

Submission to the Inquiry into the Hazelwood Mine Fire

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Submission from
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Recommendations

1. Long-term epidemiological research into both acute and chronic exposures to residents in the Latrobe Valley from coal industry derived pollutants.
2. Permanent independent air monitoring for Morwell and other vulnerable populations in the Latrobe Valley including PM_{2.5} (with publicly accessible reporting).
3. Ensure ongoing adequate health services for residents, including assessing the current exposures to coal ash and ensuring effective remediation if required.
4. Adequate ongoing assessment of surrounding soil and water ways, including ground water, if potential for spread of contaminates.
5. Minimise future health impacts from mining, transporting and burning coal by transitioning urgently to cleaner, healthier renewable energy alternatives.

Key Points

1. Globally coal fires, and coal mining and **combustion, cause significant damage to the environment, the climate and our health.**
2. **Coal mine fires are not uncommon** and pollutants from them and other forms of coal combustion are harmful to people's health.
3. Health impacts from air pollution depend on the composition and concentration of pollutants people are exposed to, the duration of exposure and how vulnerable they are due to age or pre-existing health problems.
4. In particular fine particulate pollution from coal fires, coal-fired power plants, bushfires and other pollution sources can **aggravate respiratory and cardiac disease and may increase the risk of premature death.**
5. The **adverse impacts of coal for energy generation fall disproportionately on some communities**, such as those in the Latrobe Valley.
6. Current monitoring and reporting practices for air quality in the Latrobe Valley are generally **inadequate to fully protect public health** from exposures to pollutants and inform communities of their exposures.
7. Lignite (brown coal) is not an efficient fuel, and when all the negative impacts (externalities) from coal usage (including the health and environmental costs) are considered it is **not a cheap fuel.**
8. Australian's domestic and export coal industry contributes significantly to global climate change, and **anthropogenic climate change is not only a threat to the health of Australians but an existential threat to all humans.**

Introduction

Doctors for the Environment Australia (DEA) welcomes the opportunity to submit to the Hazelwood Coal Mine Inquiry. DEA has been a strong advocate for the protection of local Latrobe Valley residents, Morwell's in particular, from the health threats that present and proposed coal industries pose. DEA opposed at the Victorian Civil and Administrative Tribunal the EPA approval of a new coal fuelled power plant (Dual gas Demonstration Project) adjacent to Morwell in 2011 due to both local and global health concerns that this new coal combustion power plant would have contributed to.

http://dea.org.au/images/uploads/submissions/VCAT_DEA_closing_sub.pdf

http://dea.org.au/news/article/landmark_hearing_doctors_vs_coal

<http://reneweconomy.com.au/2012/are-we-to-remain-in-a-dirty-industrial-revolution-28066>

DEA also refers the Inquiry Board to DEA's Air Pollution Policy

http://dea.org.au/images/general/DEA_policy_air_pollution.pdf and DEA's submission

http://dea.org.au/images/uploads/submissions/Impacts_on_health_of_air_quality_in_Australia_Submission.v1_03-13.pdf and presentation

<http://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;query=Id%3A%22committees%2Fcommsen%2Ffeabf6ea-0c69-448c-a385-0a442fadd446%2F0001%22>

to the Senate Committee on *The Health Impacts of Health of Air Quality in Australia*.

An extensive article written by DEA member Adjunct Professor Marion Carey in relation to the Hazelwood Coal Mine 'Coal mine fires remind us of coal's threat to our environment, climate and health' can also be reviewed

<http://dea.org.au/news/article/coal-mine-fires-remind-us-of-coals-threat-to-our-environment-climate-and-he> and DEA spoke at the Morwell community rally on

March 2nd 2014. <http://dea.org.au/news/article/media-release-doctors-concerned-by-vic-coal-mine-fire>

Further detail and significant sections of this submission can be found in these DEA articles, policies and previous submissions.

DEA would welcome the opportunity to present further expert opinion to this Inquiry.

Who is DEA?

Doctors for the Environment Australia (DEA) is an independent, self-funded, non-government organisation of medical doctors in all Australian States and Territories. Our members work across all specialties in community, hospital and private practices. We work to prevent and address the diseases – local, national and global – caused by damage to our natural environment. We are a public health voice in the sphere of environmental health with a primary focus on the health harms from pollution and climate change.

