Doctors Association of Victoria
Professor Sotiris Vardoulakis		Rural Doctors Association of Victoria
Cos Camassa		Rural Doctors Association of Victoria
Tim Forcey		Rural Doctors Association of Victoria

Extracts of proceedings

Committee meeting—20 October 2021

Chapter 2

Dr Ratnam moved, that the stakeholders referred to in paragraph 2.39 be identified.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Mr Meddick

The question was negatived.

Dr Ratnam moved, that a new finding be inserted at paragraph 2.52 in the following terms:

The main sources of air pollution in Victoria include motor-vehicles, industrial emissions (including from power stations), and smoke from wood heaters, bushfires and planned burns.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
Mr Meddick	Mr Melhem
	Ms Bath
	Mrs McArthur

The question was negatived.

Dr Ratnam moved, that a further new finding be inserted at paragraph 2.52 in the following terms:

Victoria does not have an up-to-date air pollution inventory

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Mr Meddick

The question was negatived.

Ms Bath moved, that at paragraph 2.89 insert quote from Michele Goldman, Asthma Australia which reads:

“Asthma is such a complex disease and there are so many things that can trigger it. Whether it is pet dander, pollen, dust, tobacco smoke or viruses, there are a whole range of things. But what we do know in relation to deaths is 70 per cent them are avoidable. So in this day and age we should not have the number of Australians dying from asthma as there are.”

The Committee Divided.

The question was put.

Ayes	Noes
Ms Terpstra	Dr Ratnam
Ms Taylor	
Mr Melhem	
Ms Bath	
Mrs McArthur	
Mr Meddick	
Dr Cumming	

The question was agreed.

Ms Bath moved, that at the end of para 2.92, the following words be inserted:

“The Committee notes however, there is no way of knowing whether the asthma attack that caused each of those deaths was itself caused by active or passive smoking, vaping, high pollen count, vehicle fumes, wood heater smoke or bushfires.”

The Committee Divided.

The question was put.

Ayes	Noes
Ms Terpstra	Dr Ratnam
Ms Taylor	
Mr Melhem	
Ms Bath	
Mrs McArthur	
Dr Cumming	

The question was agreed.

Ms Bath moved, that in paragraph 2.95 the word “very” be deleted where first occurring and that the words “very real” be deleted where secondly occurring.

The Committee Divided.

The question was put.

Ayes	Noes
Ms Bath	Ms Terpstra
Dr Cumming	Ms Taylor
Mrs McArthur	Mr Melhem
	Dr Ratnam

The question was negatived.

Chapter 3

Dr Ratnam moved, that paragraphs 3.17 to 3.36 inclusive be moved to the end of the Chapter.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Dr Cumming

The question was negatived.

Dr Ratnam moved, that a new Finding be inserted at paragraph 3.17 in the following terms:

Victoria can introduce stricter air quality measures and objectives than the national standards (or NEPM Ambient Air Quality standards)

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Dr Cumming

The question was negatived.

Dr Ratnam moved, that a new Finding be inserted after paragraph 3.18 in the following terms:

It is up to individual state jurisdictions to implement national environment protection measures.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Dr Cumming

The question was negatived.

Dr Ratnam moved, that in paragraph 3.34 the words “has not recommended specific air quality indicators or objectives to replace existing ones; instead, it...” be deleted.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur

The question was negatived.

Dr Ratnam moved, that paragraph 3.57 be amended with the deletion of the words “The Victorian Government has committed...” and the insertion of the words “The Government initiated the development of the Strategy in 2018 to:...” in their place.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur

The question was negated.

Dr Ratnam moved, that a Finding be added at paragraph 3.59 in the following terms:

The Victorian Government has not released the Air Quality Strategy that was due to release in 2019. This has caused frustration from the community especially for those directly impacted by poor air quality.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Dr Cumming

The question was negated.

Dr Ratnam moved, that a new finding be inserted at paragraph 3.80 in the following terms:

The inquiry found that the EPA was not using sanctions and other regulatory powers often enough or not being applied until a situation was critical.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur

The question was negated.

Dr Ratnam moved, that a new recommendation be inserted at paragraph 3.80 in the following terms:

The EPA enforce compliance measures and obligations to prevent air quality breeches from occurring, especially where they stem from commercial or domestic activities

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur

The question was negated.

Dr Ratnam moved, that a new finding be inserted at paragraph 3.90 in the following terms:

The EPA did not impose requirements for licensees to install basic pollution controls such as filters in its most recent review of Brown coal power station licences in Victoria.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur

The question was negatived.

Dr Ratnam moved, that recommendation at paragraph 3.91 be amended in the following terms:

That the Victorian Government reviews the scheme for issuing conditional licences to heavy industry to achieve tangible, localised air quality improvements to reduce emission by industry to lower than permitted levels.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur

The question was negatived.

Dr Ratnam moved, that a new recommendation be inserted at paragraph 3.91 in the following terms:

The Victorian Government (or the EPA) require the installation of point source emissions controls at all brown coal power stations in Victoria.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur

The question was negatived.

Dr Ratnam moved, that a new finding be inserted at paragraph 3.102 in the following terms:

The EPA and State Government are perceived to have not consulted adequately with communities impacted by air pollution and when it has occurred, the community have not been satisfied that their feedback has been considered and adopted meaningfully.

The Committee Divided.

The question was put.

Ayes	Noes
Ms Bath	Ms Terpstra
Mrs McArthur	Ms Taylor
Dr Cumming	Mr Melhem
Dr Ratnam	

The question was agreed.

Dr Ratnam moved, that a new recommendation be inserted at paragraph 3.102 in the following terms:

That the State Government, the EPA and all relevant regulatory agencies undertake meaningful participatory consultation with affected communities for all future significant projects and activities that impact the air quality of communities

The Committee Divided.

The question was put.

Ayes	Noes
Ms Bath	Ms Terpstra
Mrs McArthur	Ms Taylor
Dr Cumming	Mr Melhem
Dr Ratnam	

The question was agreed.

Chapter 4

Dr Ratnam moved, that the recommendation at paragraph 4.6 be relocated to the end of the Chapter.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur

The question was negatived.

