

Submission on the Climate change issues paper – consultation (WA)

November 2019



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Healthy planet, healthy people.

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The climate issues paper notes that we are already seeing climate impacts related to increasing temperature and drying “with our State’s South West region impacted by climate change more than almost any other place on the planet”.

A variety of other observed changes have also been documented, including wide-ranging impacts across marine and terrestrial ecosystems resulting from the 2011 heatwave.

Western Australia is already prone to heat extremes and droughts and is therefore more vulnerable to the impacts of climate change than many other regions.

Further rise in ambient temperature, changes in precipitation, increase in extreme weather events and more climate variability are projected and with them an escalation in environmental, health and economic damages.

The issues paper identifies eleven relevant policy areas for comment regarding potential effects and actions.

The underlying pathways of atmospheric greenhouse gas release - from fossil fuel combustion, land use change and other activities - are also responsible for air pollution, ecological degradation and resource depletion – and all are inseparably linked with human health.

To be able to assess the benefits and costs of mitigation and the most appropriate and cost-effective adaptation measures, we will need to include and quantify health outcomes arising from climate change as well as associated benefits derived from mitigation and adaptation.

Recommendations

- Climate change influences a range of important determinants of health; climate policies should therefore consider health implications and their mitigation.
- Greenhouse gas emissions and air pollution have common origins, therefore health and environmental effects related to air pollution and the resulting costs and benefits that can be obtained from reduction, should be assessed and included in decision making and policy related to reducing greenhouse gas emissions. This would include supporting stricter air pollution standards within the current National Environmental Pollution Measures revision, improved fuel and vehicle standards and emissions controls on energy generation and industry.
- Activities to achieve decarbonisation, including renewable energy generation, electrification of transport and increased public and active transport should be incentivised in accordance with achieving health benefits and addressing escalating Non-Communicable Diseases.
- Cease approvals of new or expanded fossil fuel projects which undermine the ability to achieve agreed national greenhouse gas reduction targets.
- Establish protocols that all gas projects in WA move rapidly towards net zero emissions, and no later than 2050.
- The links between climate change, population health and urban design, infrastructure and transport systems should be assessed and accounted for in government planning and policy.
- Identify opportunities to increase regional parks, urban green spaces and protect and restore tree canopy for mitigation, adaptation and health co-benefits.
- Minimum energy efficiency standards for building, appliances and other equipment, should be implemented commensurate with achieving net zero emissions and socio-economic benefits.
- Human and environmental health should be included in policy on food production and agriculture: Dietary guidelines and health promotion should reflect the transition towards a sustainable diet.
- Due to their interlinkage and our dependence of ecosystem services, there is a strong case for combining climate change policy with policy to conserve and promote biodiversity.
- That the government provide a transition plan with declared timelines inclusive of a supported transition for communities and industries exposed to fossil fuels.

Health and climate change

Climate change has been identified as the greatest threat to human health this century².

This is not just a future risk. Human health is already being affected, including in Australian communities, as a result of direct effects from increasing heat and greater exposure to extreme weather events.

Moreover, there are increasing concerns for indirect effects mediated through changes in biological and physical systems. For example, by altering infectious disease transmission, increasing food insecurity and worsening air pollution.

Mental health is adversely affected by many of these pathways – and these are also being experienced in Australia. Higher ambient temperatures and more intense heatwaves increase mental health emergency presentations and populations exposed to extreme weather events, such as bush fires, floods and droughts have high rates of anxiety, depression and Post Traumatic Stress Disorder³.

Children are more vulnerable than adults to mental health effects from extreme weather events. Around 50% of children from communities exposed to the 2003 Canberra bushfire were found to have significant mental health symptoms at 6 months⁴.

As a group, children are disproportionately affected by climate change owing to physiological, developmental and behavioural factors as well as their dependence on adults. This includes greater sensitivity to heat, extreme weather, nutritional deficiencies, water borne diseases and infectious diseases⁵.

Looking after and ensuring the health and wellbeing of children both now and into the future is a fundamental tenet of society and government.

Under current policies, our emissions trajectory puts us on target for 3.2°C of global warming⁶ (average surface temperature). This will require greater ambition and action in reducing greenhouse gas emissions if we are to meet our government ratified commitments to the Paris Agreement.

