

DEA POSITION PAPER ON THE HEALTH IMPACTS OF COAL

(1) Coal is a Health Hazard

Pollution from coal can affect all major body organ systems and contributes to the leading causes of morbidity and mortality in the USA; heart disease, cancer, stroke, and chronic lower respiratory tract disease and asthma. It interferes with lung development, and increases the risk of heart attacks and some neurological diseases.

The evidence from the USA in relation to the combustion of coal has been reviewed by the Clean Air Task Force http://www.maine.greenpower.org/tools/CATF-Death_Disease_Dirty_Power-10-00.pdf and more recently by Physicians for Social Responsibility <http://www.psr.org/resources/coins-assault-on-human-health.html>. In both publications it was noted that existing coal fired power stations can be made less polluting by reducing sulphur dioxide and nitrous oxide pollution, but even with these measures there still is a polluting health effect.

A study published in the USA in 2009 estimated that air pollution arising mostly from coal-fired power stations accounted for 5% of male cancer deaths and 3% of female cancer deaths between 1970-1994.
<http://www.ncbi.nlm.nih.gov/pubmed/19667146>

Twelve peer reviewed studies have been identified from different regions of the world that examine the incidence of disease and/or mortality in populations living near to open cast coal mines. Ten of the studies showed significant health effects.
http://coalhealthstudy.files.wordpress.com/2009/09/douglasdale_v42.pdf

In Australia there has been limited research into the impacts of air pollution from coal, compared to Europe and the USA. However, current evidence suggests that the health impacts of air pollution are similar to those reported from other developed countries. We do know from the Australian National Pollutant Inventory that there is considerable pollution from coal-related sources. For example in New South Wales
<http://www.smh.com.au/environment/pollution-index-reveals-the-hidden-costs-of-electricity-20100402-rjy0.html>.

A 1993 study reported an increase in symptoms of childhood wheeze and asthma-like breathing difficulties from a community near a coal-fired power station (Halliday JA et al. Increased wheeze but not bronchial hyper-reactivity near power stations. J Epidemiol. Community Health 1993; 47:282-286).

A study on Health Costs of Air Pollution in the Greater Sydney Metropolitan Region <http://www.environment.nsw.gov.au/resources/air/airpollution05623.pdf> apporitions the part coal plays in total pollution.

The Australian data has been reviewed by DEA in a publication in the Medical Journal of Australia. Castleden W, Finch P, Shearman D, Crisp G. The mining and burning of coal: its effects on health and the environment, MJA September 18 2011.
http://www.mja.com.au/public/issues/195_06_190911/cas10169_fm.htm

(2) Particulate and other pollution from coal

Read "Airborne particles and health"

<http://eprints.qut.edu.au/38685/1/c38685.pdf>

Note: DEA Policy on ambient air quality (in preparation)

There are a number of air pollutants arising from power generation which have been identified as injurious to humans. Some of these such as sulphur dioxide, a strong respiratory irritant, have been reduced over time. Of great concern among harmful pollutants are the fine PM_{2.5} particles (particles with a diameter less than 2.5µm) and coal combustion contributes to these. They are inhaled deep into the lungs to cause inflammation and damage.

The fact that neurological diseases result from particulate pollution suggests that the particles are inhaled and circulate to all parts of the body where they may cause inflammation.

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

In the USA, exposure to these particles has been shown to reduce life expectancy, with 50,000 deaths each year being attributed to pollution from power plants. <http://www.psr.org/assets/pdfs/psr-coal-fullreport.pdf>

(3) Other toxic substances in coal pollution

Many potentially toxic elements are released with coal combustion - arsenic, mercury, fluorine, cadmium, lead, selenium and zinc. Of these mercury is perhaps of greatest concern. It enters the environment and is transformed into toxic forms which can accumulate up the food chain, particularly in fish, and affect the human nervous system. Exposure during pregnancy is of most concern, because it may harm the development of the unborn child's brain. Over one third of all human-released mercury comes from coal-fired power stations.

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

However, Australian thermal coal has lower levels of mercury than other sources of thermal coal.

