

# AIR 2020-2021

## General Statement of Air

The management and monitoring of air pollutants is crucial to the health and wellbeing of people.

This chapter details the air quality monitoring carried out across the region by Waikato Regional Council (WRC) to maintain and improve our current levels of air quality.

Through extensive climate monitoring at sites across the region, WRC has collected data on air quality which helps guide decision-making by the Council and many other individuals and agencies including MPDC.



Exceeding safe limits of air pollution can have adverse effects on people, by causing respiratory conditions, cardiovascular issues, and irritation of the skin, nose, eyes and throat. Air pollution can also affect people's emotional and mental wellbeing.

Air is made up of nitrogen and oxygen gases, with minute amounts of carbon dioxide and other gases. Contamination of the air occurs through solid contamination such as dust and discharged particles from fires, liquid contamination such as pesticide and herbicide, and gas contamination. Some air contamination occurs naturally, through geothermal emissions but most, occurs through human activity.

In the Waikato region, emissions are mostly from house fires, agrichemicals, motor vehicle emissions, industry discharge, outdoor burning and livestock farming practices. Air is considered to be polluted when these contaminants are airborne for long enough, and at concentrations that could affect people, plants and animals. Air pollution can happen at multiple scales. Particle matter like dust and smoke, transport emission and industry discharge are influential at a regional level, but contribute to accumulative global scale pollution which culminates in adverse effects such as climate change and ozone deterioration.

## Sources of pollutants

The Waikato Regional Council monitors the proportion of carbon dioxide (CO<sub>2</sub>), carbon monoxide (CO), nitrogen oxide, sulphur dioxides and fine particle matter (PM<sub>10</sub>) in the air daily, from industry, motor vehicles and domestic heating throughout the Waikato Region.

Common Sources of pollutants are:

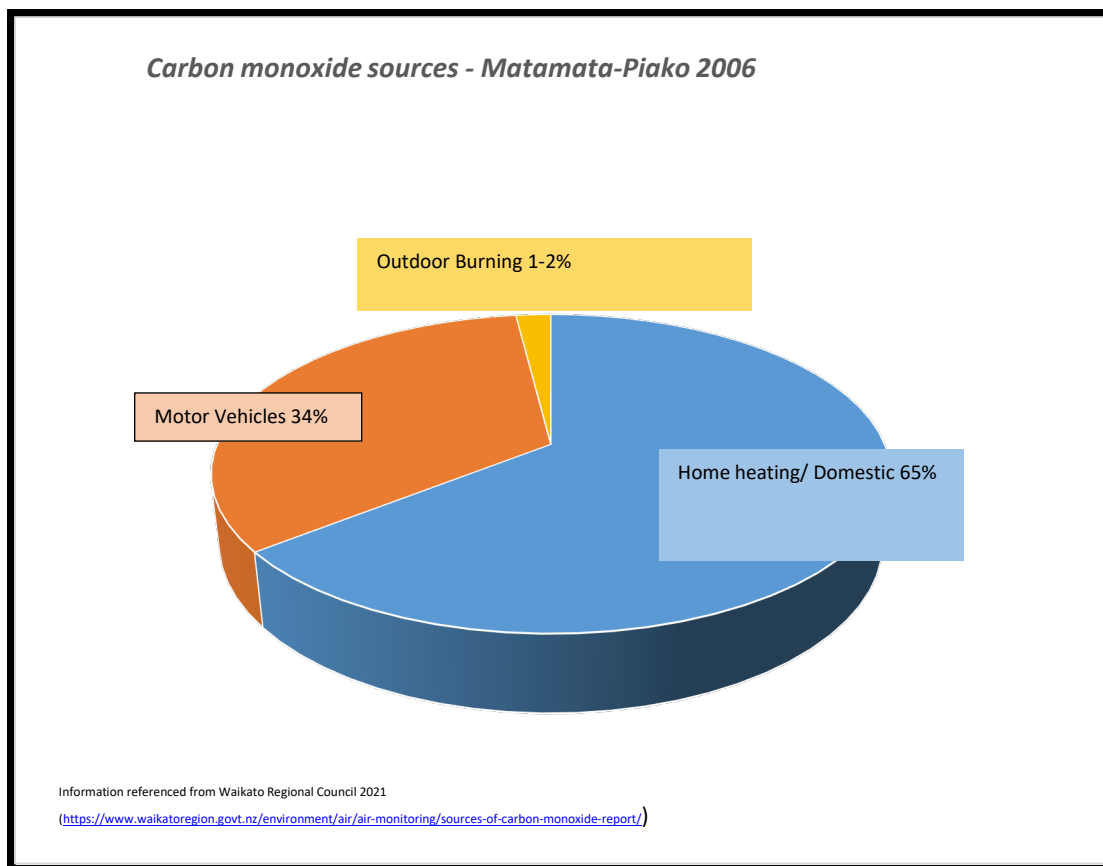
- Carbon dioxide - is a greenhouse gas. It is thought that increasing amounts of gases will contribute to climate change.
- Carbon monoxide - is a poisonous gas that is colourless, odourless and tasteless. It is absorbed into the bloodstream of people and animals, causing health effects ranging from headaches and dizziness to loss of consciousness and death.
- Nitrogen oxides - can affect people's health by causing respiratory problems. It can be damaging to our environment by contributing to ozone loss and greenhouse gases.
- Sulphur dioxides - have a strong, unpleasant smell, and can harm people's health and our environment.