From an understanding of 'carbon budgets' (the amount of carbon that can be released into the atmosphere in relation to temperature rise), rapid decarbonisation is required in order to avoid exceeding agreed "safe" targets. The required trajectory of reducing emissions is now 7.6 per cent per year average reduction for the 1.5°C goal, 2.7% per year from 2020 for the 2°C target⁷.

The urgency of action now required to limit increasingly unmanageable health impacts has forced many of our medical colleges and the Australian Medical Association (AMA) to declare climate change a health emergency.

Meaningful and coordinated economy wide action will require overarching policy and planning. It is also the responsibility of governments to act through both mitigation and adaptation to protect and minimise potential harm in communities.

Whilst the costs of acting have been frequently cited as a reason to delay or moderate mitigation, the cost-benefits that can arise from climate action are rarely discussed or included.

This is a regrettable lost opportunity, as it is abundantly clear that our health is being increasingly compromised by climate change and that many of the actions that we can take to mitigate climate change can improve our health and economy as well⁸.

Fossil fuel combustion: externalities and opportunities for health

Fossil fuel combustion is the largest source of both anthropogenic greenhouse gas emissions and air pollution.

Power generation accounts for the largest sectoral contribution to greenhouse emissions in Australia, primarily as a result of liberating sequestered carbon through fossil fuel combustion and from associated activities relating to; extraction, processing, transport, leakage (fugitive emissions) and waste. These processes also result in the direct and secondary air pollutants such as oxides of nitrogen and sulphur, particulate matter and ozone.

Road transport is also a significant source of both greenhouse gas emissions (approximately 18%) and urban air pollution where most population exposure to air pollution occurs⁹. Western Australia has the highest transport emissions on a per capita basis with total emissions equal to 6 times the emissions from the Bluewaters Power station in Collie.

This population exposure is set to worsen due increasing urban population and a trend to diesel vehicles (which are more polluting in terms of oxides of nitrogen and fine particulate matter) as well as larger private vehicles. Increasing urban temperatures related to both climate change and urban heat island effects exacerbate urban pollution. Added to that, hotter drier conditions and other land use changes are increasing particulate air pollution from smoke from bush fires and prescribed burning and dust from soil erosion.

Air pollution is directly harmful to human health. Current estimates are that worldwide, over 3 million people die prematurely each year as a result of exposure to ambient air pollution (7.6% of all deaths¹⁰) primarily from energy generation and vehicle tail pipe emissions.

This is not a problem limited to large developing cities, adverse health effects occur at levels found in Australian environments, especially in larger cities. These health impacts include acute effects from short term exposure – such as exacerbations of asthma and heart attacks, and from long-term low-level exposure – resulting in higher rates of heart disease, stroke, respiratory disease and lung cancer¹¹.

More recent research suggests that air pollution health impacts and costs have previously been significantly underestimated due to a failure to appreciate both the range of health impacts and the very low exposure threshold at which these health effects occur.

As new studies are published and more data accumulates, the link between short term exposure to particulate air pollution and health impacts (including respiratory, cardiovascular, Parkinson's disease and type 2 diabetes) has again been confirmed but also an association with serious infections and diseases; urinary tract, cellulitis and septicaemia, renal failure and electrolyte disorders¹². As the authors of this study point out, this study suggests that 'current figures for PM_{2.5} associated morbidity, which focus on established disease associations, might be considerable underestimates.'

Ambient air pollution is estimated to contribute to over 3,000 premature deaths annually in Australia, including 1,570 related to fine particulate matter in our 4 largest cities. The national economic cost has been estimated to be approximately \$20B pa¹³.

Australia's air pollution standards and fuel efficiency standards in comparison to other developed countries are poor. Regulatory authorities around the world have instigated stricter standards and moved to banning diesel vehicles in urban spaces recognising the health impacts of air pollution¹⁴.

The health impacts and consequent costs of this pollution from fossil fuels is currently not being considered or accounted for in the general price of energy generation and transport. If they were, then renewable energy would be even cheaper than coal and gas generation and electric vehicles would be more competitive.

Previous cost-benefit analyses demonstrated that the economics of burning coal was unfavourable even before this updated range of air pollution impacts of air pollution was well understood.

The costs of coal fired power generation has been calculated by Nordhaus¹⁵ who stated that if these air pollution costs were accounted for, coal fired power stations in the US would be “net negative”, in other words, they would result in more costs than economic benefits. A similar outcome has been found in the Australian setting¹⁶.