DEA advocates to governments to consider the public health impacts and health costs of our energy choices: particularly at a time when both State and Federal Governments are making key energy decisions and creating policy settings that will determine our energy sources and industries with subsequent health implications for future decades and generations to come. Climate change is a true existential threat to humanity and viable alternative energy sources are presently available.

Terms of Reference Points 4v. and 5.

The adequacy and effectiveness of the response to the Hazelwood Coal Mine Fire by: v. responding to those effects on, and risks to, the affected communities.

5. Any other matter reasonably incidental to the matters specified in paragraphs 1 to 4.

Coal Fires

Coal fires can start in a number of ways including; deliberate lighting, spontaneous combustion; bush fires; and lightning strikes. They are more common than many people would anticipate,

<http://www.abc.net.au/science/articles/2014/02/14/3944897.htm> are widespread globally, and can burn for years, decades or even (rarely) millennia.

<http://www.earthmagazine.org/article/rising-global-interest-coal-fires>

They can present significant environmental, human health and climate risks. Ground subsidence and ecosystem destruction can occur, with gases and fly ash polluting air, water and soil. <http://pubs.er.usgs.gov/publication/70026896> Well-known

examples are the Jharia coal field in India, the largest coalmine fire complex in the world, <http://www.bbc.com/news/world-asia-india-23422068> and the coal fire that caused depopulation of the town of Centralia in Pennsylvania.

<http://news.nationalgeographic.com.au/news/energy/2013/01/pictures/130108-centralia-mine-fire/>

Coal combustion releases carbon dioxide, water vapour and a cocktail of noxious pollutants, including carbon monoxide, methane, sulphur and nitrogen oxides, volatile organic compounds, particulate matter and potentially toxic trace elements such as arsenic and mercury. The exact composition of the coal varies with location.

In association with the Hazelwood Coal Mine Fire it has been well documented that the levels of particulate matter (PM) both fine (PM_{2.5}, 2.5ug in diameter and less) and coarse (PM₁₀, 10ug in diameter and less) were far above national standards, at hazardous levels for weeks in fact, in parts of Morwell and surrounding areas.

Health Implications of Air Pollution

During the peak of the Hazelwood coal mine fire, Morwell residents complained of respiratory and other health symptoms with official advice to leave if able. This was especially sound advice during this period for those more susceptible to air pollution; the young and elderly and people with pre-existing disease eg. heart disease, asthma or emphysema.

We need to acknowledge also however that long term exposure to coal pollutants can be a significant health hazard even at chronically low levels, with the literature documenting well that health effects can occur for some people with exposure well below current air quality guidelines for various air pollutants. This has been confirmed in a discussion paper developed for review of the Ambient Air Quality National Environment Protection Measure (NEPM). However what is not clear is exactly how long healthy people need to be exposed to coal fires before their health is adversely affected – there is very little direct research on this subject. Although we know where coal fires have burned for long periods, increases in human illness, such as asthma and chronic bronchitis, have been reported.

There is also extensive literature on many of the pollutants associated with coal fires, from studies of the health impacts of bushfire smoke

<http://theconversation.com/what-you-can-do-about-the-health-impact-of-bushfire->

[smoke-19333](#), <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3346787/> and urban air pollution - both traffic and other fossil fuel combustion. <https://www.mja.com.au/journal/2002/177/11/air-pollution-and-its-health-impacts-changing-panorama>.

One of the pollutants of greatest concern is inhalable particulate matter, which can aggravate respiratory and cardiac disease and increase the risk of premature death. <http://www.epa.vic.gov.au/your-environment/air/air-pollution/particles-in-air>. Fine particles (PM_{2.5}) are of particular concern as they can penetrate more deeply into the lungs, and even the bloodstream <http://www.epa.gov/pm/health.html>. People with heart or lung diseases, children and older adults are the most likely to be affected by particulate matter pollution exposure.

Australia, unlike the USA and EU, only has an advisory reporting standard for PM_{2.5} of 25 micrograms per cubic metre daily (ug/m³) daily and 8ug/m³ yearly.