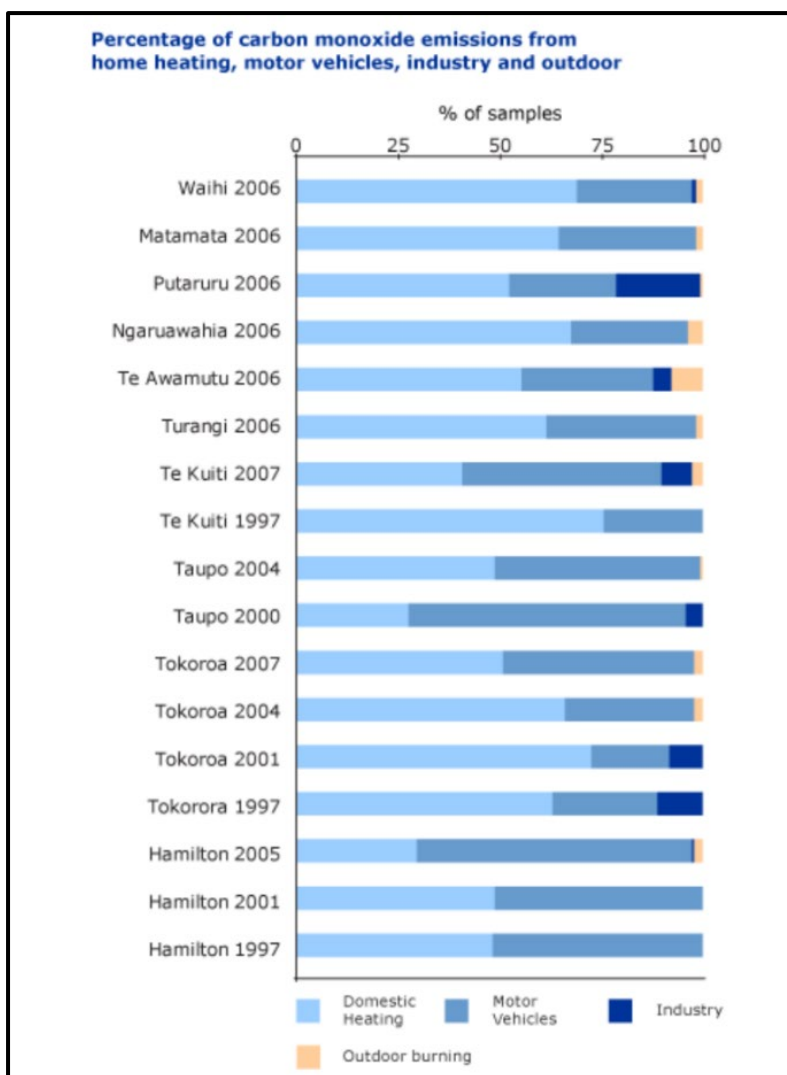
## Sources of pollutants in our District

### 1. Carbon Monoxide

Most carbon monoxide in urban areas are sourced from motor vehicle, domestic home heating and industry. The figure below indicates the most recent published carbon monoxide readings for Matamata - 2006. 65% of all carbon monoxide pollutants, were from domestic contributions such as home fires, 34% of carbon monoxide pollutants were from vehicle use and only 2% were from outdoor burning. Waikato Regional Council carries out carbon monoxide monitoring in Hamilton only. The results of existing levels are considered 'excellent' or 'good', indicating that carbon monoxide is not of concern in Hamilton.

The results from Hamilton strongly suggest that carbon monoxide concentrations in other urban areas within districts like Matamata-Piako District Council are unlikely to be of concern as carbon monoxide is associated with high-density housing and busy roads.