Dr Ratnam moved, that the finding at paragraph 4.22 be amended in the following terms:

The Committee is concerned about the ongoing exposure of local residents in and around the Brooklyn Industrial Precinct to poor air quality and the detrimental health impacts that this may cause for populations that are more vulnerable to adverse health outcomes and the broader community more generally

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
Mr Meddick	Mr Melhem
	Ms Bath
	Mrs McArthur

The question was negated.

Ms Bath moved, that In Finding 1 at paragraph 4.22, substitute existing text with “The Committee notes the concerns of residents living near the Brooklyn Industrial Precinct regarding exposure to poor air quality.”

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Mr Meddick

The question was negated.

Dr Ratnam moved, that a new finding be inserted at paragraph 4.24 in the following terms:

Residents of Melbourne’s inner west experience poorer health outcomes when compared to the Australian average.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Mr Meddick

The question was negated.

Ms Bath moved, that in the recommendation at paragraph 4.48 the words “if it has not already done so,” be deleted.

The Committee Divided.

The question was put.

Ayes	Noes
Ms Bath	Ms Terpstra
Mrs McArthur	Ms Taylor
Dr Cumming	Mr Melhem
Dr Ratnam	
Mr Meddick	

The question was agreed.

Dr Ratnam moved, that a new recommendation be inserted at paragraph 4.59 in the following terms:

That the Victorian Government develop guidelines for who is responsible for first response air monitoring and ensure that all responsible government agencies are aware and trained to use these guidelines.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Mr Meddick

The question was negatived.

Chapter 5

Ms Bath moved, that words be inserted before paragraph 5.2 in the following terms:

“The consideration of air pollution within the context of the Latrobe City remains challenging, given the long-standing associations with energy generation and other heavy industry developments. The impact of these major employing industries to air quality and the centrality of these industries to socioeconomic conditions along with overall community health outcomes are significant and complex.”

The Committee Divided.

The question was put.

Ayes	Noes
Ms Terpstra	Dr Ratnam
Ms Taylor	Dr Cumming
Mr Melhem	Mr Meddick
Ms Bath	
Mrs McArthur	

The question was agreed.

Ms Bath moved, that the words in paragraph 5.9 “three large coal-fired power stations, the Maryvale paper mill, three open cut coal mines, and annual burns of logging coupes and plantations, fuel reduction burns, and private land burn-offs” be replaced by the words “three large coal-fired power stations and associated mines, the Maryvale paper mill, and other heavy industries.”

The Committee Divided.

The question was put.

Ayes	Noes
Ms Terpstra	Dr Ratnam
Ms Taylor	
Mr Melhem	
Ms Bath	
Mrs McArthur	
Mr Meddick	
Dr Cumming	

The question was agreed.

Dr Ratnam moved, that a new finding be inserted at paragraph 5.29 in the following terms:

“Residents of the Latrobe Valley experience poorer health outcomes than the Victorian average.”

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Mr Meddick

The question was negated.

Dr Ratnam moved, that a new finding be inserted at paragraph 5.29 in the following terms:

“Residents are concerned and frustrated that their health concerns are not adequately considered in decision making about the operation of industries that contribute to pollution in their environment.”

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Mr Meddick

The question was negated.

Dr Ratnam moved, that a new recommendation be inserted at paragraph 5.41 in the following terms:

That real time monitoring of air quality in the Latrobe Valley be implemented and shared with the community so that they are able to make informed decisions about the type of pollution they are being exposed to and how to minimise their exposure.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Mr Meddick
	Dr Cumming

The question was negated.

Dr Ratnam moved, that a new finding be inserted at paragraph 5.77 in the following terms:

The Victorian Government failed to conduct and release an Environmental Effects Statement for the ULAP proposal and this has heightened community concerns about the potential impact on air pollution for their local environment.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Ms Bath	Ms Taylor
Mrs McArthur	Mr Melhem
	Mr Meddick
	Dr Cumming

The question was negatived.

Dr Ratnam moved, that a new recommendation be inserted at paragraph 5.77 in the following terms:

That the Victorian Government conduct an assessment and monitoring of heavy metals emissions in the Latrobe Valley as a matter of urgency.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Mr Meddick
	Dr Cumming

The question was negatived.

Dr Ratnam moved, that the recommendation at paragraph 5.84 be amended to read:

That the Victorian Government develop effective community consultation guidelines and/or practice notes to assist project proponents in meeting community expectations, especially where heavy industry is in operation or likely be in operation.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Ms Bath	Ms Taylor
Mrs McArthur	Mr Melhem
	Mr Meddick
	Dr Cumming

The question was negated.

Dr Ratnam moved, that the Finding at Paragraph 5.90 be Moved up earlier after the relevant section

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Mr Meddick
	Dr Cumming

The question was negated.

Ms Bath moved, that a new recommendation be inserted at paragraph 5.90 in the following terms:

That the Victorian Government conduct an environment effects statement on the proposed used lead acid battery secondary smelter

The Committee Divided.

The question was put.

Ayes	Noes
Ms Bath	Ms Terpstra
Mrs McArthur	Ms Taylor
Dr Cumming	Mr Melhem
Dr Ratnam	
Mr Meddick	

The question was agreed.

Ms Bath moved, that at paragraph 5.95, the following text be inserted:

In relation to particulate matter, to comply with licencing agreements, each power station utilises electrostatic precipitators¹ to extract solid particles from boiler flue gases before the gases are discharged into the atmosphere.

In addition, an explanatory footnote that states:

An electrostatic precipitator separates solid particles from gases by electrically charging the dust particles and then attracting them to collecting electrodes of opposite polarity. On the electrode surface the dust particles give up their charge and, in time, form a layer which can be rapped off and removed. The electrostatic precipitators remove on average approximately 99% of the particles, with a peak separation efficiency (depending on the ash properties and other process conditions) of 99.5%.]

The Committee Divided.

The question was put.

Ayes	Noes
Ms Terpstra	Dr Ratnam
Ms Taylor	
Mr Melhem	
Ms Bath	
Mrs McArthur	
Mr Meddick	
Dr Cumming	

The question was agreed.

