Best Practice: Retrofitting Sanitation Fleet

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CITY: NEW YORK CITY

POLICY AREAS: ENVIRONMENT; WASTE MANAGEMENT

BEST PRACTICE

NYC Department of Sanitation's (DSNY) **Clean Fleet Program** aims to retrofit pre-2007 refuse and recycling collection trucks with new diesel particulate filters (DPFs) by 2012. The new DPFs will reduce particulate matter (i.e. soot) from diesel exhaust emissions by 90 percent, pursuant to Local Law 39 of 2005.

ISSUE

Before 2010, New York City (NYC) was not meeting the annual National Ambient Air Quality Standard (NAAQS) for fine particulate matter (PM2.5). One local source of such air emissions was DSNY's fleet of heavy duty diesel (Class 8) waste collection trucks. 2007 Model Year and newer heavy duty diesel trucks reduce particulate matter (PM) emissions by 90 percent compared to the pre-2007 model year levels using factory-installed equipment. NYC passed Local Law 39 in 2005 mandating the use of Best Available Retrofit Technology to reduce emissions from the existing pre-2007 model year DSNY collection trucks to help improve local air quality.

GOALS AND OBJECTIVES

The goal of the program is to comply with Local Law 39/2005, which principally aims at incorporating new alternative fuel sanitation vehicles and technology into DSNY's fleet, to reduce particulate matter emissions from DSNY's pre-2007 waste collection trucks by 90 percent. This requires that 100 percent of the collection truck fleet is equipped with DPFs (diesel particulate filters) by July 1, 2012, and also entails training mechanics and retrofitting 512 trucks over the next 6 years.

IMPLEMENTATION

The pilot retrofit program with DPFs resulted in partnerships with equipment manufacturers, and prior research and development for DSNY's effort was partially supported by grant funds from the U.S. Department of Transportation Congestion Mitigation and Air Quality (CMAQ).

Data collection from the pilot program demonstrated the feasibility of the retrofits. Ultra-low sulfur diesel (ULSD) fuel was required for the DPF technology to work properly and mechanics were trained on how to install and diagnose the DPF technology.

Per 2005's Local Law 39 mandate, DSNY developed a schedule to retrofit their truck fleet. Additionally, they prepared contracts to procure the filters. All of the DPFs are passively regenerating filters. ULSD fuel was already mandated nation-wide under federal law in 2006. DSNY selected Longview DPF technology for installation. DSNY worked in partnership with the NYC Department of Environmental Protection to ensure that the technology selected met appropriate standards.

COST

The cost to retrofit one truck is approximately $16,900 for equipment (in 2010) plus 16 hours of mechanic's labor. Training of a mechanic to install and service DPFs required approximately 24 hours. A DPF requires annual cleaning of ash from the filter, which takes one to two hours. Additionally, fleet turnover results in the purchase of approximately 250 new trucks per year to meet these new-truck standards. 80 percent of the DPF equipment and installation cost was covered by U.S. Department of Transportation CMAQ grant funds. Staff time was required to apply for federal grant funding.

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RESULTS AND EVALUATION

The program is very successful and on track to meet its goals of reducing PM pollution by 90 percent from pre-2007 DSNY collection trucks by 2012. DSNY has already cut its overall diesel fleet PM emissions by approximately 80 percent and NO emissions by half since LL38/2005 was passed, with further reductions expected as the fleet turns over.

Cleaner diesel collection trucks benefit local air quality and are better for the vehicle operators and the technicians who service the trucks. The exhaust system backpressure is measured over time to insure there is no adverse effect on overall vehicle performance. Truck mileage per gallon has not been adversely affected by the DPFs. This retrofit of collection trucks is estimated to result in a reduction of 15.8 tons in PM annually, assuming 5 hours of use per truck, 6 days per week. This measure and others have helped NYC achieve the annual NAAQS for PM2.5 in 2010.

TIMELINE

Every round of retrofits is planned one year in advance. The lead time for parts delivery is approximately six months.

2005 – Local Law 39 passed
2006 – ULSD fuel mandated under federal law
August 2006- beginning 2007 – DSNY Pilot retrofit (during which mechanics and operators were interviewed)
2007– Mechanics trained
March 2007 – City-wide Retrofitting began
May 2007- heavy-duty vehicle CNG fueling station in Woodside, Queens went into service for new fleet
October 2010-DSNY also put into service one hybrid-hydraulic CNG collection truck
2011 – Retrofits completed January 1, ahead of required date of July 1, 2012 (set by Local Law 39)
Present– Continued interest in alternative fuel. DSNY is currently testing two diesel-powered hybrid-electric street sweepers in two districts and is committed to exploring fully the costs and benefits of incorporating hybrid collection trucks into its fleet.

LEGISLATION

In 2005, NYC enacted Local Law 39, which requires all City-owned and operated diesel-powered vehicles to use ULSD fuel and mandates a schedule to equip such vehicles with the best available exhaust after-treatment technology. In 2006, the Federal Clean Air Act mandated the use of ULSD fuel by on-road diesel equipment, and required new heavy duty diesel trucks to come equipped with DPFs or other equipment to meet a PM standard of 0.01grams per brake-horsepower-hour starting with the 2007 Model Year.

LESSONS LEARNED

Operator and mechanic training are key to the successful implementation of the retrofit program. It is very important to work closely with the engine and after-treatment equipment manufacturers. The diesel engine must be in good working order prior to a retrofit, so it does not prematurely load the filter and cause excessive back pressure.

TRANSFERABILITY

With the proper resources (trades people) in place, and by following proper retrofitting procedures as per the manufacturer, any municipality that uses ULSD should be able to install/retrofit its heavy duty diesel fleet with advanced diesel exhaust after-treatment such as DPFs.

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In US cities, the availability of grant funding to help cover the cost of the program will depend on the jurisdiction. This experience is transferable to other kinds of heavy duty diesel fleets, both public and private. The use of retrofits for heavy duty diesel vehicles older than model year 1992 may present certain technical limitations.

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Facts and figures in this report were provided by the highlighted city agency to New York City Global Partners.