

A grayscale X-ray image of a human chest, showing the ribcage and lungs. The image is slightly blurred and has a soft, ethereal quality, with light filtering through from the right side, creating a gradient effect.

CLIMATE COUNCIL BRIEFING PAPER: HEALTH EFFECTS OF COAL

The Climate Council is an independent, crowd-funded organisation providing quality information on climate change to the Australian public.

CLIMATECOUNCIL.ORG.AU

Coal's impacts on human health

Every aspect of coal's lifecycle - mining, transportation, combustion and the disposal of waste - produces pollutants that affect human health (Epstein et al 2011). Health impacts from coal emissions on miners, workers and local communities can be severe (Kizil and Donoghue 2002; Kjellström et al 2002; Lockwood et al 2009; Castleden et al 2011; Armstrong et al 2013). For example, the risk of premature death for people living within 50 kilometres of coal-burning power plants can be as much as three to four times that of people living at a greater distance (Epstein et al 2010). Health risks from coal include lung cancer, bronchitis, heart disease and other health conditions (Temple and Sykes 1992; García-Pérez et al 2009; Hendryx and Zullig 2009). A review of air pollution and cardiopulmonary disease in Australia by Howie et al (2005) concluded that air pollutants were associated with an increase in cardiovascular and respiratory mortality and hospital admissions, consistent with the international evidence (Colagiuri et al 2012).

Health risks from coal include lung cancer, bronchitis and heart disease.

In the US, 50,000 deaths each year have been attributed to air pollution from coal-fired power generation.

In the United States, coal contributes to four of the five leading causes of mortality: heart disease, cancer, stroke and chronic respiratory diseases (Lockwood et al 2009). In the US, 50,000 deaths each year have been attributed to air pollution from coal-fired power generation (Lockwood et al 2009). Globally, air pollution from coal combustion accounts for over 200,000 deaths per year (Burt et al 2013).

The hidden costs of coal

A global study of health indicators spanning 40 years and 41 countries found that there are large, hidden health costs associated with coal consumption (Gohlke et al 2011). In Australia, it is estimated that the adverse impacts from pollutants produced from coal-fired electricity generation costs A\$2.6 billion annually (ATSE 2009). In Europe, the health cost of air pollution from coal-fired power stations is 43 billion Euros (A\$61 billion) a year. There are

18,200 premature deaths, about 8,500 new cases of chronic bronchitis, and over four million lost working days each year due mainly to respiratory and cardiac disease in Europe (HEAL 2013). US economists have estimated the health impacts of coal-fired power stations in the US to be between one and six times its value added (Parkinson 2014).

In Australia, it is estimated that the adverse impacts from pollutants produced from coal-fired electricity generation costs A\$2.6 billion annually.

Coal fires

Coal mine fires can cause atmospheric pollution, acid rain, hazardous land subsidence, the degradation of floral and faunal habitats, human fatalities, and increased coronary and respiratory diseases. Some of the oldest and largest coal fires in the world occur in China, India and the US (Stracher and Taylor 2004). Coal mine fires are also a serious issue in Australia. For example, communities around the Hazelwood mine

experienced a massive and prolonged coal fire earlier this year. There was significant disquiet in the community as a consequence with many people reporting respiratory concerns and the government eventually recommending that residents of Morwell leave their homes. The Hazelwood coal mine inquiry recommendations are due to be released in early September 2014 (Victorian Government 2014).

Accounting for human health risks of coal

Despite Australia's dependence on coal for electricity generation – it provides 75% of our electricity supply (AEMO 2013; ESAA 2013) – there has been scant research into the health impacts of coal mining and power generation in this country compared with Europe and the US (Castleden et al 2011; DEA 2011; Colagiuri et al 2012; AMSA 2014; Armstrong and Tait 2014). Furthermore, the disease burden is likely to become greater given substantial coal industry expansion. This presents additional risks to human health in Australia and overseas (Carey 2013).

A comprehensive review of the literature has found a serious lack of consistent monitoring of air, water and soil quality at and around Australian coal mines. Further there is a stark deficiency in the research into the effects of coal on Australian communities. Given the extensive work done overseas to quantify the risks and the impacts of coal burning and mining, Australia is well behind similar countries world-wide in understanding the impacts on our population.

A comprehensive review of the literature has found a serious lack of consistent monitoring and research into the impact of coal on Australian's health.

Recommendations

- 1. Consistent air, water and soil quality monitoring at and around every coal mine and power station in Australia is urgently needed. It is critical that the monitoring be overseen by an independent authority to ensure its veracity.**
- 2. Adequate funding must be allocated for research to evaluate the health, social and environmental impacts of coal in coal mining communities, and more broadly, across Australia.**
- 3. Coal's human health risks must be properly considered and accounted for in all energy and resources policy and investment decisions.**

Acknowledgements

The Climate Council thanks Professor Fiona Stanley and the Climate and Health Alliance for reviewing this briefing paper.