Dr Ratnam moved, that a new finding be inserted at paragraph 5.114 in the following terms:

The renewal of the licences for Victoria's brown coal power stations did not include implementing best practice standards for air pollution mitigation or the requirement for industry to install point source emissions controls that could reduce air pollution for the residents of the Latrobe Valley.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Mr Meddick
	Dr Cumming

The question was negatived.

Dr Ratnam moved, that a new finding be inserted at paragraph 5.114 in the following terms:

The failure of the EPA to require point source emissions controls in the renewal of brown coal power stations in Victoria represented a missed opportunity to reduce air pollution and minimise the adverse health outcomes that residents of the Latrobe valley may experience.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Mr Meddick
	Dr Cumming

The question was negatived.

Ms Bath moved, that the words “and farming” be deleted from the first sentence at paragraph 5.115.

The Committee Divided.

The question was put.

Ayes	Noes
Ms Bath	Ms Terpstra
Mrs McArthur	Ms Taylor
Dr Cumming	Mr Melhem
	Dr Ratnam
	Mr Meddick

The question was negatived.

Dr Ratnam moved, that the recommendation at paragraph 5.119 be deleted.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Ms Bath	
Mrs McArthur	
Dr Cumming	
Ms Taylor	
Mr Melhem	
Mr Meddick	

The question was agreed.

Chapter 6

Ms Bath moved, that in the list at paragraph 6.25 the word “logging” be deleted and replaced with “timber harvesting”.

The Committee Divided.

The question was put.

Ayes	Noes
Ms Bath	Dr Ratnam
Mrs McArthur	Mr Meddick
Ms Terpstra	
Ms Taylor	
Mr Melhem	
Dr Cumming	

The question was agreed.

Ms Bath moved, that in the heading at paragraph 6.27 the word “logging” be deleted and replaced by “timber harvesting”.

The Committee Divided.

The question was put.

Ayes	Noes
Ms Bath	Dr Ratnam
Mrs McArthur	Mr Meddick
Ms Terpstra	
Ms Taylor	
Mr Melhem	
Dr Cumming	

The question was agreed.

Dr Ratnam moved, that paragraph 6.27 be amended to read:

The Victorian Government's submission contended that in relation to timber harvesting on public land, VicForests has an obligation to regenerate harvested areas to defined standards. They argued that VicForests...

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Mr Meddick	Ms Taylor
Dr Cumming	Mr Melhem
	Ms Bath
	Mrs McArthur

The question was negatived.

Dr Ratnam moved, that a new recommendation be inserted at paragraph 6.32 in the following terms:

That the Victorian Government continue to develop and strengthen partnerships with First Nations People to make greater use of traditional owner land management practices to, where possible, reduce reliance on large scale fuel reduction burns to assist mitigation of adverse impacts from smoke.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Mr Meddick

The question was negatived.

Dr Ratnam moved, that a new recommendation be inserted at paragraph 6.43 in the following terms:

The Government in coordination with other responsible agencies develop a strategy to minimise the health impacts of planned hazard reduction burning that includes options for non-burning fuel reduction methods, adequate consultation involving affected residents and improved communication to the community about how health impacts can be minimised.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Mr Meddick

The question was negated.

Dr Ratnam moved, that in paragraph 6.58, the words “rough sleepers” be deleted and replaced with “people experiencing homelessness”.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Mr Meddick

The question was negated.

Ms Bath moved, that the finding at paragraph 6.66 be deleted.

The Committee Divided.

The question was put.

Ayes	Noes
Ms Bath	Ms Terpstra
Mrs McArthur	Ms Taylor
	Mr Melhem
	Dr Cumming
	Dr Ratnam
	Mr Meddick

The question was negated.

Dr Ratnam moved, that a new finding be inserted at paragraph 6.80 in the following terms:

That the AS/NZS4013 test to assess emissions from wood heaters is based on laboratory measurements of a correctly operated wood heater that do not reflect real world use with harmful emissions being consistently higher when wood heaters are used outside the laboratory conditions.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Mr Meddick
	Dr Cumming

The question was negated.

Ms Bath moved, that at paragraph 6.86 the following words be inserted:

“The Committee notes that Asthma Australia’s submission repeatedly makes the point that people living in areas of socioeconomic disadvantage ‘often’ have higher rates of air pollution but provides no references to support that claim. People living in areas of socioeconomic disadvantage might have higher rates of asthma, but they also have higher rates of smoking and higher rates of exposure to second-hand smoke.”

The Committee Divided.

The question was put.

Ayes	Noes
Ms Bath	Ms Terpstra
Mrs McArthur	Ms Taylor
	Mr Melhem
	Dr Ratnam
	Dr Cumming
	Mr Meddick

The question was negated.

Dr Ratnam moved, that a new finding be inserted at paragraph 6.94 in the following terms:

That while wood heaters at one point historically represented a cost-effective form of heating for a home, the real-costs are not often counted in this assessment. The health impacts and the associated social and economic costs of adverse health outcomes must be factored into any assessment of the cost-effectiveness of wood heaters.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Mr Meddick
	Dr Cumming

The question was negated.

Dr Ratnam moved, that a new finding be inserted at paragraph 6.94 in the following terms:

That the arguments by the wood-heating industry that they offer a low-cost heating option for people experiencing socio-economic disadvantage do not account for the adverse health outcomes and health inequalities these communities are asked to accept and tolerate.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Mr Meddick
	Dr Cumming

The question was negatived.

Dr Ratnam moved, that a new recommendation be inserted at paragraph 6.109 in the following terms:

That the Victorian Government introduce a woodheater replacement and public education program (based on successful models in Launceston and New Zealand) with a target to phase out woodheater use in Victoria.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Mr Meddick

The question was negatived.

Dr Ratnam moved, that the recommendation at paragraph 6.109 be amended to read:

The Victorian Government to develop state-wide guidelines for the managing and enforcing air pollution impacts caused by domestic wood smoke, including consideration of recommendations made by Banyule City Council to provide for:

- the issue of infringement penalties where continual visible smoke was present
- the ability to issue a smoke abatement order to an occupier of a residence from which excessive wood heater smoke is emitted
- the implementation of guidelines for enforcement agencies
- additional funding support to assist enforcement or education activities.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Mr Meddick

The question was negatived.

Ms Bath moved, that the recommendation at paragraph 6.119 be deleted.