<http://ec.europa.eu/environment/air/quality/standards.htm> Daily readings of fine particles around Morwell during the Hazelwood Coal Mine Fire were recorded up to 563ug/m³ <http://www.epa.vic.gov.au/our-work/monitoring-the-environment/air-quality-bulletins/hourly-air-quality-data-table>, levels that might be expected in cities like New Delhi or Beijing. http://www.nytimes.com/2014/01/26/world/asia/beijings-air-would-be-step-up-for-smoggy-delhi.html?_r=0

In recent years, a large body of new scientific evidence has emerged that has strengthened the link between ambient PM exposure and health effects, particularly in relation to PM_{2.5} particles, which are strongly associated with mortality and other endpoints such as hospitalisation for cardio-pulmonary disease. Numerous scientific studies have linked particle pollution exposure to a variety of health problems, including increased respiratory symptoms, decreased lung function; worsening of asthma, irregular heartbeat and premature death in people with heart or lung disease (US EPA). <http://www.epa.gov/pm/health.html>

A review of a number of air pollution studies has estimated that there is an increase in mortality for longer term exposure for a population of 6% for every increase of 10ug/m³ in fine particle levels (annual mean) in ambient air

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2687917/>

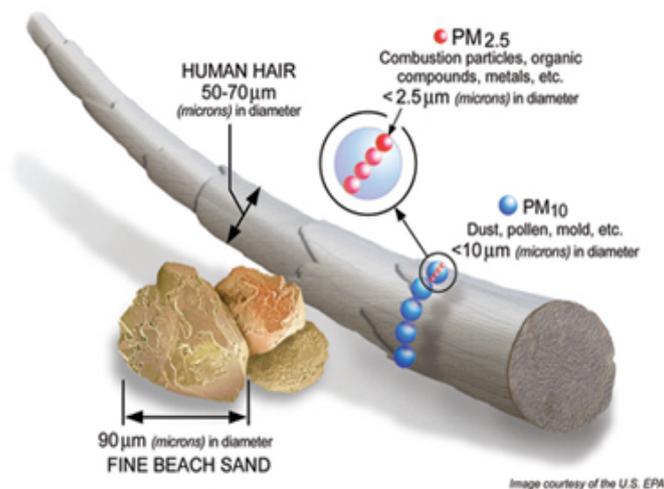


Image : US EPA <http://www.epa.gov/pm/basic.html>

The American Heart Association has gone on record to say evidence is consistent with a causal relationship between PM_{2.5} exposure and cardiovascular morbidity and mortality. "Exposure to PM_{2.5} over a few hours to weeks can trigger cardiovascular disease-related mortality and nonfatal events; longer-term exposure (eg, a few years) increases the risk for cardiovascular mortality to an even greater extent than exposures over a few days and reduces life expectancy within more highly exposed segments of the population by several months to a few years."

<http://circ.ahajournals.org/content/121/21/2331.abstract>. Fine particle exposure can also increase respiratory symptoms, decrease lung function and worsen asthma and chronic lung disease.

In children particulate air pollution has been associated with increased chronic cough, and bronchitis. Pope et al. in the USA found that each 10 ug/m³ elevation in fine particulate air pollution was associated with approximately a 4%, 6% and 8% increased risk of all-cause, cardiopulmonary and lung cancer mortality, respectively.

<http://jama.jamanetwork.com/article.aspx?articleid=194704>

A discussion paper prepared for the National Environment Protection Council reviewed the recent health evidence for exposure to a range of air pollutants, including particulate matter (NEPC 2010).

http://www.scew.gov.au/archive/air/pubs/aaq-nepm/aaq_discppr_review_of_the_aaq_nepm_discussion_paper_aq_standards_final_201007.pdf A review report by the same body in 2011

http://www.ephc.gov.au/sites/default/files/AAQ%20NEPM%20review%20report_0.pdf

df concluded: "PM₁₀ and PM_{2.5} are associated with increases in mortality and morbidity, with much stronger evidence now for cardiovascular outcomes... There is evidence for links with both cardiovascular and respiratory effects, particularly respiratory disease, asthma and COPD, while there are strong associations with ischemic heart disease and congestive heart failure ... Associations have also been found between particles and increases in respiratory symptoms and medication use in children with asthma. These are linked to reduction in lung function and increased lung inflammation."

A World Health Organisation report (WHO 2003)

http://www.euro.who.int/_data/assets/pdf_file/0005/112199/E79097.pdf notes that

- Fine particles are strongly associated with mortality and other endpoints such as hospitalization for cardiac and pulmonary disease.
- Epidemiological studies on large populations have been unable to identify a threshold concentration below which ambient PM has no effect on health.
- Studies suggest that a number of source types are associated with health effects, especially motor vehicle emissions and also coal combustion.

