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Report to the Environment Committee
from Perry Davy, Resource Scientist

# Air Emissions Inventory

## 1. Purpose

To present the results of the Air Emissions Inventory of Domestic and Area Sources undertaken during 1998/99.

## 2. Background

The Wellington Regional Council has undertaken an air emissions inventory of the Wellington Region as part of the Councils' state of the environment monitoring programme. The inventory is being conducted in several stages. The first stage of the project, completed in 1997/98, recorded emissions from the Industrial and Transport Sectors. The second stage, completed in 1998/99, entailed an inventory of Domestic and Area sources.

The purpose of the project is to estimate the amount of criteria pollutants being discharged to air, throughout the Wellington Region.

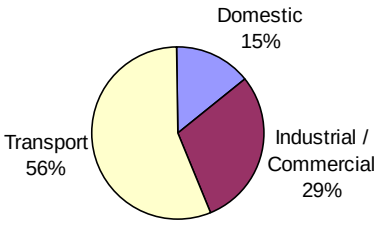
The critical pollutants addressed in the inventory were non-methane volatile organic compounds (NMVOC), nitrogen oxides (NOx), sulphur dioxide ($SO_2$), carbon monoxide (CO), carbon dioxide ($CO_2$) and particulate matter less than 10 microns in size ($PM_{10}$).

Data about emissions from the domestic sector were collected through a household telephone survey. A total of 949 randomly selected residents from 41 geographical areas within the Wellington Region were surveyed. The results were used in conjunction with 1996 Census information to build a 'typical' usage trend profile (both temporal and spatial) for residential dwellings in the Wellington Region.

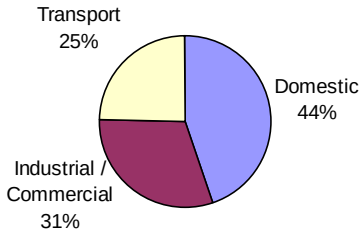
Information about discharges from commercial activities was collected from a variety of sources, with preference given to Wellington specific data where possible.

## 3. Results

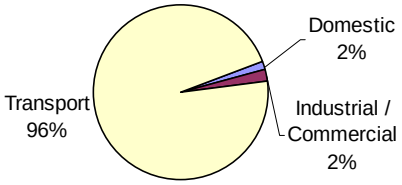
Summary results from both stages of the air emissions inventory are presented in Figure 3.1. These do not include emissions from natural sources (forests, soils and ocean). Emissions from natural sources will be examined during 1999/00.



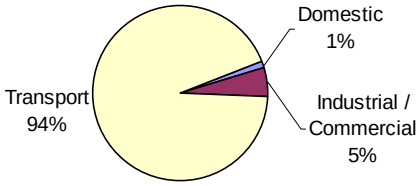

**a) Non-methane Volatile Organic Compounds**



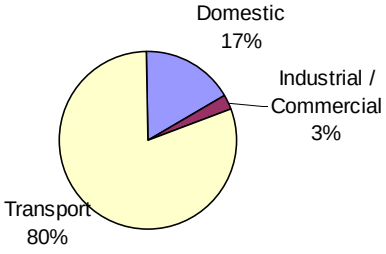

**b) Fine Particulate ($PM_{10}$)**



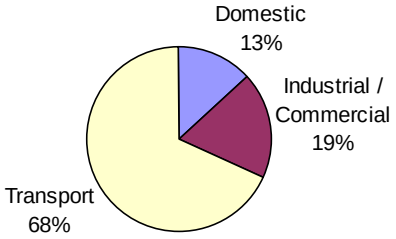

**c) Oxides of Nitrogen ($NO_x$)**




**d) Sulphur Dioxide ($SO_2$)**




**e) Carbon Monoxide (CO)**




**f) Carbon Dioxide ($CO_2$)**

**Figure 3.1. Relative Source Contributions for Pollutant Emissions in the Wellington Region.**

## 4. Discussion

The results show that mobile sources are the main source of the air pollutants that were recorded. The exception was fine particulate matter, for which the greatest contribution comes from domestic combustion sources (mainly solid fuel fires). Approximately 85% of the annual contribution to particulate matter emissions from domestic fires occurs during the winter months. As a consequence, in some areas there are likely to be significant local pollution episodes on cold calm winter nights.

Preliminary results from the ambient air quality monitoring station at Masterton this year confirm this.

The emissions inventories provide average summers day and average winters day emissions for each category. During a typical summers day mobile sources are the primary source for most emissions within the Region. However, for $PM_{10}$, there is an even split between mobile and industrial sources.

During a typical winters day mobile sources are still the major pollution source, but, domestic emissions have a much greater impact, especially on $PM_{10}$ where the contribution to air pollution is five times that of any other source.

Within the Wellington Regional airshed, industrial emissions of the criteria pollutants only contribute significantly to $CO_2$, NMVOC and fine particulate. The most significant emitter of this compound is quarrying operations, releasing over 65 percent of the industrial $PM_{10}$ emissions. Many industrial sources may also discharge hazardous air pollutants that were not inventoried as part of this project.

## 5. Conclusion

The results of the emissions inventory so far show that motor vehicles and domestic fires are the main sources of critical air pollutants in the Region.

Overall, industrial emissions are a minor contributor. However, they may still have significant localised effects due to the quantity of contaminants discharged.

While, the proportions of contaminants arising from each category may change once the final stage of the emission inventory is completed, it is expected that transport will still be the major source.

This information will assist air quality management in the Region. It provides a basis for assessing the effects of resource consent applications to discharge contaminants to air and will be considered when locations for long term air quality monitoring stations are selected.

## 6. Communications

The interim results of air emissions inventory will be reported to the community by media releases.

The results will also be made available to parties involved in transport planning.

## 7. **Recommendation**

*That the report be received and its contents noted.*

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