The Committee Divided.

The question was put.

Ayes	Noes
Ms Bath	Ms Terpstra
Mrs McArthur	Ms Taylor
Dr Cumming	Mr Melhem
	Dr Ratnam
	Mr Meddick

The question was negatived.

Mrs McArthur moved, that the recommendation at paragraph 6.120 be deleted.

The Committee Divided.

The question was put.

Ayes	Noes
Ms Bath	Ms Terpstra
Mrs McArthur	Ms Taylor
	Mr Melhem
	Dr Ratnam
	Dr Cumming
	Mr Meddick

The question was negatived.

Dr Ratnam moved, that in the recommendation at paragraph 6.120, the word consider be deleted and replaced by the word “introduce”.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Mr Meddick

The question was negatived.

Dr Ratnam moved, that the words “consider the development of and” in paragraph 6.121 be deleted from and replaced with the word “implement”.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
Mr Meddick	Mr Melhem
	Ms Bath
	Mrs McArthur

The question was negated.

Ms Bath moved, that the recommendation at paragraph 6.121 be deleted.

The Committee Divided.

The question was put.

Ayes	Noes
Ms Bath	Ms Terpstra
Mrs McArthur	Ms Taylor
	Mr Melhem
	Dr Ratnam
	Mr Meddick
	Dr Cumming

The question was negated.

Dr Ratnam moved, that in paragraph 6.124 the words “consider the creation of” be deleted and replaced with the word “create” and after the words “relating to woodsmoke” the words “as part of a state-wide phase out program” be inserted.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Mr Meddick
	Dr Cumming

The question was negatived.

Chapter 7

Dr Ratnam moved, that a new finding be inserted at paragraph 7.32 in the following terms:

Some areas of Victoria endure a disproportionate air pollution burden because of high vehicle traffic on their roads and within their neighbourhoods.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
Mr Meddick	Mr Melhem
	Ms Bath
	Mrs McArthur

The question was negatived.

Dr Ratnam moved, that a new finding be inserted at paragraph 7.42 in the following terms:

That the impact of high vehicle traffic and heavy vehicles in local neighbourhoods causes adverse air pollution outcomes for affected communities.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Mr Meddick

The question was negated.

Dr Ratnam moved, that a new recommendation be inserted at paragraph 7.43 in the following terms:

That the Victorian State Government prioritise a goal of reducing the amount of vehicular traffic on roads by at least 30% over the next 5 years in affected areas.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Mr Meddick
	Dr Cumming

The question was negated.

Dr Ratnam moved, that the finding at paragraph 7.58 be amended to read:

The Committee finds that high traffic in the close vicinity of facilities such as schools and childcare centres represents a risk to both the short and long-term health outcomes for children.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Mr Meddick

The question was negatived.

Dr Ratnam moved, that a new recommendation be inserted at paragraph 7.58 in the following terms:

That the Victorian State Government develop and introduce clean air zones around facilities such as schools and child-care centres by 2025.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Ms Bath	Ms Taylor
Mrs McArthur	Mr Melhem
Dr Cumming	
Mr Meddick	

The question was agreed.

Dr Cumming moved, that the words “by 2025” in the new recommendation at paragraph 7.58 be deleted.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Ms Bath	Ms Taylor
Mrs McArthur	Mr Melhem
Dr Cumming	
Mr Meddick	

The question was agreed.

Dr Ratnam moved, that paragraph 7.60 be moved to after the Heading “The impact of idling”.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Mr Meddick

The question was negatived.

Dr Ratnam moved, that the recommendation at paragraph 7.78 be deleted.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Mr Meddick

The question was negated.

Dr Ratnam moved, that the recommendation at paragraph 7.79 be amended to read:

That the Victorian Government introduce interventions that reduce vehicle idling when stationary, including regulatory options.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
Ms Bath	Mr Melhem
Mrs McArthur	Mr Meddick

There being an equality of votes, the Chair gave her casting vote to the Noes.

The question was negated.

Dr Ratnam moved, that a new paragraph be inserted at paragraph 7.96 in the following terms:

A number of submissions strongly criticised the Victorian Government's introduction of the first Australian distance levy for electric vehicles as it poses a disincentive to potential EV purchases.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
Ms Bath	Mr Melhem
Mrs McArthur	Mr Meddick

There being an equality of votes, the Chair gave her casting vote to the Noes.

The question was negatived.

Dr Ratnam moved, that a new finding be inserted at paragraph 7.97 in the following terms:

The Victorian Government's distance levy for electric cars is likely to have a detrimental impact on the uptake of electric cars in Victoria and the subsequent air quality improvements that could have been achieved with an incentive based Government scheme to increase the number of electric vehicles replacing combustion vehicles in Victoria.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
Ms Bath	Mr Melhem
Mrs McArthur	Mr Meddick

There being an equality of votes, the Chair gave her casting vote to the Noes.

The question was negatived.

Ms Bath moved, that the finding at paragraph 7.110 be deleted.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
Ms Bath	Mr Melhem
Mrs McArthur	Mr Meddick

There being an equality of votes, the Chair gave her casting vote to the Noes.

The question was negatived.

Chapter 8

Dr Ratnam moved, that in the recommendation at paragraph 8.47, the word “consider” be deleted and replaced with the word “urgently”.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
Mr Meddick	Mr Melhem
	Ms Bath
	Mrs McArthur

The question was negatived.

Chapter 9

Dr Ratnam moved, that in the finding at paragraph 9.23 the word “may” be deleted and replaced with the word “does”.

The Committee Divided.

The question was put.

Ayes	Noes
Dr Ratnam	Ms Terpstra
Dr Cumming	Ms Taylor
	Mr Melhem
	Ms Bath
	Mrs McArthur
	Mr Meddick

The question was negatived.

Minority reports

Air Pollution Inquiry Minority Report

Samantha Ratnam MLC

This was an important inquiry for the environment and planning committee to conduct. While the time for hearings was limited, it received a significant number of submissions. The inquiry canvassed some of the most urgent issues that Victoria must address if it is to improve air quality and protect communities that are experiencing the greatest health burdens of poor air quality.