WHO Air quality guidelines Global Update 2005

http://www.euro.who.int/_data/assets/pdf_file/0005/78638/E90038.pdf

states "There is robust scientific evidence indicating that exposure to air pollutants can affect human health in a variety of ways, ranging from subtle biochemical and physiological changes to severe illness and death".

It notes also "PM_{2.5} is an important indicator of risk to health from particulate pollution, and might also be a better indicator than PM₁₀ for anthropogenic suspended particles in many areas."

Standards, Monitoring and Regulation

Current monitoring and reporting practices for air quality are inadequate to fully protect public health. Outside of large cities and major regional centres there is often great difficulty obtaining independent air quality assessment. In spite of proximity to polluting industry, coal fired power stations, coal and other mines, or heavily trafficked roads, there are many parts of Australia where citizens do not have access to air quality data for their environment.

Health advocacy groups such as Doctors for the Environment Australia have been warning for some time about the dangers to communities exposed to low level chronic pollution associated with mining and burning coal
<http://theconversation.com/something-in-the-air-time-for-independent-testing-in-coal-areas-5763>.

The Latrobe valley is home to five brown coal fired power stations and many coal mines. Almost half of all the SO₂ emitted in Victoria is emitted in the Latrobe Valley: 140 million kg per year of SO₂ is emitted in Victoria by energy generators and 100 million kg of this is emitted in the Latrobe Valley. Despite this, until February 2012 we understand there was only one permanent independent EPA air quality monitoring station in the area (Traralgon) which was not located to pick up the impact of industry or power generation (this monitoring station did not monitor for PM_{2.5}, in spite of this pollutant being considered to be a high risk pollutant for health impacts). Air quality monitoring by the coal industry is required by the EPA and shows there are exceedances of the current SO₂ standard, but this monitoring is not publicly transparent as is the direct EPA monitoring.

http://www.epa.vic.gov.au/compliance-enforcement/comments/dualgas-docs/L_Denison_Expert_Report.pdf

To our knowledge, despite the significant exposures to air pollution, there has been no recent federal or state commissioned research on the impacts on the health of the population in the Latrobe Valley.

Hence it could reasonably be argued that the Latrobe Valley has significant exposure to air pollutants at levels known to affect health, with inadequate state standards and monitoring related to outdated federal standards and little research on the health impacts.

The Australian Ambient Air Quality National Environment Protection Measure (AAQ NEPM) sets national benchmarks for air quality monitoring and action by the states. The AAQ NEPM in 1998, set standards for six criteria air pollutants: PM₁₀, ozone, CO, NO₂, SO₂, and lead. The NEPM was varied in 2003 to include advisory reporting standards for PM_{2.5}. A review of the NEPM commenced in 2005.

The standards apply to regional air quality of populations of a sufficient size and not to individual sources or pollution hot-spots. The NEPM monitoring protocol does not apply to monitoring or controlling peak concentrations from major roads or major industrial sources. However recent recommendations from the review have suggested monitoring on potential population risk rather than on population size and the introduction of compliance standards for PM_{2.5}.

A change of the advisory reporting standard for PM_{2.5} to a compliance standard is strongly supported by DEA. A compliance standard for PM_{2.5} in the AAQ NEPM is needed to increase monitoring activity and drive air quality management action in the jurisdictions. See DEA submission

http://dea.org.au/images/uploads/submissions/Submission_AAQ_DEA.pdf

Recommendations were made in 2011 that have yet to come into force. The National Plan for Clean Air has also not yet eventuated. The AAQ NEPM review process has been unacceptably long and has not produced timely outcomes. An agreement seems at least another 2 years away

<http://www.cedaily.com.au/files/2014/0307alanhuntoration.pdf> The regulatory process is lagging way behind the growth in scientific knowledge on this issue. The United States has recently tightened its annual primary National Ambient Air Quality Standard (NAAQS) for PM_{2.5}. The US EPA estimates that the updated standards will lead to annual benefits of \$4–9.1 billion in avoided health problems and premature deaths.

<http://ehp.niehs.nih.gov/2013/03/121-a74/>

Externalities – True Cost of Coal

Coal is considered a cheap fuel, which governments are rushing to exploit for local and domestic markets. However there are hidden costs or “externalities” from damage to the environment, climate and human health associated with coal mining, transport and processing.