<http://www.acarp.com.au/Downloads/ACARPTTraceElementsinCoalNewsletterOct06.pdf>

More work needs to be done to assess the role of mercury and other toxic elements in the Australian setting.

(4) Health impacts on community life

Environmental injustice and air pollution in coal affected communities, Hunter Valley, Australia.

<http://www.sciencedirect.com/science/article/pii/S1353829209001105>

The authors described environmental injustice from air pollution in the Upper Hunter, Australia, and analysed the inaction of state authorities in addressing residents' health concerns. In places such as the Hunter, where a significant part of the economy is fueled by air polluting industry, assessing the health risks of air pollution can be considered a low priority for government, even when local residents demand it.

(5) Other environmental impacts of coal which affect health

Each step of the coal lifecycle—mining, transportation, washing, combustion, and disposing of post-combustion wastes— can have additional impacts on human health.

- Water is diverted from drinking, agricultural and ecological uses. This has become detrimental in areas which are mixed mining and agricultural. For example, in the Latrobe Basin over 50% of total surface water is extracted annually by brown coal electricity generators
- The water table can be disrupted, reducing water available for environmental and agricultural needs
<http://www.abc.net.au/news/2012-01-31/experts-suggest-link-between-coal-mining-and/3803510>
- Water is polluted from mining, coal washing and combustion
- Land is degraded from mining, pollution from combustion and the disposal of solid wastes. For example the coal ash heaps around Australia are sleeping hazards
http://dea.org.au/news/article/coal_ash_and_mercury_why_coal_is_a_health_hazard
- Open cast mining is consuming fertile agricultural land. With a projected world crisis in food production, the continued approval of open cast mining on productive agricultural land is madness
- Coal mining and coal-fired electricity foster centralized energy production and use, thus supporting a system that is vulnerable to disruption from natural causes, electrical instabilities and sabotage

(6) Coal combustion is a major source of greenhouse gases; it causes climate change and threatens the foundations of good health

According to the World Health Organization (WHO), climate change is one of the greatest threats to public health and it will affect, in profoundly adverse ways, some of the most fundamental pre-requisites for good health: clean air

and water, sufficient food, adequate shelter and freedom from disease. Combustion of coal pays a large part in the total burden of emissions.

The rise in green house emissions is a key factor in climate change which, according to a WHO research project, carried out during 2000-2002, climate change due to green house emissions was responsible for an additional 150,000 deaths per annum, mainly in developing or poor countries. These deaths were due to impaired food yields and consequent malnutrition; diarrhoeal diseases associated with freshwater shortages (especially in poorer and unhygienic settings); increased ranges and rates of some infectious diseases; and heightened exposures to storms and floods. Today, taking into account increased population sized exposure and increasing climate change it has been estimated that this figure may be 300,000 to 400,000.

<http://www.canberratimes.com.au/news/opinion/editorial/general/folly-to-ignore-climatechange-dangers-on-health/2169741.aspx?storypage=0>

The elderly, the very young, the poor and the chronically ill are the most vulnerable to the impacts of climate change. Recent events such as the unprecedented heatwave and bushfires in Victoria suggest health impacts are beginning to be seen in Australia. In the January 2009 heatwave in Victoria, which had temperatures 12–15°C above normal, there was a reported 62% increase in mortality above expected, a 25% increase in metropolitan emergency cases for Ambulance Victoria, and a 12% increase in hospital presentations with an 8 fold increase in direct heat-related presentations.

<http://www.health.vic.gov.au/chiefhealthofficer/publications/heatwave.htm>

The Australian events and their significance are discussed in the national report <http://www.pwc.com.au/industry/government/assets/extreme-heat-events-nov11.pdf>. The number of deaths far exceeds those from cyclone, bush fire and flood and is projected to treble by mid century.

Farming communities, particularly in the Murray Darling Basin, are suffering from stress, social disruption and depression. In the future if no action is taken, we can expect more extreme weather events, threats to food and water security, sea level rises, changes in vector-borne, food and water-borne diseases, exacerbation of air pollution, increases in aeroallergens, mental health and refugee health impacts.