While I support the findings and recommendations contained in the majority report, I submit this minority report because there are some significant findings omitted from the majority report and a number of recommendations that I believe the majority report should have included if the report is to accurately reflect the evidence the inquiry received and the strength of the testimony we heard.

I want to thank all those individuals and organisations who made submissions to the inquiry and particularly the witnesses who appeared at inquiry hearings. The evidence presented at the hearings told a compelling and at-times heartbreaking story about the people and communities who have had to endure the devastating health consequences of air pollution.

I want to especially acknowledge the communities of the Latrobe Valley and Melbourne's Inner West who provided evidence at the Inquiry's hearings and shared their accounts of what it was like to have to endure continuous and unrelenting air pollution.

Their evidence told the story about what happens when people are ignored and forgotten by governments, representatives and agencies who are supposed to care for them. It also told the story of how unequal health outcomes are created and worsened by government inaction. The people of the Latrobe Valley and Melbourne's Inner West are being asked by the Victorian Government to continue to put up with more air pollution because the Government refuses to legislate and regulate strongly enough to prevent damage to their health and wellbeing.

The majority report fails to acknowledge the disease burden that these communities are asked to carry and the recommend the types of interventions that could improve air quality. There are also several gaps in the majority report in terms of findings from the evidence submitted. I am disappointed that the committee did not appreciate that making strong and clear findings was an important way of evaluating and reflecting the strength of some of the evidence presented.

For communities that have attempted to increase awareness for years about the air pollution risks they face, this inquiry was an opportunity to acknowledge their concerns and document the evidence they provided. Their attempts to do this are too often minimised and dismissed by those who either don't wish to take strong action or refuse to accept the evidence. I felt it especially important to document in this minority report the concerns raised by the communities of the Latrobe Valley, Melbourne's Inner West and those who have been advocating for reducing the harms of wood smoke exposure because the majority report did not adequately capture the evidence they submitted and presented.

In the following sections, I will outline several findings and recommendations that I moved to be included in the majority report but were not supported by the committee as detailed in the appendices containing the outcomes of the committee's deliberations on the report.

Chapter 2: Key drivers and the health impacts of air pollution

This chapter outlines the main sources of air pollution but does not contain a definitive finding about the evidence presented. It also fails to highlight that Victoria does not have an up-to-date air pollution inventory. This is significant because in the absence of a current Victorian inventory, we are forced to rely on the National Pollution Inventory which provides estimates and reports on emissions of toxic substances. If we want to better assess Victoria's air quality and reduce pollution, we should update Victoria's own air pollution inventory. As such, the majority report should have included the following findings.

New findings at the end of section 2.2.1 (p. 17):

1. The main sources of air pollution in Victoria are motor-vehicles, industrial emissions (including from coal power stations), and smoke from wood heaters, bushfires and planned burns.
2. Victoria does not have an up-to-date air pollution inventory

Chapter 3: Governance and compliance

While this chapter outlines the legal and regulatory context in which air pollution can be minimised, it failed to include several important findings and recommendations namely regarding the failure of the State Government to release the Air Quality Strategy it committed to release in 2019 and the failure of the EPA to require strong pollution control measures in its most recent review of licences for brown coal power stations in the Latrobe Valley. As such, here are several new findings and recommendations that should have been included in this chapter.

New findings in section 3.2.1 (p. 37):

1. Victoria can introduce stricter air quality measures and objectives than the national standards (or NEPM Ambient Air Quality standards).
2. That Victoria does not use health-based air quality objectives.

Alternative recommendation 1 (p. 42): That the Victorian Government introduce stricter air quality enforcement measures that include health-based ambient air objectives and appropriately resource enforcement agencies such as the EPA to enforce health-based clean air standards.

Alternative finding 1 (p. 51): The Victorian Government has not released the Air Quality Strategy that was due for release in 2019. This has frustrated the community especially those directly impacted by poor air quality.

Alternative recommendation 3 (p. 51): That the Victorian Government expedite the completion and release of its Air Quality Strategy as a matter of priority.

New finding in section 3.7.1 (p. 59): The inquiry found that the EPA was not using sanctions and other regulatory powers often enough or not applying them until a situation was critical.

New recommendation in section 3.7.1 (p. 59): The EPA enforces compliance measures and obligations to prevent air quality breaches from occurring, especially where they stem from commercial or domestic activities.

New finding at the end of section 3.7.1 (p. 63): The EPA did not require licensees to install basic pollution controls such as filters in its most recent review of brown coal power station licences in Victoria.

Alternative recommendation 4 (p. 63): That the Victorian Government review the scheme for issuing conditional licences to heavy industry to achieve tangible, localised air quality improvements to reduce emission by industry to lower than permitted levels.

New recommendation at the end of section 3.7.1 (p. 63): The Victorian Government (and/or the EPA) require the installation of point source emissions controls at all brown coal power stations in Victoria.

New finding at the end of section 3.7.2 (p. 67): The EPA and State Government have not consulted adequately with communities impacted by air pollution and when it has occurred, the community have not been satisfied that their feedback has been considered and adopted meaningfully.

Chapter 4: Inner West

It was clear from the evidence submitted and presented to the inquiry that the communities of Melbourne's inner west have suffered worse health outcomes relative to the rest of Victoria because of poor air quality. The State Government has failed to act on the drivers of air pollution in the inner west such as reducing the number of cars and trucks on the roads. The inquiry heard strong evidence that particulate matter from vehicles was making people sick in the inner west. I was disappointed that the majority report does not include a finding that reflects the evidence we heard about the impact of air pollution on the health of people living in Melbourne's inner west.

I was also concerned that the report asserts that the recent Government announcement about improved tree planting in the inner-west will be their main response to poor air quality in the region. While the tree planting initiative is welcome and will help improve air quality and mitigate the urban heat island effect in future, more targeted actions are also needed by the State Government to reduce the pollution caused by particulate matter.

Here are additional new findings and recommendations that should have been included in the majority report.

Alternative finding 3 (p. 74): The Committee is concerned about the ongoing exposure of local residents in and around the Brooklyn Industrial Precinct to poor air quality and the detrimental health impacts that this may cause for populations that are more vulnerable to adverse health outcomes and the broader community more generally.

New finding at the end of section 4.3 (p. 75): Residents of Melbourne's inner west experience poorer health outcomes when compared to the Australian average.