## 2. Carbon Dioxide

Measuring the amounts of carbon dioxide in the air, and identifying the sources of this gas is critical as this greenhouse gas is thought to be one of the greatest contributors to global-scale shifts such as climate change. It is critical to highlight the sources and find methods of reducing this pollutant as this plays greatly into the role of planning for large-scale changes in our natural and built environments in the future.

In the Waikato Region, carbon dioxide is sources mostly from motor vehicles, industry and home heating. Over 50% of all carbon dioxide emissions sourced from the Matamata is from domestic heating, followed by motor vehicles at approximately 40%. Carbon dioxide sourced from industry and outdoor burning equates to less than 10% of the districts total. It is important to note that industrial activities contributes approximately 5% of carbon dioxide emissions within the Matamata area.

## Fine Particle Monitoring (PM<sub>10</sub>)

The most significant air pollutant in New Zealand are small airborne particles in our air (known as particulate matter). Particulate pollutants are of most concern in New Zealand due to high concentrations found in towns. Exposure to high levels of airborne particle pollutants has the potential to cause respiratory and cardiovascular issues. The size of these particles are smaller than 10 microns (1 micron is one-millionth of a meter), which is why it can affect human health when inhaled.

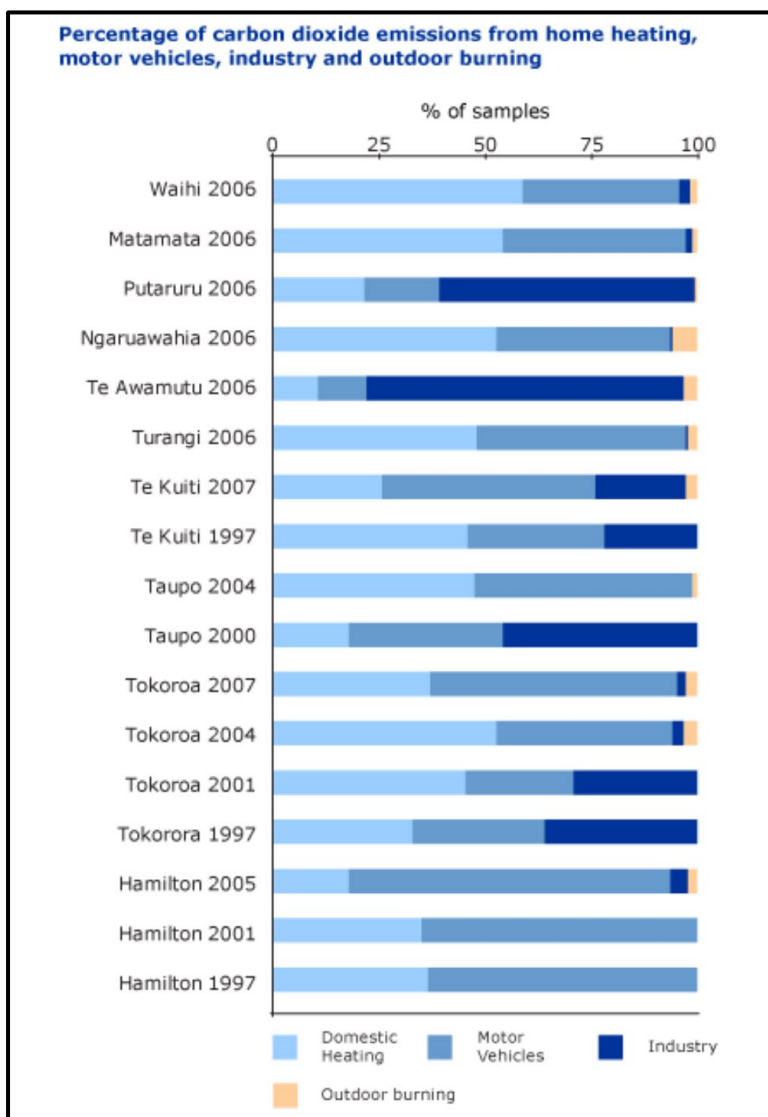
The majority of PM<sub>10</sub> in the Waikato comes from home fires, mainly burning wood. PM<sub>10</sub> can cause respiratory problems, especially for asthmatics, children and the elderly, and can result in hospital admissions and premature mortality in sensitive people.

The Waikato Regional Council Reports on annual and daily PM<sub>10</sub> concentrations each year.

Trends are reported for towns where they have 10 or more years of PM concentrations.

