

# CARBON MONOXIDE

## What is carbon monoxide?

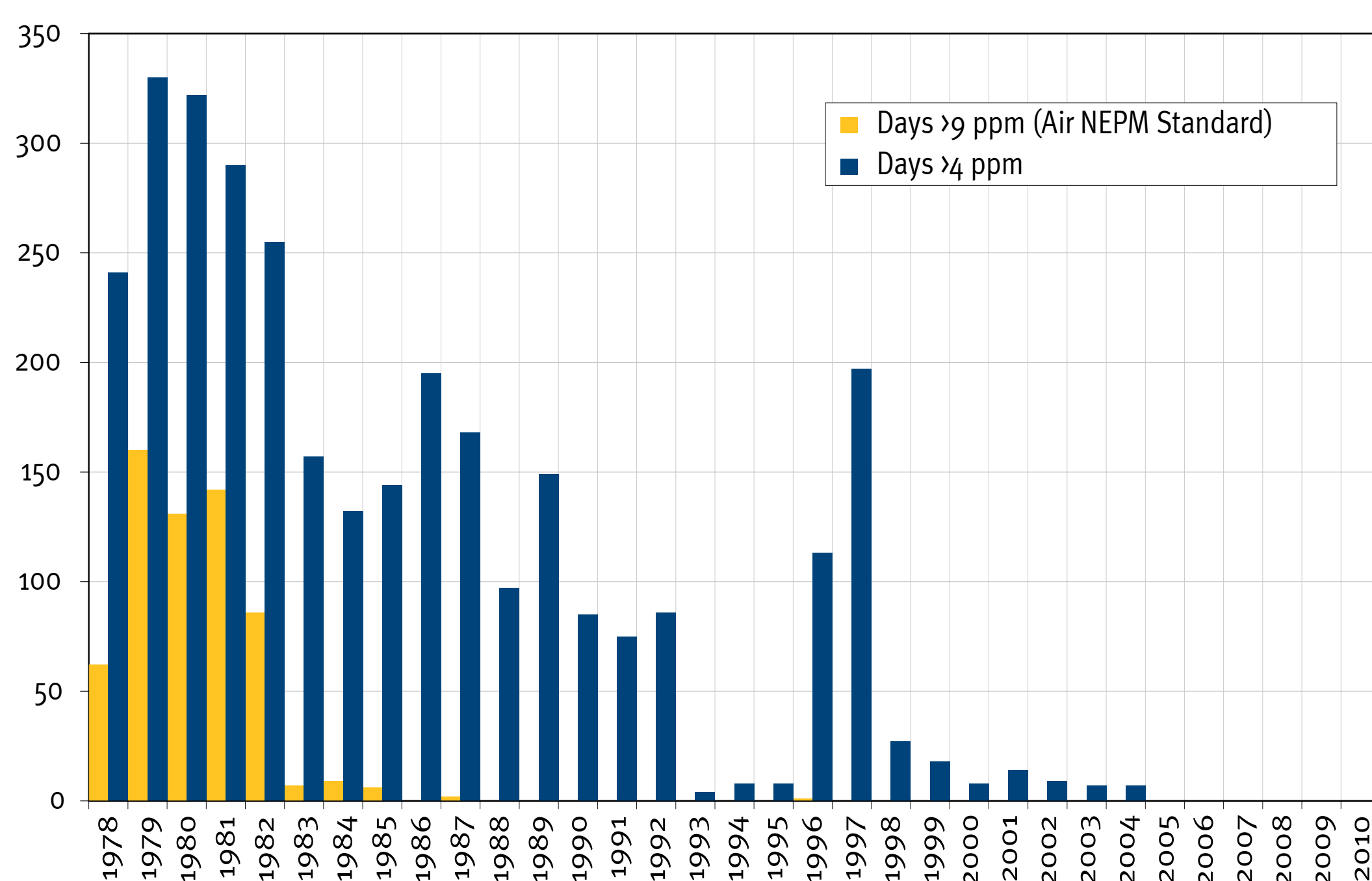
Carbon monoxide (CO) is a colourless, odourless gas formed when substances containing carbon are burned with an insufficient supply of air. Motor vehicles operating on petrol, diesel, or gas are the main source of carbon monoxide pollution in urban areas due to the incomplete burning of fuel in the engine.

## Why is carbon monoxide measured?

Carbon monoxide can have serious health impacts on humans and animals. When inhaled, it bonds to the haemoglobin in the blood (and becomes carboxyhaemoglobin) in place of oxygen. This is carried through the blood stream and reduces the oxygen-carrying capacity of the red blood cells, decreases the supply of oxygen to tissues and organs, particularly the heart and brain, and can be a serious problem for people with cardiovascular disease. Carboxyhaemoglobin formation is reversible when the person is no longer exposed to carbon monoxide.

Australian Design Rules (ADR) for spark-ignition vehicles have been progressively introduced to reduce emissions of pollutants from new motor vehicles. The table below shows the limits imposed, and those planned over the next decade. The effect on carbon monoxide levels are shown in the graph.