New recommendation in section 4.5 (p. 89): That the Victorian Government develop guidelines for who is responsible for first response air monitoring and ensure that all responsible government agencies are aware and trained to use these guidelines.

Chapter 5: Latrobe Valley

The residents of the Latrobe Valley have been exposed to unacceptable levels of air pollution for decades. Successive state governments have refused to adequately regulate air pollution

from industry in the region and this has left the communities in the Latrobe Valley vulnerable to more health issues due to air pollution. Victoria's reliance on brown coal for energy has resulted in the people of the Latrobe Valley being forced to breathe in air with higher than accepted levels of particulate matter such as mercury, nitrogen oxides and sulphur dioxide. During the most recent opportunity to reduce air pollution when the licences for the region's brown coal power stations were being reviewed for renewal, the State's Environmental Protection Agency (EPA) failed to introduce strong point source emissions controls. If Victoria's EPA does not have the power or inclination to require the types of pollution controls that could reduce air pollution, then the State Government must legislate to require them to do so. The majority report should have included the following findings and recommendations.

New findings at the end of section 5.1.2 (p. 101):

1. Residents of the Latrobe Valley experience poorer health outcomes than the Victorian average.
2. Residents are concerned and frustrated that their health concerns are not adequately considered in decision making about the operation of industries that contribute to pollution in their environment.

New recommendation in section 5.1.3 (p. 103): That real time monitoring of air quality in the Latrobe Valley be implemented and shared with the community so that they are able to make informed decisions about the type of pollution they are being exposed to and how to minimise their exposure.

New finding in section 5.2.3 (p. 113): The Victorian Government failed to conduct and release an Environmental Effects Statement for the Used Lead Battery Recycling Facility (ULAB) proposal and this has heightened community concerns about the potential impact on air pollution for their local environment.

Alternative recommendation 11 (p. 113): That the Victorian Government conduct an assessment and monitoring of heavy metals emissions in the Latrobe Valley as a matter of urgency.

New findings at the end of section 5.3.2 (p. 124):

1. The renewal of the licences for Victoria's brown coal power stations did not include the implementation of best practice standards for air pollution mitigation or the requirement for industry to install point source emissions controls that could reduce air pollution for the residents of the Latrobe Valley.
2. The failure of the EPA to require point source emissions controls in the renewal of brown coal power stations in Victoria represented a missed opportunity to reduce air pollution and minimise the adverse health outcomes that residents of the Latrobe valley may experience.

New recommendation at the end of section 5.3.2 (p. 124): That the Government introduce legislation requiring strong point source emissions controls for Victoria's coal fired power station set at levels that will reduce harm to the residents of the Latrobe Valley.

Chapter 6: Woodsmoke

The strength of evidence that was presented to both the federal parliamentary inquiry into wood smoke pollution as well as this inquiry demonstrates without doubt that wood smoke is harmful to human health. Despite the overwhelming scientific evidence about the impact of wood smoke, the majority of governments at all levels refuse to take the type of action that is needed to reduce this pollution. However, several jurisdictions in New Zealand and Tasmania have successfully reduced the use of domestic wood fires for heating with large reductions in air pollution. The following findings and recommendations should have been included in the majority report.

New recommendation at the end of section 6.2.1 (p. 139): The Government in coordination with other responsible agencies develop a strategy to minimise the health impacts of planned hazard reduction burning that includes options for non-burning fuel reduction methods, adequate consultation involving affected residents and improved communication to the community about how health impacts can be minimised.

New finding in section 6.3.1 (p. 148): That the AS/NZS4013 test to assess emissions from wood heaters is based on laboratory measurements of a correctly operated wood heater that does not reflect real world use, with harmful emissions being consistently higher when wood heaters are used outside the laboratory conditions.

New findings at the end of section 6.3.2 (p. 154):

1. That while wood heaters at one point historically represented a cost-effective form of heating for a home, the real-costs are not often counted in this assessment. The health impacts and the associated social and economic costs of adverse health outcomes must be factored into any assessment of the cost-effectiveness of wood heaters.
2. That the arguments by the wood-heating industry that they offer a low-cost heating option for people experiencing socio-economic disadvantage do not account for the adverse health outcomes and health inequalities these communities are asked to accept and tolerate.

New recommendation at the end of section 6.3.3 (p. 158): That the Victorian Government introduce a replacement and public education program (based on successful models in Launceston and New Zealand) with a target to phase out wood heater use in Victoria.

Alternate recommendation 18 (p. 158):

The Victorian Government to develop state-wide guidelines for the managing and enforcing air pollution impacts caused by domestic wood smoke, including consideration of recommendations made by Banyule City Council to provide for:

- the issue of infringement penalties where continual visible smoke was present
- the ability to issue a smoke abatement order to an occupier of a residence from which excessive wood heater smoke is emitted
- the implementation of guidelines for enforcement agencies
- additional funding support to assist enforcement or education activities.

Chapter 7: Vehicle Emissions

It was clear from the evidence submitted and presented to the inquiry's hearings that vehicle emissions are a key source of air pollution as well as carbon emissions. This chapter fails to acknowledge the concerns raised by several witnesses about the potential impact of the Victorian Government's new tax on electric vehicle use on the uptake of zero emissions electric cars in place of combustion vehicles. Several recommendations in the majority report also shift the responsibility onto the individual to avoid air pollution rather than responding to the State Government's responsibility to reduce air pollution and protect people's health. The following findings and recommendations should be included in the majority report.

New finding at the end of section 7.2 (p. 169): Some areas of Victoria endure a disproportionate air pollution burden because of high vehicle traffic on their local roads and within their neighbourhoods.

New finding at the end of section 7.3 (p. 171): That the impact of high vehicle traffic and heavy vehicles in local neighbourhoods causes adverse air pollution outcomes for affected communities.

New recommendation at the end of section 7.3 (p. 171): That the Victorian State Government prioritise a goal of reducing the amount of vehicular traffic on roads by at least 30% over the next 5 years in affected areas.

Alternative finding 7 at the end of section 7.4 (p. 174):

The Committee finds that high traffic in the close vicinity of facilities such as schools and childcare centres represents a risk to both the short and long-term health outcomes for children.

