CLIMATE CHANGE AND EXTREME WEATHER EVENTS IN THE CITY OF MELBOURNE

Climate change is recognised as a significant and growing threat to community health which exacerbates existing social inequality.[1]

For example, resulting heatwaves can increase the risk of heat exhaustion and stroke, with studies showing higher mortality rates in Melbourne during the 2009 and 2014 heatwaves.[2] The 2020 summer bushfires also resulted in significant physical harm, respiratory problems and deaths for the community. Further, air pollution from fossil fuels contributes to respiratory health problems and exacerbates chronic diseases such as heart disease, chronic obstructive pulmonary disease and asthma, while increasingly severe and frequent flooding, drought and extreme weather is a risk to public safety and can contribute to poor mental health. The disruption of agricultural food production can also impact food security.

Climate change can also undermine people's mental health directly and indirectly. In addition to the trauma caused by experiencing extreme weather events, there are growing concerns about the impacts of eco-anxiety (also described as climate anxiety) – a chronic fear of environmental doom, especially amongst younger people.

The COVID-19 lockdown has had various short-term impacts to the environment and climate. In some areas, local air and water quality has improved, and we have also seen a decline in worldwide emissions of carbon dioxide emissions due to reduced energy demand from transport and manufacturing.

CITY OF MELBOURNE

How are we tracking?

Extreme weather events

Extreme weather events such as thunderstorms, heatwaves, heavy rainfall and drought can result in immediate health impacts including death or injury or long-term impacts such as mental illness and chronic injury.

Heat waves and extreme heat

Eight heat health alerts (for days with forecasted average temperature of 30 degrees Celsius or more) were issued for the Central District over the summer season 2018-2019 and five over the summer season 2019-20. The number of extreme forest fire danger days is expected to increase 42 per cent in Melbourne by the 2050s.

During the 2009 heatwave there was a 46 per cent increase in ambulance callouts and a 12 per cent increase in emergency department presentations. In addition, there were 374 excess deaths recorded during the heatwave period. The 2014 heatwave also led to a significant increase in demand for health services, with a 25 per cent increase in ambulance callouts and an estimated 167 excess deaths.

Drought and reduced rainfall

Drought and insufficient water supply as a priority for action and focus for the City of Melbourne. Critical risks identified for extreme drought and reduced rainfall for the City of Melbourne are:

- Insufficient urban water supply
- Biodiversity impacts in stressed waterways
- Injury due to hard sporting grounds
- Loss of social cohesion due to inability to fully optimise the use of sporting grounds in drought period.

Additionally, insufficient water supply can impact on how the community responds to heat, for example, watering of trees and parks. Drought can also lead to water restrictions and increased water prices which may lead to mental or emotional stress, especially for the most vulnerable in the community.

At current rates of growth Melbourne will become Australia's largest city by 2030. Should very low rainfall conditions continue in the short to medium term, there is a risk of Melbourne experiencing serious water shortages from its centralised mains water supply.

Flooding and storm events

Flash flooding is known to cause the most deaths or injuries of all natural disaster weather events. Increased wind speeds have an exponential effect on building damage, which results in more debris flying through the air. Depending on the cause and location, the risk of public injury or death during a storm event is significant for the community.

The City of Melbourne 2009 Climate Change Adaptation Strategy identified floods and storm events as one of the four main climate change risks for Melbourne.

Thunderstorm asthma

The size, severity and impact of the 2016 thunderstorm asthma event in Victoria was unprecedented. Thousands of people developed breathing issues, with many experiencing an asthma attack for the first time in their lives. During the event, almost 13,000 people presented at hospital emergency departments – 44 per cent more than the three-year average, and a 73 per cent increase in ambulance call outs. An estimated 9 excess deaths occurred in people with asthma as a result of the event.

Air quality

From 2015 to 2017, levels of PM2.5 and NO2 concentration have increased in the city of Melbourne (7.9 to 8.3 micrograms per cubic metre and 18.8 to 19.9 micrograms per cubic metre, respectively), while levels of O3 and SO2 decreased slightly (30.1 to 29.6 micrograms, and 1.5 to 1.1 micrograms per cubic metre, respectively).

Motor vehicle emissions are one of the main drivers of poor air quality in the municipality; however bushfire smoke is a growing health concern for the municipality as the intensity and severity of bushfires is predicted to increase due to climate change.

Greenhouse gas emissions

The City of Melbourne has made progress in reducing per capita greenhouse gas emissions, falling 23 per cent from 2016 to 2019. This is largely due to the closure of the Hazelwood power station and increase in renewable energy that supplies the electricity grid.

While overall emissions levels are on the decline, the municipality still has one of the highest emissions in the world on a per capita basis. This is attributed to the municipality's large number of office buildings powered by coal-fired power stations relative to its low residential population.

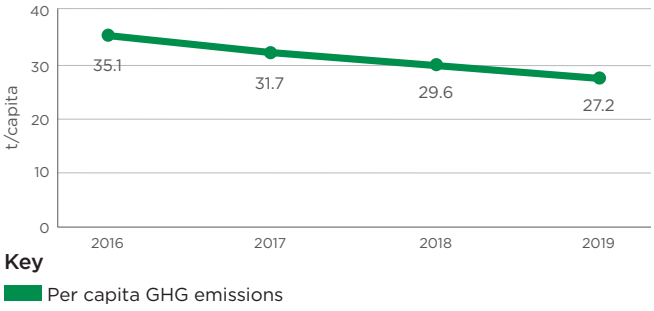

Figure 1. Per capita greenhouse gas emissions in the City of Melbourne.

Source: City of Melbourne Climate Change and City Resilience branch

How is the City of Melbourne responding?

- The **City of Melbourne Climate Mitigation Strategy** recognises the health benefits of transitioning the municipality away from fossil fuels to 100 per cent renewable energy. The strategy commits to zero emissions buildings that better insulate from heatwaves, actions to support walking and cycling with associated health benefits, investment in public transport and the rapid electrification of vehicles to improve air quality.
- The **Climate Change Adaptation Strategy** includes investment in nature-based solutions, changes to planning policy and community engagement on the health impacts of climate change through public health alerts and public arts programs.
- The City of Melbourne have declared a **Climate and Biodiversity Emergency** and set a target of net zero emissions by 2040 for the municipality. As part of our response to the Climate and Biodiversity Emergency and COVID-19 the City of Melbourne has brought forward investments to extend cycling lanes and deliver tree planting programs. These actions will support health outcomes, create jobs and also respond to climate change
- The **Urban Forest Strategy** sets targets of 3000 trees planted each year within the municipality. This action will cool the city during heat waves and support mental health through connection to nature.
- The **Integrated Water Management Plan** addresses flooding, drought and water quality. This supports green infrastructure which will reduce the impact of heatwaves, and addresses public safety by helping to reducing flooding.
- The City of Melbourne is adapting to the impacts of climate change through the use of nature-based solutions as outlined in the **Integrated Water Management Plan, Green Our City Strategic Action Plan** and **Nature in the City Strategy**.