THE COSTS (EXTERNALITIES OF COAL)

Taking all externalities into account, including the health burden of coal in Australia estimated by the Australian Academy of Technological Sciences and Engineering to be \$2.6 billion per annum, it is likely that coal is the most expensive fuel. Yet under our present accounting system it is the cheapest, and an unfair competitor for renewable energy.

<http://www.atse.org.au/resource-centre/func-startdown/63/>

Research from the influential Harvard Medical School has determined that the externalities of coal combustion double the cost of electricity in the US bringing it into parity with some renewable energy sources.

These externalities are mainly the human morbidity and mortality from particulate pollution. It seems likely that Australian externalities will have a similar cost and in any socially responsible society there must be a limit to what is a huge public health impost.

<http://onlinelibrary.wiley.com/doi/10.1111/j.1749-6632.2010.05890.x/full>

The externality costs of coal are calculated to add 18c/kWh to the price of electricity in the USA and this cost may be as high as 27c/kWh.

The estimated costs in **US\$ billions** are as follows

Land disturbance; release of carbon and methane	3
Public health burden in mining communities	75
Fatalities in the public due to transport by rail	2
Air pollution from combustion	188
Mercury impacts	6
Subsidies	3
Abandoned mines	9
Climate contribution from combustion	62

Epstein lists these figures as "best". He also has a "high" calculation in which the climate contribution rises from \$62 to \$206.

The international costs of coal were estimated by Greenpeace to be E360 billion in 2007.

<http://www.greenpeace.org/international/Global/international/planet-2/report/2008/11/true-cost-coal.pdf>

Externalities in developing countries

In developing countries coal is the 'cheapest fuel' for electricity production and is presently necessary for the move away from poverty. Despite its health impacts its interim use cannot be denied, for these countries, unlike the developed countries, do not have the finances to move to renewable energy. It follows that the initial move to reduce coal consumption must come from the wealthy coal users, particularly the USA and Australia.

HEALTH CO-BENEFITS

Governments are rightly concerned about the delivery of health services through hospitals and clinics. Equally important is the prevention of ill health (preventative medicine) through such measures as vaccination, cessation of smoking, healthy life style and removal of carcinogens and pollutants from our environment.

Health practitioners use the term co-benefit when we can have a health win, commensurate with a government decision on another need. For example

development of good public transport has been shown to improve health because people get out of their cars and walk to the bus. There is less pollution of cities and greenhouse emissions. There are cost savings to health which can be offset against the cost of public transport infrastructure.

The greatest co-benefit for global and national health would be a reduction in the mining of coal and in its use for power generation.

14.2.2012

ARTICLES ON COAL BY DEA MEMBERS

Health, coal and climate change, David Shearman, Climate Spectator, June 16 2011

<http://www.climatespectator.com.au/commentary/health-coal-and-climate-change>

Giving climate change the right health treatment, David Shearman, George Crisp & David King, Climate Spectator, May 20, 2011

<http://www.climatespectator.com.au/commentary/giving-climate-change-right-health-treatment>

Time to clear the air, David Shearman, Climate Spectator, April 19, 2011

<http://www.climatespectator.com.au/commentary/time-clear-air>

Too many questions about open cut coal, Eugenie Kayak, Geelong Advertiser, May 12 2011

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

Big Coal: A burning economic and health issue, David Shearman, March 17 2011

<http://www.thepunch.com.au/articles/big-coal-a-burning-issue/>

Coal Ash and Mercury: why coal is a health hazard, David Shearman, The Drum (ABC), Dec 22 2010

<http://www.abc.net.au/unleashed/42476.html>

The mining and burning of coal: its effects on health and the environment, Castleden W, Finch P, Shearman D, Crisp G, Medical Journal of Australia, September 18 2011

http://www.mja.com.au/public/issues/195_06_190911/cas10169_fm.htm

Coal industry healthy but community is not, David Shearman, Newcastle Herald Op-Ed, 29 September 2011

The health dangers of coal-fired power, Dimity Williams, Medical Observer, 30 July 2010