Australian Design Rules for Spark-Ignition Vehicle Emissions Limits [g/km]						
Standard	-	ADR27	ADR37/00	ADR37/01	ADR79/00	ADR79/01
Date	Pre 1972	1974-1985	1986-1996	1997-2000	2000-2004	2005-2011
CO [g/km]	40.0	24.2	9.3	2.1	2.2	2.3



## How do we measure carbon monoxide?

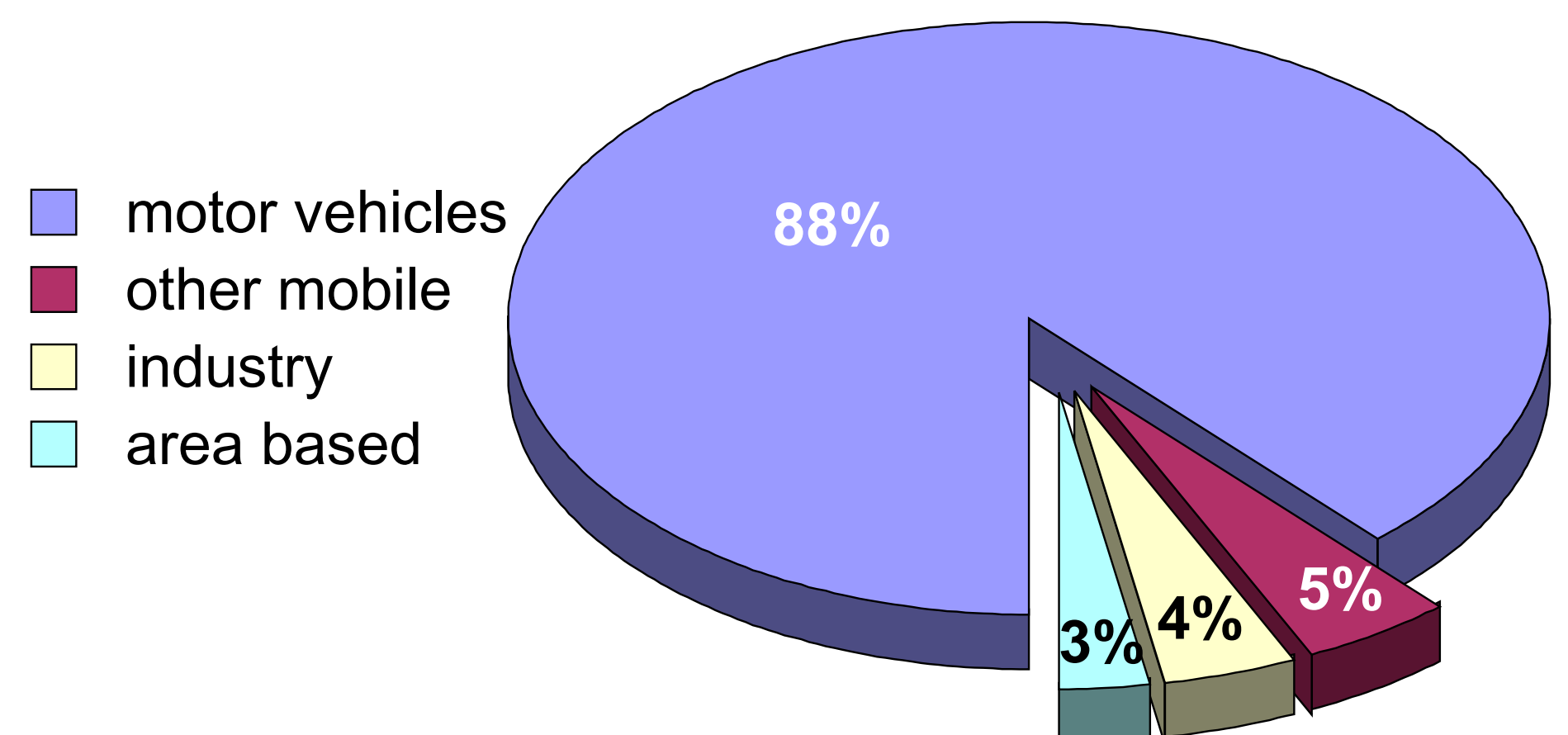
Carbon monoxide concentrations are measured by a technique known as non-dispersive infra-red spectroscopy. Carbon monoxide absorbs infrared radiation at wavelengths near 4.7 microns.

Infrared radiation is passed through a cell containing ambient air, causing the carbon monoxide molecule to vibrate like a coil spring. As the energy is absorbed, the atoms move slightly apart releasing that energy as they re-compress. The degree of absorption of the infrared radiation is a measure of the amount of carbon monoxide.

A gas-filter correlation technique incorporated in the instrument minimises interference from other gases that absorb infrared radiation, ensuring that the instrument responds specifically to carbon monoxide.

For more information about air quality in Queensland, visit the Department of Environment and Resource Management website <[www.derm.qld.gov.au](http://www.derm.qld.gov.au)> or email <[air.sciences@derm.qld.gov.au](mailto:air.sciences@derm.qld.gov.au)>.

## Sources of carbon monoxide



The main source of carbon monoxide emissions in cities and urban areas is motor vehicles. Motor vehicles contribute 88 per cent of carbon monoxide emissions in South East Queensland.

Carbon monoxide emissions from fuel burning at industrial facilities and from other transport, including shipping and boating, are much less than the CO released from motor vehicles.

## Air quality standards

The National Environment Protection Measure for Ambient Air Quality (Air NEPM) standard of nine parts per million (ppm) for an eight-hour period has been set to protect sensitive members of the community from any adverse health effects.

Carbon monoxide concentrations in the ambient (outdoor) air in South East Queensland are well below 9 ppm.

Controls on motor vehicle emissions, such as catalytic converters, have resulted in reduced carbon monoxide emissions and corresponding levels in the air in recent years.