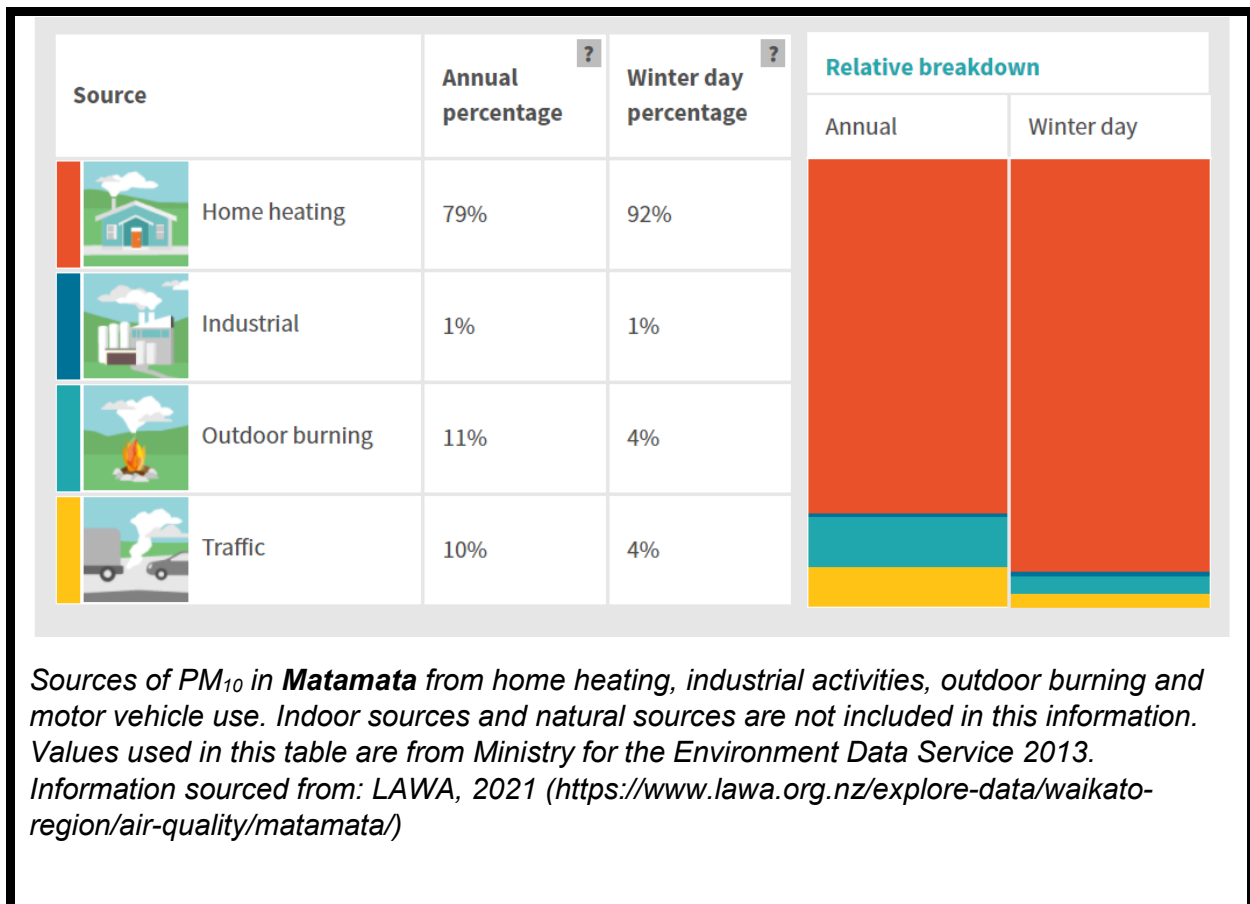
### Fine Particle Matter in Our District

In 2006, it was identified that in winter, over 90% of particles in the air in Matamata comes from home fires, followed by outdoor burning and motor vehicles which both contributed 4% of fine particle matter and industrial activities sourcing only 1% of total matters.

