



Ontario Public Health Association
l'Association pour la santé publique de l'Ontario
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Ontario Public Health Association
700 Lawrence Ave. W., Suite 310
Toronto, Ontario, M6A 3B4
Tel: (416) 367-3313 / 1-800-267-6817
Fax: (416) 367-2844
Email: info@opha.on.ca
Web: www.opha.on.ca

Improve Air Quality: Use Low Sulphur Diesel for Off-Road Vehicles

Several common air pollutants that have been consistently linked to the human health impacts associated with smog or poor air quality include:

- ground-level ozone & its precursors nitrogen oxides (NO_x , NO, & NO_2) and volatile organic compounds (VOCs)
- fine particulate matter (PM_{10} and $\text{PM}_{2.5}$)
- sulphates (SO_4) & sulphur dioxide (SO_2)
- carbon monoxide (CO).

How Diesel Fuels Compare

Coloured or Off-Road Diesel is the diesel fuel that is typically used in vehicles and equipment that are not licensed for use on roads. In 2002, red diesel produced in Ontario contained on average 3,080 ppm sulphur. This diesel has no road tax applied to it. It must be dyed red to be eligible for the tax exemption.

Low Sulphur Diesel is the diesel that must be used in vehicles that are licensed for use on roads. In 2002, low sulphur diesel produced in Ontario contained on average 350 ppm sulphur. When used in licensed vehicles, a road tax of \$0.143 per litre applies. When low sulphur diesel is used in unlicensed vehicles that are used for non-road purposes, it can be exempted from the road tax provided that it is dyed red.

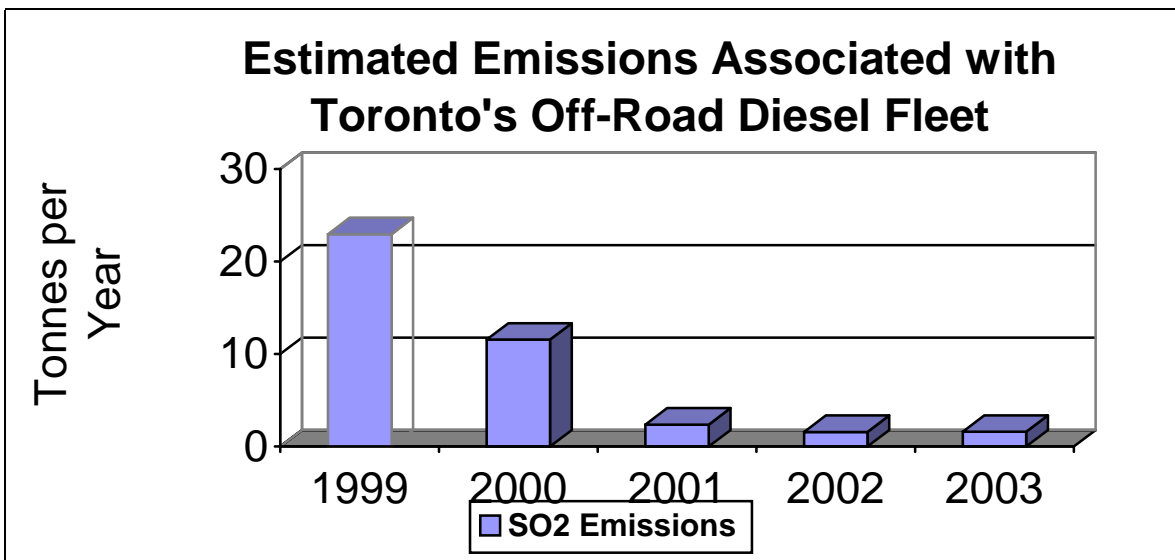
Reduce Emissions from Off-Road Fleets

When low sulphur diesel is used in off-road vehicles, emissions of SO_2 , SO_4 and PM can be directly reduced. Municipalities that maintain fleets of off-road vehicles & equipment such as construction equipment can realize significant emission reductions by using low sulphur diesel in their off-road equipment.

For example, the Region of Waterloo has estimated that it can reduce sulphur oxide emissions by about 8.5 tonnes per year by using low sulphur diesel in its off-road fleet.

By using low sulphur diesel for its off-road fleet, the City of Toronto has:

- Reduced SO₂ emissions from its off-road fleet by about 90% from an average of 17 tonnes per year to 1.6 tonnes per year;
- Over the 3 years in which it has done so, Toronto has paid between 2.7% less and 5.7% more per litre for the red dyed low sulphur diesel than it would have for the conventional coloured diesel.



To Estimate SO₂ Emissions

For simplicity's sake, the emissions associated with bids and fuel types can be crudely estimated by applying the following equation:

$$\text{Total SO}_2 \text{ (kg)} = \frac{[\text{ppm S in fuel}] \times [\text{litres of fuel}] \times [\text{fuel density}]}{[\text{MW of SO}_2/\text{AW of S}] \times 1 \text{ kg}/1,000,000 \text{ mg}}$$

Where:

sulphur content is ppm by weight (mg S/kg fuel)
 fuel density (kg/L) is approximately 0.844 for diesel
 MW (molecular weight) of SO₂ is 64
 AW (atomic weight) of sulphur is 32
 1000 kg = 1 tonne

Note: Sulphur levels and fuel densities can be found in Environment Canada reports, "Sulphur in Liquid Fuels", that are produced annually.

For more information, see www.opha.on.ca/projects/air.html or visit Environment Canada at www.ec.gc.ca/energ/main_e.htm and click on Library/Reports.