Alternative recommendation at the end of section 7.4 (p. 174): That the Victorian State Government develop and introduce clean air zones around facilities such as schools and childcare centres by 2025.

New findings in section 7.6 (p. 181):

1. A number of submissions strongly criticised the Victorian Government's introduction of the first Australian distance levy for electric vehicles as it poses a disincentive to potential EV purchases.
2. The Victorian Government's distance levy for electric cars is likely to have a detrimental impact on the uptake of electric cars in Victoria and the subsequent air quality improvements that could have been achieved if the Government had not introduced this disincentive to the purchase of electric vehicles.

THE NATIONALS and LIBERAL MEMBERS' MINORITY REPORT

Inquiry into the Health Impacts of Air Pollution

1.1. Members' View

This Minority Report represents the position of the Nationals and Liberal Members of the *Inquiry into the Health Impacts of Air Pollution*.

- i) The Andrews Government must undertake an Environmental Effects Statement on the Used Lead Acid Battery secondary smelter, proposed in the Latrobe Valley.
- ii) The Committee Report does not adequately consider technological advances and high emission standards imposed for new efficient wood combustion heaters;
- iii) The forced phase out of domestic wood fire heaters upon the sale of a property in all Victorian homes is an overreach of government powers and disproportionately impacts regional Victorians and low income earners.
- iv) New technology wood combustion heaters operated to manufacturers' specifications are an efficient and cost-effective method of heating homes particularly in regional communities
- v) The Nationals and Liberals raise concern that any Andrews Government public awareness campaign on air quality and pollution will incite fear and anxiety in the community.

1.2. Members' view on Recommendations.

1.2.1. **RECOMMENDATION 12 : That the Victorian Government consider developing effective community consultation guidelines and/or practice notes to assist project proponents in meeting community expectations, especially where heavy industry is in operation or likely to be in operation.**

The Andrews Government's failure to conduct an Environment Effects Statement (EES) on Chunxing Corporation's Hazelwood North Used Lead Acid Battery (ULAB) project in Latrobe Valley was negligent and openly dismissed air pollution concerns expressed by residents.

The Nationals and Liberals are pleased that the Committee adopted Recommendation 12 calling for an Environmental Effects Statement for the Hazelwood North Used Lead Acid Battery (ULAB) secondary smelter.

Despite significant community opposition on the ULAB project, the Andrews Government continually refused to address the many valid concerns of the Latrobe Valley community. The Andrews Government also denied repeated calls from The Nationals and Liberals to conduct an EES to ensure the project was open transparent using the parliamentary process.

The Andrews Government Minister for Planning shockingly called in the ULAB project despite objections about its proximity to residential properties and Hazelwood North Primary School. The closest residential property is only 800 metres away and the

Hazelwood North Primary School only 1.5 kilometres. The community have continually expressed serious concerns about the impact of air quality in the Latrobe Valley.

At the local government level, ULAB's application for a planning permit was denied by Latrobe City Council only to be shockingly overridden by the Andrews Government.

The planning application and EPA works approval drew significant community opposition in the Latrobe Valley community, including 136 submissions to the EPA and two petitions with thousands of signatures. The Nationals and Liberals are pleased that the Committee supported our recommendation that any industrial project in Victoria is recommended to have an EES conducted.

The Andrews Government must improve communications with all Victorian communities around health implications of all proposed industrial projects, rather than ignoring local sentiment and calling in projects.

The Latrobe Valley community are one of the most disadvantaged communities in Victoria. Members of the community expressed concern that the EPA standards relating to air emissions for lead are out of date, noting the Victorian standard is three times lower than the United States of America.

The Nationals and Liberals support open and transparent development that is performed to best practice. Best practice must include an independent EES and environmental impacts should not be completed through self-assessment as was the case with ULAB.

Conducting an independent EES for the planned ULAB project in Hazelwood North must be undertaken by the state government.

1.2.2. The Nationals and Liberals oppose Recommendations 19, 20 and 21

RECOMMENDATION 19 : The Victorian Government develop and implement a public community education and awareness campaign to actively inform the community about the dangers of wood heaters and adverse health impacts caused by exposure to smoke, especially in built-up areas, including targeted education for households with a wood heater. **OPPOSE**

RECOMMENDATION 20 : The Victorian Government consider a targeted rebate scheme to assist people from a low socioeconomic background to transition away from reliance on domestic wood heaters as their only source of heating to more modern and efficient reverse cycle air conditioning. The scheme should be extended to people who live in a rental property and who do not have a choice of heating options. **OPPOSE**

RECOMMENDATION 21 : The Victorian Government consider the development of and implement a supported rebate program to assist with the progressive phase out and removal of wood heaters from dwellings in urban and built-up areas by vendors at the point of sale of a property. **OPPOSE**

The Committee Report does not consider technological advances and high emission standards imposed for new efficient wood combustion heaters;

There is a wide array of factors that contribute to air pollution in Victoria.

There are many documented benefits of wood heating that the Committee failed to recognise. Technology in efficient combustion wood heaters has significantly advanced in recent years.

Any move to label all wood fire heaters as a main source of air pollution in Victoria is misguided and misrepresentative. It fails to acknowledge technological advancement and positive change being driven by the industry to significantly improve efficiency and minimise emissions from wood fired heaters.

Wood heater emissions and efficiency standards are mandatory in most states and territories within Australia with high standards established by Standards Australia. Solid fuel heaters must comply with the latest Australian Standards for domestic solid fuel burning appliances and be installed correctly.

The Australia Home Heating Association (AHHA) submission to the Committee clearly outlines that under the 2019 Australian standards newly designed wood heaters are subject to rigorous and comprehensive regulations, for the operation and efficiency of the units.¹

The Committee report fails to acknowledge all wood heaters sold after 2019 must comply with:

- AS/NZS 4012:2014 – Domestic Solid Fuel Burning Appliances – Method for determination of power output and efficiency.
- AS/NZS 4013:2014 – Domestic Solid Fuel Burning Appliances – Method for determination of flue gas emission²

The Wood Heating Industry has taken an active role in improving air quality in Victoria without the need for government bans and intervention.