A Harvard study in 2011, assessing the health and environmental costs in the US associated with power generation found that ‘accounting for the damages conservatively doubles to triples the price of electricity from coal per kWh generated, making wind, solar, and other forms of non-fossil fuel power generation, along with investments in efficiency and electricity conservation methods, economically competitive’¹⁷.

Reducing air pollution has been shown to be cost-beneficial. The US EPA has calculated that between 1970 and 1990 every dollar invested in reducing air pollution in the US returned \$30 to the economy¹⁸.

In contrast to mitigation of greenhouse gas emissions where benefits emerge over decadal time scales and are globalised, reduction in air pollution results in almost immediate and local health benefits and cost savings.

LNG and unconventional gas development

LNG projects are driving the State’s rising greenhouse gas emissions and contributing to the reversal in Australia’s national emissions trajectory. The projections for expansion of North-West conventional gas and new unconventional gas are inconsistent with meeting proposed national greenhouse targets both domestically and globally¹⁹.

The argument that LNG exported from WA is displacing coal is unproven. No evidence has been provided to support this assertion. Furthermore, it is entirely at odds with federal ambitions to open new coalfields, expand existing coal mines, export more coal and support domestic coal fired power stations.

Even if LNG were to displace coal use, the emission intensity from gas combustion is still above those required to meet climate targets. This also does not account for other emissions such as those involved in the CO₂ produced from gas fields, the emissions from highly energy intensive processing and transport, and fugitive emissions. Methane has a far higher global warming potential than carbon dioxide; around 86-times that of CO₂ over a 20-year time frame and 28 -34 times over one hundred years²⁰.

As well as the health effects related to climate change, gas production and combustion results in numerous other health risks due to air pollution, water contamination and other associated activities.

Gas processing and handling results in the production and release of toxic hydrocarbons, such as benzene, and heavy metals. Many of these chemicals are known to be toxic at even low levels of exposure.

Some heavy metals, such as mercury, bioaccumulate in the food chain, so even dispersed emissions can result in significant potential population exposure over time.

There are also significant uncertainties regarding the toxicology effects of hydrocarbons and other produced chemicals in terms of endocrine disruption, carcinogenicity and toxicological effects when there is concurrent exposure to multiple chemicals.

Unconventional gas (UG) development increases the risk of population exposure to harm from contamination of toxic products and from the associated surface activities. Experience overseas has documented a range of observed adverse health outcomes and risks, none of which have been adequately assessed in the Western Australian setting. In addition to this the water use involved in UG is very large and will compete in some areas with agricultural use plus there are very real risks of surface and groundwater contamination²¹

Health-promoting urban environments

Since the late 20th century there has been a rising epidemic of non-communicable diseases (NCDs). NCDs result from a combination of behavioural (lifestyle), environmental and genetic factors and now account for 70% of global mortality.

Urban environmental conditions are one of the significant factors involved in the rising prevalence of NCDs through the promotion of inactivity ('obesogenic environment'), access to green space and recreational and social opportunity, and exposure to pollution, noise and heat.

These built environmental features are both health determinants and are often integral to actions to mitigate and adapt to climate change.

Urban design plays an important role in promoting physical inactivity or activity. The design and topography of suburbs and local transport infrastructure determines car dependence and walkability.

Inactivity is a major contributor to the epidemics of the major causes of ill health and death - heart disease, cancer, stroke, type 2 diabetes and obesity, and dementia. The economic costs of inactivity in Australia, for example, are around \$15.6 billion per annum.²²

Car dependence and urban design are also linked to traffic congestion. A 2015 BITRE report estimated that the avoidable social costs of congestion in Australia in 2030 would amount to \$30 billion annually²³. Perth's congestion costs were \$0.45 billion in 1990, rising to \$2 billion in 2015, and to as much as \$5.7 billion by 2030 with business as usual. It is well documented that congestion is not solved by building more roads which also impact local amenity, urban heat and biodiversity loss. Mass transport systems are both more efficient and encourage more physical activity as well as reduce air pollution and congestion.

Conversely, active transport – cycling and walking – has been consistently demonstrated to have a range of health benefits. The large 2017 UK Biobank study found a 41% lower mortality risk in cycle commuters compared to car and public transport users, a 52% lower risk of dying from heart disease and a 40% lower risk of dying from cancer²⁴.

In the US Twin Cities study, taking just three additional weekly bicycle trips per week confers 46% lower odds of metabolic syndrome, 32% lower odds of obesity, and 28% lower odds of hypertension²⁵

There are also demonstrated local economic benefits. Cycle infrastructure is many times cheaper to build and maintain than car infrastructure.

