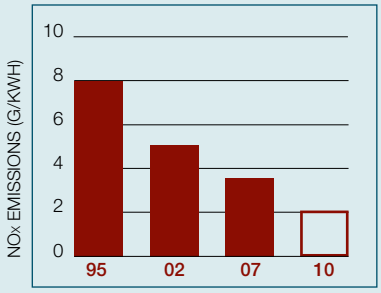
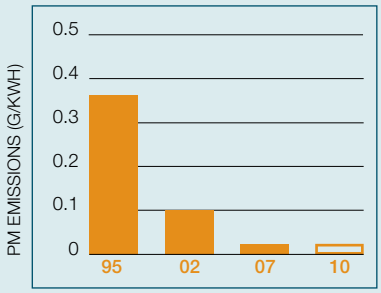
# Caltex Talkingpoint

## SOME ESSENTIAL AIR POLLUTION JARGON

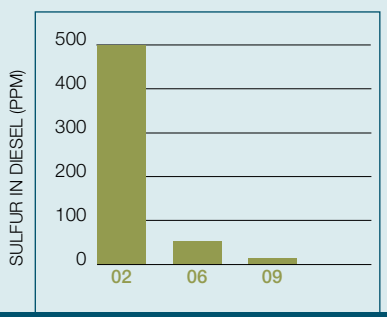
The exhaust emissions controlled by Australian Design Rules (ADRs) are:
– carbon monoxide (CO)
– hydrocarbons (HC)
– oxides of nitrogen (NOx)
– fine particulate matter (PM)

### EMMISSION STANDARDS FOR DIESEL TRUCKS




### SULFUR STANDARDS FOR DIESEL




## NEW VEHICLE TECHNOLOGY AND FUELS HELP THE ENVIRONMENT

- Cleaner fuels and vehicles have greatly reduced air pollution – and further reductions are coming. What are these reductions and the technology driving them?
- Petrol is still the fuel of choice for cars and diesel for trucks. But new generation diesel cars use up to 30 per cent less fuel than petrol vehicles for similar performance and sales in Australia are booming. New technology to control diesel emissions is making them cleaner as well as greener.
- Great progress has been made in reducing vehicle emissions. By law, today's new petrol cars must emit about 80 per cent less HC (see box on jargon) and 90 per cent less NOx than they did in 1986.
- In future, allowable emissions of HC and NOx from new petrol cars will be halved compared with today. For new diesel cars, allowable emissions of NOx are likely to be cut by 70 per cent and PM by 80 per cent.
- Today's new diesel trucks must emit over 50 per cent less NOx and 90 per cent less PM than in 1995 (see chart). For new diesel trucks, allowable NOx emissions will be cut 40 per cent.
- Australian emission standards follow those in Europe, with a delay. For cars, the 2005 European standard (Euro 4) will be phased in from 2008. For trucks, the 2005 European standard is being phased in from 2007 and the 2009 European standard (Euro 5) will be phased in from 2010.
- Europe has already developed even tougher standards for cars in 2009 (Euro 5) and 2014 (Euro 6). These standards are likely to be adopted in Australia.
- How do fuels contribute to emission reductions? Unleaded petrol was introduced in 1986 so new catalytic converters on vehicles would be able to clean up emissions. Since 2002, the sulfur content of diesel and petrol has been reduced – because most of the advanced emission controls only work with very low sulfur content fuels.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## EMISSION CONTROL TECHNOLOGY IS REDUCING AIR POLLUTION

- In the past two decades, developments like electronic fuel injection, multiple valves per cylinder, variable valve timing and three-way catalytic converters have reduced emissions from petrol cars and light commercial vehicle engines.
- Catalytic converters, which have been fitted to the exhaust systems of new petrol vehicles since 1986, have been highly effective in reducing CO, HC and NOx emissions. They contain a layer of precious metals like platinum, rhodium and palladium which convert pollutants into harmless gases and water vapour.
- Diesel cars are more fuel efficient than petrol cars but in the past had high exhaust emissions. Modern diesel cars use high pressure common rail fuel injection and turbocharging to increase efficiency and may also have oxidation catalysts and particulate filters to cut CO, HC and PM emissions.
- A diesel particulate filter (DPF) works by trapping particulate matter in a fine honeycomb-like structure, then periodically heating the exhaust gases to burn it off. A diesel engine equipped with a DPF emits no visible smoke from its exhaust.
- To meet future standards, all diesel cars will have DPFs and an additional device to cut NOx emissions. A NOx storage trap stores NOx on a specially treated surface then converts it periodically to harmless nitrogen. Alternatively, a selective catalytic reduction (SCR) converter typically uses a urea solution to chemically change exhaust NOx into nitrogen.
- Diesel trucks and buses currently control emissions of NOx through advanced fuel injection, turbocharging and exhaust gas recirculation (EGR) which recirculates part of the exhaust gas into the engine to cut combustion temperature.
- In future, diesel trucks and buses will need either SCR converters or NOx storage traps to reduce NOx emissions and may also need particulate filters depending on the type of NOx control technology.

The ultimate diesel engine – the V12 power plant from Peugeot's Le Mans race car

- Future filters and other devices will typically require extra low sulfur diesel (maximum 10 parts per million sulfur) to work efficiently and no more than 50 ppm sulfur petrol. Caltex's Clean Fuels Project completed in 2006 invested $250 million in new refinery capability to produce 10 ppm sulfur diesel, as well as producing 50 ppm premium unleaded petrol.

*Do you have any comments on this Talkingpoint? Please email feedback@caltex.com.au.*