The AHHA Inquiry demonstrates how the industry has actively driven the development of high emission standards. This move has reduced emissions from wood fired heaters by approximately 63 per cent over the last 10 years. The voluntary reduction in emissions, driven by industry, has seen emissions reduce from 4gm per kg down to 1.5gm per kg.³

The AHHA clearly articulated to the Committee that all appliances sold in Australia must be tested by a registered laboratory with National Association of Testing Authorities (NATA) for compliance with strict standards. Evidence the industry is committed to consumers, the community and the environment.

The Nationals and Liberals concur with the AHHA in supporting the of phasing out non-compliant wood heaters and are advocating for the state government to financially assist in the replacement of old non-compliant wood heaters lower emitting appliances.

¹ Australian Home Heating Association Inc, *Inquiry into the Health Impacts of Air Pollution*

² Australian Home Heating Association Inc, *Inquiry into the Health Impacts of Air Pollution*

³ Australian Home Heating Association Inc, *Inquiry into the Health Impacts of Air Pollution*

The industry acknowledges old, second hand, non-compliant wood heaters can contribute to excessive emissions and should be replaced with a unit that meets the new emission standards to help improve air quality in Victoria.

The forced phase out of domestic wood fire heaters upon the sale of a property in all Victorian homes is an overreach of government powers and disproportionately impacts regional Victorians.

Phasing out all solid fuel wood heaters in Victoria is a complete overreach of state government powers and removes the consumer's ability to choose what heating method suits their personal situation.

The National and Liberals do not support a blanket phase out of all wood heaters in Victoria - any move to do so is impractical, unethical and an over reach of government powers.

The Nationals and Liberals support the AHHA recommendation to incentivise households to replace old non-compliant wood heaters with assistance from a government subsidy or rebate. A targeted rebate scheme should be introduced in Victoria to phase out old non-compliant wood heaters.

Wood heaters are a popular heating option, especially in regional Victoria where there is a lower population density, cooler winter temperatures and an abundant and an accessible fuel source. Firewood is often sourced free of charge from friends or family on private property or periodically through firewood collection zones in state forests.

Firewood collection season assists to reduce the fuel load in Victoria state forests by enabling the safe removal of fallen trees from the forest floor. Fuel reduction is a necessary and important activity that helps to minimise fire risk. Bushfires are powered by excessive fuel loads on the forest floor and have a far more detrimental impact on air quality. A build up of fuel source on public land enables bushfires to burn hotter and move quickly - resulting in widespread and catastrophic impacts on the health and wellbeing of all Victorians.

It is widely acknowledged regional Victorians experience greater economic disadvantage⁴ than their metropolitan counterparts, the forced phase out of all wood heaters regardless of their efficiency standards will further add to economic disadvantage.

It is estimated only 10 per cent of homes in Victoria have wood heating, with 70 per cent located in regional areas.⁵ Efficient wood heaters provide a low cost, low emission and reliable form of heating homes.⁶ In many remote areas of Victoria – wood heating is the only reliable heating option. Targeting home owners to forcibly remove wood fire heaters is a move whereby the state government is picking low bearing fruit while ignoring other greater factors impacting air quality and emissions in Victoria.

New technology wood combustion heaters are a reliable and cost-effective method of heating homes in regional communities.

⁴ Victorian Auditor General's Office – Outcomes of Investing in Regional Victoria

⁵ Australian Bureau of Statistics, 4602.0.55.001 - Environmental Issues: Energy Use and Conservation, Mar 2014

⁶ Sustainability Victoria – <https://www.sustainability.vic.gov.au/energy-efficiency-and-reducing-emissions/save-energy-in-the-home/reduce-heating-costs-at-home/choose-the-right-heating-system-for-your-home>

Wood heating is a popular and low-cost method of heating homes in regional Victoria and many country Victorians would strongly oppose the complete phase out of all wood heaters. Removing all heaters would have a detrimental impact on the finances of many regional residents who would be forced to pay for more expensive home heating options or not use home heating.

The Committee Report fails consider all factors when considering air quality. It fails to acknowledge that new efficient wood fire combustion heaters are a reliable and efficient method of heating Victoria homes. An Adelaide University report published in 2018 comparing Residential Heating Costs for Electricity, Gas, Firewood and Pellets⁷ ranked wood heaters as the second most efficient home heating option behind heat pumps.

Sustainability Victoria compares the annual emissions of home heating options with slow combustion wood heating producing the lowest annual emissions by far, compared to gas ducted, gas hydronic, ducted reverse cycle, split system electric, electric in slab. Emission comparisons for a medium sized house are in the table below ⁸

<i>Heater type</i>	<i>Energy star rating</i>	<i>Annual emissions (kg/year)</i>
Gas ducted	3 star	4500
	4 star	3955
	6 star	3415
Gas hydronic	European C rating (84%)	3595
	European A rating (92%)	3285
Ducted reverse-cycle air conditioner	2 star	5270
	4 star	4030
Multi-split reverse-cycle air conditioner	2 star	4640
	3.5 star	3720
Electric in-slab	No ratings	17,865
Slow combustion wood heater	Standard	320

⁷ Comparison of Residential Heating Costs for Electricity, Gas, Firewood and Pellets (2018), The University of Adelaide p.19

⁸ Sustainability Victoria - <https://www.sustainability.vic.gov.au/energy-efficiency-and-reducing-emissions/save-energy-in-the-home/reduce-heating-costs-at-home/calculate-heating-costs>

Instead of phasing out all wood fired heaters, a targeted campaign to phase out *non-compliant wood heaters* and replace them with new technology, compliant low emission units should be adopted.

The campaign should address buying the right wood heater, using it correctly to maintain efficient running, burning firewood correctly so the unit is not overloaded and starved of oxygen which causes it to smoulder and produce smoke.

RECOMMENDATION 35

The Nationals and Liberals raise concerns in relation to public awareness campaigns on the risks of air pollution.

Individual citizens do not have the ability to enact large scale reductions to ambient air pollution and so any campaign on the risk of air pollution that results in fearmongering is counterproductive and may result in unnecessary distress and anxiety in the community.



Melina Bath MP

Member for Eastern Victoria Region



Beverley McArthur MP

Member for Western Victoria Region



Matthew Bach MP

Member for Eastern Metropolitan Region