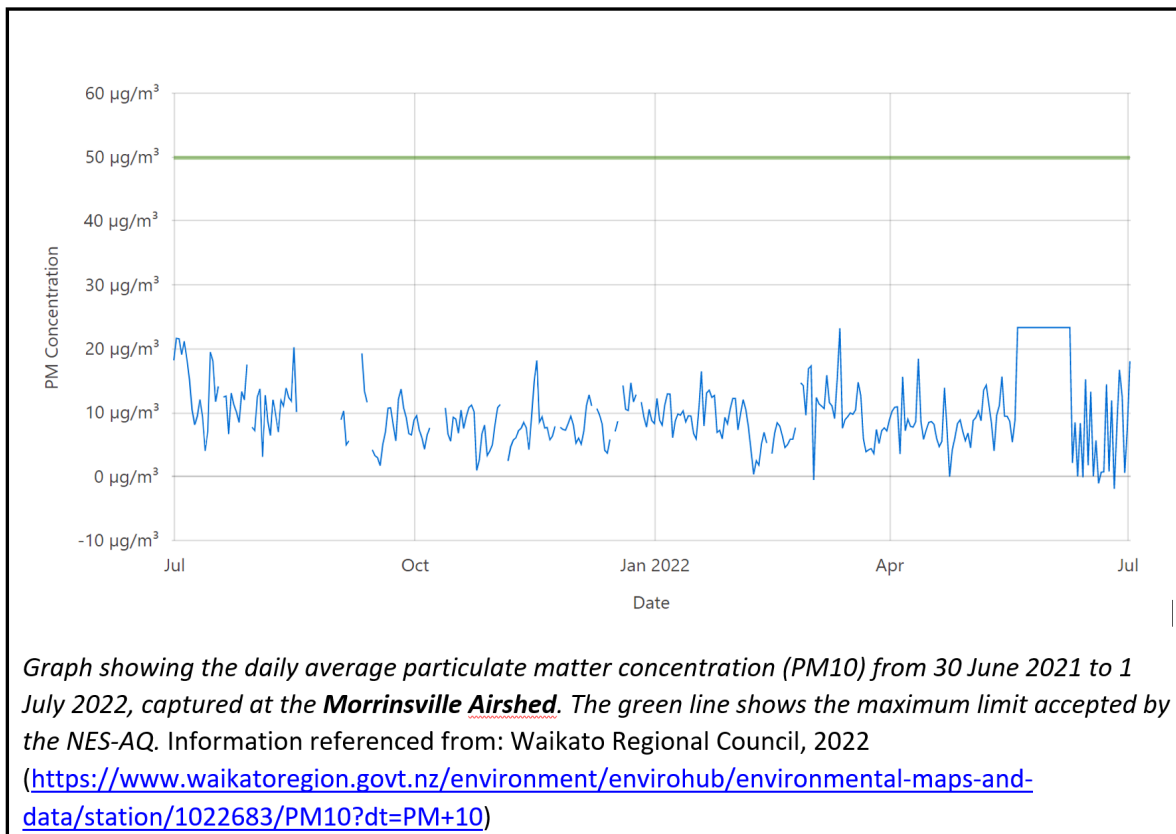


Information referenced from Waikato Regional Council 2021  
<https://www.waikatoregion.govt.nz/environment/air/air-monitoring/sources-of-carbon-dioxide-report-card/>

However, the annual averages show a slightly different breakdown due to the changes in activities carried out in the district. Annual averages suggest that home heating is still the largest source of fine particle matter at 79%, outdoor burning accounted for 11% of fine particle matter and 10% from motor vehicles. Industrial activity accounted for 1% in both annual and winter-day readings.



The trend in the graph below indicates that during colder months of the year, the Matamata-Piako District produces higher PM concentrations in winter months compared to that over warmer months. Most concentrations of 15µg/m<sup>3</sup> or greater occurred during winter months. Given that home fires, outdoor burning, and motor vehicles are significant contributor to increased PM<sub>10</sub> concentrations, it can be noted that the Matamata-Piako District experiences poorer air quality in winter compared to other months. Overall, the air quality in the Matamata-Piako District is well below the NES-AQ maximum threshold, with all concentrations of PM<sub>10</sub> for the year remaining below half of the acceptable threshold. Urban areas of the Waikato Region are to meet the target of no more than one exceedance per year as from September 2016. There were no exceedances recorded for Matamata-Piako District between 2021 – 2022.



At Morrinsville Airshed, fine particulate monitoring is measured every hour, demonstrated in the graph above. While there has not been a significant change in the level of average particulate matter in the district, the most important pattern to take note of is the considerable fluctuations in the level of particulate matter in the different seasons in the graph above. Values from the warmer months have proved to be much lower than other months, with much fewer peaks than compared to cooler months.

Over the last 10 years there has been a decline in particulate matter present in the air, particularly in the winter months. Changes such as these suggest residents of the district are shifting from domestic fires to alternative means of warming their homes which is a positive trend. By shifting away from domestic fires as a way of heating homes, there could be a significant change in the hourly readings, therefore reducing the overall average suspended fine particle matter within the district. This could result in better health outcomes for residents by reducing the risk of respiratory illnesses caused by breathing in fine particle matter.

Unfortunately, in the graph above there are gaps in the data set and this is likely a result of technical errors as the data is missing. There is also a consistent elevation in the reading in early June. As there was no major event, it may suggest a further technical error at this time.