References

- Armstrong F, Haworth E, Tait P and Barker H (2013) Health and Energy Policy. Accessed at http://caha.org.au/wp-content/uploads/2012/01/Health-and-Energy-Policy-Roundtable-Briefing-Paper_120213_final.pdf.
- Armstrong F and Tait P (2014) Health and Energy Choices: Background Briefing Paper. Climate and Health Alliance, Public Health Association of Australia, Australian Nursing and Midwifery Federation, National Toxics Network, Australian Medical Students' Association, and Woman's Health East. *In prep*. Accessed at <http://caha.org.au/projects/healthy-energy/>.
- Australian Academy of Technological Sciences and Engineering (ATSE) (2009) The Hidden Costs of Electricity: Externalities of Power Generation in Australia. Accessed at <http://www.atse.org.au/Documents/Publications/Reports/Energy/ATSE%20Hidden%20Costs%20Electricity%202009.pdf>.
- Australian Energy Market Operator (AEMO) (2013) NEM Historical Market Information Report. Accessed at <http://www.aemo.com.au/Electricity/Planning/Related-Information/Historical-Market-Information-Report>.
- Australian Medical Students' Association (AMSA) (2014) Australian Medical Students' Association Submission to the Victorian State Government Hazelwood Mine Fire Inquiry. Accessed at <https://www.amsa.org.au/wp-content/uploads/2014/05/AMSA-submission-Hazelwood-Mine-Fire-Inquiry.pdf>.
- Burt E, Orris P and Buchanan S (2013) Scientific Evidence of Health Effects from Coal Use in Energy Generation. University of Illinois at Chicago School of Public Health Chicago, Illinois, USA. Accessed at http://noharm.org/lib/downloads/climate/Coal_Literature_Review_2.pdf.
- Carey M (2013) We need to do our homework on the health risks of coal seam gas. *The Conversation*, 2 April 2013. Accessed at <http://theconversation.com/we-need-to-do-our-homework-on-the-health-risks-of-coal-seam-gas-13173>.
- Castleden WM, Shearman D, Crisp G and Finch P (2011) The mining and burning of coal: effects on health and the environment. *The Medical Journal of Australia*, 195(6), 333–335.
- Colagiuri R, Cochrane J and Girgis S (2012) Health and Social Harms of Coal Mining in Local Communities: Spotlight on the Hunter Region. Beyond Zero Emissions, Melbourne, October 2012. Accessed at http://sydney.edu.au/medicine/research/units/boden/PDF_Mining_Report_FINAL_October_2012.pdf.
- Doctors for the Environment Australia (DEA) (2011) Briefing paper on the health impacts of coal mining and pollution. Accessed at http://dea.org.au/topics/article/briefing_paper_on_the_health_aspects_of_coal_and_renewables.
- Energy Supply Association of Australia (ESAA) (2013) Australian Electricity Markets. Accessed at: http://www.esaa.com.au/policy/australian_electricity_markets_1_1_1.
- Epstein PR (2010) Testimony for the Kentucky General Assembly, House of Representatives Committee on Health and Welfare. London, Kentucky: Kentuckians for the Commonwealth. Accessed at http://www.kftc.org/sites/default/files/docs/resources/dr_epstein_testimony.pdf.
- Epstein PR, Buonocore JJ, Eckerle K, Hendryx M, Stout III BM, Heinberg R, Clapp RW, May B, Reinhart NL, Ahern MM, Doshi SK and Glustrom L (2011) Full cost accounting for the life cycle of coal in "Ecological Economics Reviews." Costanza R, Limburg K and Kubiszewski I, Eds. *Ann. N.Y. Acad. Sci.* 1219: 73–98.
- García-Pérez J, Pollán M, Boldo E, Pérez-Gómez B, Aragonés N, Lope V, Ramis R, Vidal E and López-Abente G (2009) Mortality due to lung, laryngeal and bladder cancer in towns lying in the vicinity of combustion installations. *Science of the Total Environment* 407 (8): 2593-2602.
- Gohlke JM, Thomas R, Woodward A, Campbell-Lendrum D, Prüss-Üstün A, Hales S and Portier CJ (2011) Estimating the global public health implications of electricity and coal consumption. *Environmental health perspectives*, 119(6), 821.

Health and Environment Alliance (HEAL) (2013) The Unpaid Health Bill: How Coal Power Plants Make Us Sick. Accessed at http://www.env-health.org/IMG/pdf/heal_report_the_unpaid_health_bill_-_how_coal_power_plants_make_us_sick_finalpdf.pdf.

Hendryx M and Zullig KJ (2009) Higher coronary heart disease and heart attack morbidity in Appalachian coal mining regions. *Preventive Medicine*, 49(5): 355-359.

Howie J, Tong S, Verrall K, Gerber R and Wolff R (2005) Air pollution and cardiopulmonary diseases in Australia: A review of epidemiological evidence. *Environmental Health*, 5(1), 23.

Kizil GV and Donoghue AM (2002) Coal dust in the longwall mines of New South Wales: a respiratory risk assessment. *Occup Med (Lond)*, 52: 137-149.

Kjellström TE, Neller A and Simpson RW (2002) Air pollution and its health impacts: the changing panorama. *Medical Journal of Australia*, 177: 604-608.

Lockwood AH, Welker-Hood K, Rauch M, Gottlieb B (2009) Coal's Assault on Human Health: A Report from Physicians for Social Responsibility. Accessed at <http://www.psr.org/assets/pdfs/psr-coal-fullreport.pdf>.

Parkinson G (2014) Wind gets clean bill of health, but no clear path to development. Accessed at: <http://reneweconomy.com.au/2014/wind-gets-clean-bill-health-clear-path-development-47498>.

Stracher GB and Taylor TP (2004) Coal fires burning out of control around the world: thermodynamic recipe for environmental catastrophe. *International Journal of Coal Geology* 59:7-17.

Temple JMF and Sykes AM (1992) Asthma and open cast mining. *British Medical Journal*, 305 (1): 396-397.

Victorian Government (2014) Hazelwood Mine Fire Inquiry. Accessed at <http://hazelwoodinquiry.vic.gov.au/>.