Green spaces have a wide range of health and social benefits. A large body of research confirms the positive relationship between living near green space and better health and social outcomes.

Living in greener neighbourhoods is associated with reduced rates of cancers, reduced rates of cognitive decline, lower levels of stress and symptoms of depression. A recent study looking at over 1 million children found that those with the least access to green spaces had up to a 55% higher risk of developing a range of psychiatric disorders²⁶. Access to green parks is associated with lower levels of high blood pressure, obesity and overweight. Levels of domestic violence and antisocial behaviour are lower in areas with more green space and trees. Even proximity to greenspace by itself has been shown to improve patient recovery times in hospital and attention spans of students.

Green spaces also reduce urban heat and noise, are important in flood mitigation and provide habitat for native plants and animals. These factors will be increasingly important in facilitating adaptation and resilience to exposure to more intense heat and weather events mediated by climate change.

Due to loss of tree cover, replacement with heat absorbing impervious surfaces such as bitumen and concrete and taller built structures, which trap and re-radiate heat, urban areas can become several degrees hotter than their surrounds. This is important for human health as there are temperature thresholds at which health impacts are demonstrated to

occur. These thresholds are well within the current normal temperature ranges experienced in Australia, meaning there are already significant temperature related current health impacts (*including heart attacks and cardiac arrests, renal failure, respiratory illness and mental illness episodes*)²⁷.

Changing urban design to facilitate transition away from car dependence toward active transport, increase tree canopy and access to green space in major cities would assist in achieving reduced rates of NCDs, reduce greenhouse gas emissions and increase resilience in the face of increasing extreme weather events.

Built environment and climate change

Australian buildings are generally energy inefficient and poorly suited to prevailing climatic conditions. They contribute to our very high per capita greenhouse emissions and collectively account for around half of Australia's energy use and nearly one quarter of electricity consumption.

Thermal inefficiency in residential buildings results in higher power costs and leads to adverse social and health outcomes due to more extreme temperatures and more especially in disadvantaged groups due to competition between paying for electricity and other household expenditure such as healthcare, food and clothing.

These socio-economic effects and exacerbation of existing inequality are set to worsen with further climate change and will drive increasing adaptation costs.

Some forms of heating, such as gas and combustion heaters, can produce unhealthy levels of indoor and ambient air pollution. Greater demand for power for cooling buildings also contributes to air pollution from coal and gas generation as well as greenhouse gas emissions.

It has been estimated that raising energy efficiency and reducing emissions in the built environment could save Australian businesses and households almost \$20 billion by 2030 and at the same time improve wellbeing and health outcomes as well as productivity²⁸.

Building standards are set by states and territories and therefore entirely within the control of the WA state government.

Agriculture Food and Health

The food we produce and the way it is produced are interlinked with both our health, greenhouse emissions and other environmental impacts.

Unhealthy diets are a leading cause of death from non-communicable diseases.

The foods that are implicated in causing NCD epidemics are generally those with the highest environmental impacts in terms of energy, water and land use and nutrient and chemical pollution.²⁹

Our food choices – in terms of content, overconsumption and waste – are therefore important determinants of both our health and environmental sustainability.

Agriculture is the largest factor in land use change, and consequently is a major driver of biodiversity loss and climate change. Our food systems lead to deforestation, depletion of soil, overuse and contamination of freshwater resources and critical depletion of phosphate reserves.

Currently around 50% of habitable land is being used for agriculture, of which 77% is used for livestock (and crops to feed them) with 23% used for crops for human consumption. However, 83% of calories and 63% of protein derives from those plant crops.³⁰

Inputs of water, energy and land area are far higher per unit of food produced from livestock as compared to plants. For example, beef requires around 40 times as much water per kilogram of food produced than cereal crops.

This has obvious implications for food production in arid countries such as Australia and especially when climate change is projected to make freshwater availability more variable and scarcer.

Agriculture accounts for around 16% of Australia's greenhouse emissions and ruminant livestock accounts for over two thirds of this³¹.

Estimates are that the amount of land required to produce food will double by mid-century due to global population growth and increasing meat consumption in the developing world. This area would equate to an area the size of the continent of Africa with catastrophic implications for forests, wetlands, wild animals and biodiversity generally.

