COMPARISON OF CLEAN DIESEL BUSES TO COMPRESSED NATURAL GAS BUSES

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ABSTRACT

Using previously published data on regulated and unregulated emissions, this paper will compare the environmental performance of current- generation transit buses operated on compressed natural gas (CNG) to current-generation transit buses operated on ultra-low sulfur diesel fuel (ULSD) and incorporating diesel particulate filters (DPF). Unregulated emissions evaluated include toxic compounds associated with adverse health effects (PAH, NPAH, benzene) as well as particulate matter (PM) particle count and size distribution.

For all regulated and unregulated emissions except NO_x, both technologies are shown to be comparable, with virtually identical levels of PM emissions, toxic emissions, and particle number emissions. DPF-equipped buses are shown to have lower HC and CO emissions than CNG buses. CNG buses are shown to have NO_x emissions that average 25 percent less than NO_x emissions from DPF-equipped buses, though CNG bus NO_x emissions are shown to be much more variable.

In addition, this paper will compare the capital and operating costs of CNG and DPF-equipped buses. The cost comparison is primarily based on the experience of MTA New York City Transit in operating CNG buses since 1995 and DPF-equipped buses fueled with ULSD since 2001. Published data on the experience of other large transit agencies in operating CNG buses is used to validate the NYCT experience.

The incremental cost (compared to "baseline" diesel) of operating a typical 200-bus depot is shown to be six times higher for CNG buses than for "clean diesel" buses. The contributors to this increased cost for CNG buses are almost equally split between increased capital costs for purchase of buses and installation of fueling infrastructure, and increased operating costs for purchase of fuel, bus maintenance, and fuel station maintenance.