Failure to account for the costs of externalities has led the market price of coal derived energy to be calculated significantly below the true cost. The total costs of coal mining, transport and burning includes the healthcare costs of people affected by coal pollution, economic losses and environment damage to water sources, land and food production. Accounting for the costs of climate change and extreme weather events resulting from coal burning adds yet more to the true cost of coal.

http://dea.org.au/images/general/How_coal_burns_Aust._-

[True cost of burning coal 04-13.pdf](http://dea.org.au/images/general/How_coal_burns_Aust._-True_cost_of_burning_coal_04-13.pdf) A 2009 published peer-reviewed study from the Harvard Medical School estimated that the full life cycle effects of coal and the waste streams generated are costing the US public a 1/3 to a 1/2 of a trillion dollars annually (over US \$1,000 per year for every American man, woman and child). Taking the conservative estimates from this Harvard study effectively doubles to triples the price of electricity from coal per kWh.

Brown coal mined and burned in Victoria is a highly inefficient form of energy generation. The recent coal fire involving the disused section of the Hazelwood coal mine also demonstrates how dangerous and costly this energy source can be to local communities, not only during the mining and processing stages for energy, but for many, many years after.

<http://www.psr.org/assets/pdfs/psr-coal-fullreport.pdf>

Climate Change Threats Our Health

Australia’s coal industry is contributes over 1/3 of our domestic green house gas emissions and is therefore a significant contributor to climate change and its global health impacts. Although some argue that these domestic greenhouse gas emissions represent 1.5% of the global total, our coal exports alone contribute at least another 3.3% of global emissions. <https://theconversation.com/why-australia-must-stop-exporting-coal-9698> - significant for a country of relatively small population size.

Anthropogenic climate change threatens the health of all Australians. According to the WHO, climate change is one of the greatest threats to public health. It will affect some of the most fundamental pre-requisites for good health: clean air and water, sufficient food, adequate shelter and freedom from disease. Changes to our weather patterns will subject Australians to more severe heat waves, droughts, fires, floods

and storms, which we are already becoming familiar with. Such events further strain our health and health services. The health and climate costs of coal are unseen, and when costs to health systems are included, coal is an expensive fuel.

http://dea.org.au/images/general/Coal_Policy_Document.pdf

http://dea.org.au/images/general/Briefing_paper_on_coal_2011.pdf

<https://www.mja.com.au/journal/2011/195/6/mining-and-burning-coal-effects-health-and-environment>

Assessing Risks From Other Coal Mining Areas in Victoria

Many, if not all, of Victoria's coal mines are situated in high fire prone areas. Anglesea and its surrounds are considered high fire prone areas and were significantly affected by the Ash Wednesday fires in 1983. Both the Anglesea Coal Mine and Anglesea Power Station are within close proximity of the town boundary and primary school. The Anglesea Power Station emits over 3 times the amount of SO₂ compared to the much larger Hazelwood Power Plant (Hazelwood has 10 times the power output). The Anglesea coal has an extremely high sulphur content leading to large amounts of the SO₂ being emitted from its combustion.

Electricity generated from Anglesea Power Station is not required to ensure the reliability of Victoria's electricity supply. The announcement of the closure of the Point Henry Aluminium Smelter provides an important opportunity to close the Anglesea Power Station and adjacent coal mine that supplies it coal to protect the health of the local community from dangerous air pollutants. Furthermore with adequate rehabilitation, steps to prevent a coal fire occurring at Anglesea similar to the Hazelwood coal fire could be instigated.

http://dea.org.au/images/uploads/submissions/Anglesea_Electricity_License_Submission_12-13.pdf

Conclusion

The Hazelwood Coal Mine Fires of 2014 have heightened public awareness and concern in relation to the adverse health implications from our coal industries. This fire was unique in its extent and durations however authorities should acknowledge and address the inadequate monitoring and health research concerning exposure of Latrobe Valley residents to coal pollutants over the past decades. Furthermore it is not in the interests of Victoria to continue with coal developments in view of their serious health effects locally and globally and the economic need to enter the world wide transition to renewable energies. From a public health or public financing perspective coal is not a cheap energy source, with communities and tax payers paying dearly once the health and environmental impacts are adequately considered.

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