The EAT Lancet report³² released in January 2019 has highlighted how we can provide both a sustainable as well as healthy diet for a growing population. The adoption of the reference diet would require worldwide consumption of meat and sugar to reduce by more than 50% and consumption of fruit nuts, vegetables and legumes to increase by 100%.

Water security

As noted in the climate issues paper, the south west of the state is drying, and this long-term trend is projected to increase with water security under threat in the South West and agricultural regions.

So far adaptation (technology, management and improved varieties), and the fact that though rainfall has reduced it is still adequate for crops, has enabled continued improvement in crop yields. However, agriculture is likely to be increasingly impacted through a combination of further reduced rainfall (particularly seasonality), higher temperatures and more variable weather³³.

This long-term trend is apparent in the meteorological record and the increase of frequency and severity of drought³⁴.

Drought is a known risk factor for suicide and depression in regional areas³⁵.

Extreme weather events are also increasing both in severity and range. These have similar capacity to drought in effecting socio-economic impacts in regional communities but are currently not included in agricultural models.

Whilst climate change is the major factor in reduced rainfall across the SW of Western Australia, up to 50% of the observed decrease in rainfall in this region could also be consequent of large-scale tree removal.³⁶

Preservation of existing forested areas and large-scale reforestation has multiple benefits in terms of maintaining or increasing rainfall, reducing salinity, stabilising soils and buffering surface wind speeds reducing soil erosion, increasing habitat for biodiversity and carbon sequestration³⁷.

Biodiversity and climate change

Ecosystems are also in crisis with extinction rates now occurring at around 10s – 100s of times higher the natural background rate and is accelerating³⁸.

This has primarily been driven by land use change for agricultural purposes with other human activities such as overharvesting and chemical pollution contributing.

Biodiversity provides ecosystem services essential for our health and prosperity and ultimately, survival.

In terms of food production these services create and maintain healthy soils, pollinate plants, regulate pest and diseases and provide habitat³⁹.

Biodiversity that supports agricultural food production at genetic, species and ecosystem levels is in decline.

Biodiversity loss and climate change are closely linked in terms of their causal (anthropogenic) pathways and health effects, and because they are interactive.

Climate change is increasingly driving biodiversity loss as natural species are impacted by higher ambient temperatures, extreme weather events and indirect pathways in the same way as we are. Furthermore, fragmentation and other ecological stressors are impeding potential migration and adaptation⁴⁰.

Transitions: industry and communities

Renewable energy generation is now cheaper than new coal or gas, and these costs as well as those for storage continue to fall. It is quite clear from this that on economic grounds alone renewables will continue to displace fossil fuels for energy generation. This transition is inevitable and likely to be more rapid than previously anticipated. This has important implications for industries and communities that are reliant on or exposed to these traditional fuels. Rapid or unplanned transitions greatly increase the potential for adverse social and economic harm. It is essential therefore that rather than try to extend the period of fossil fuel use – and risking stranded assets and communities – early and structured transition is undertaken.

The risk of stranded assets and economic downgrades to carbon intensive economies has been highlighted this week by the decision of Sweden's Riksbank to sell their holdings in bonds issued by the Australian states of Queensland and Western Australia⁴¹.

Western Australia has some of the best and most accessible renewable resources in the world. There are significant economic and social opportunities to be gained by early investment and development. Economist Ross Garnaut has identified the opportunities for us as a “Renewable Energy Superpower”⁴².

Note:

We have made a detailed submission⁴³ to the Climate Health WA Inquiry highlighting concerns and making recommendations relating to healthcare.

Most of the focus on climate change affecting health has been on the direct effects, namely increasing temperatures, heatwaves and consequent of extreme weather. These impacts are already being felt in Australia and projected to worsen. They are also the most easily measured and linked to climate change and clearly adaptation measures are necessary to minimise the rising health and social costs. It is particularly important to identify vulnerable communities and do research to understand where and when risks will emerge and how we implement effective adaptation measures.

The indirect risks are more delayed but have both far greater potential to impact health through degradation and loss of ecological services and built infrastructure, changing patterns of disease, food insecurity and economic disruption. These impacts are more complex and clearly harder to manage in terms of adaptation.

Mental health can also be impacted through a variety of mechanisms. Mental health presentations are known to increase during heatwaves. People affected by extreme weather-related events such as cyclones, fires and floods have high rates of anxiety, depression and Post traumatic Stress Disorder which often persist for years. The societal costs in terms of mental health of these have been assessed.

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