



Expanding the Success of NYC DOT
Hunts Point Clean Trucks Program

Hunts Point TRU Incentive Program



www.nycctp.com



Program Background

Initial Program: FY 2017 – FY 2021

Diesel emissions generated by older Transport Refrigeration Units (TRUs) increase the risk of negative health effects and are a major source of Particulate Matter (PM) pollution. The New York City Department of Transportation (NYC DOT) launched the Hunts Point TRU Incentive Program to address this source of emissions within the Hunts Point Produce Market (HPPM) as part of the Hunts Point (now NYC) Clean Trucks Program.

Historically, the South Bronx has the highest asthma rates in New York City due to poor air quality. Approximately 15,000 trucks travel to and from the market daily. Hunts Point is defined by its role as a major industrial and commercial hub, is home to the Hunts Point Food Distribution Center, and is one of the largest food, produce, meat and fish distribution centers in the world. The HPPM uses a significant number of stationary transport trailers operating twenty-four hours a day, seven days a week, for excess storage on-site, to keep produce cold-chain compliant. These nearly 1,000 trailers are rarely driven off-site. Aggregated, these storage trailers represent a unique 'point source' of emissions in the local community and negatively contribute to freight-generated air pollution and the associated health risks for residents and businesses alike.

Support for the NYC DOT TRU Incentive Program came from NYC's "PlaNYC" funds over the course of fiscal years (FYs) 2017 through 2021. The initiative showed that the replacement and scrappage of older non-road TRU units create a significant environmental benefit by replacing old, high polluting units with newer, more efficient technologies, including all-electric, hybrid-electric, or the newest diesel model TRUs.

How are TRU Engine Tier Levels Categorized?

TRU engines are considered by the U.S. Environmental Protection Agency (EPA) as non-road engines, which are defined as engines used for purposes different than the operation of vehicles on public roadways. The U.S. EPA has adopted emission standards for different types of non-road engines, including TRU engines. TRU engine standards are regulated under the category of emissions from heavy equipment with compression-ignition

(diesel) engines. The U.S. EPA adopted emission standards, known as Tiers, for TRU engines ranging from the least stringent (uncontrolled “Tier 0”) to the most stringent (Tier 4-Final). Tier levels are determined by the engine model year and maximum rated horsepower (HP).

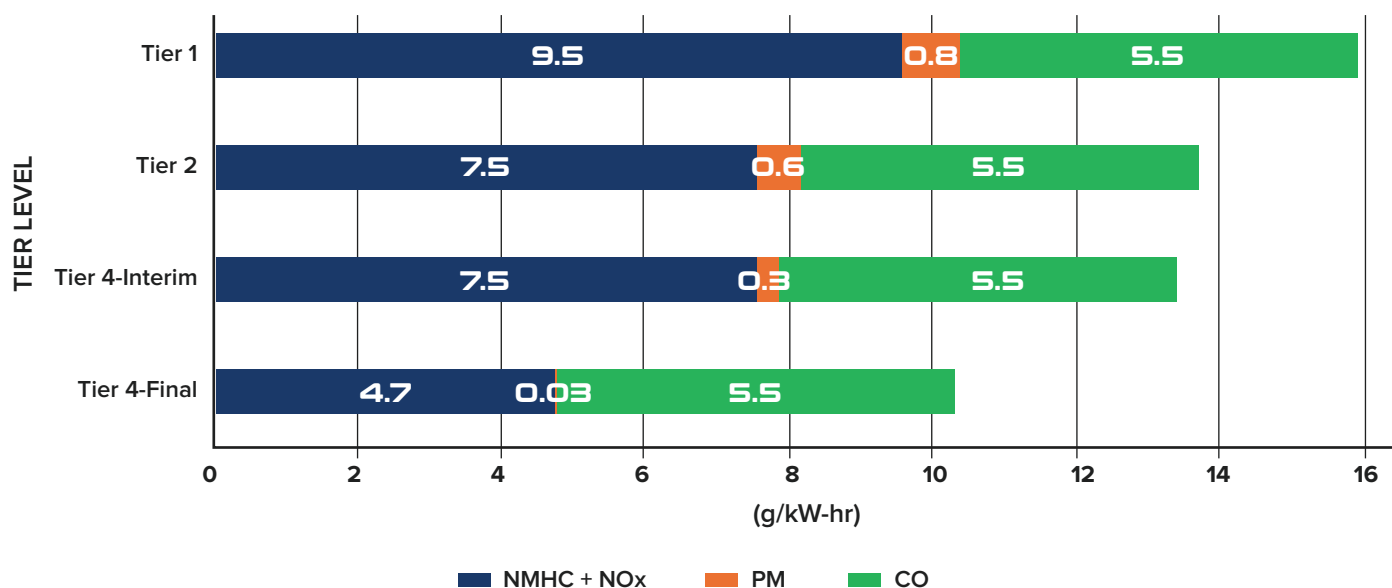
TRUs are used at the HPPM to store perishables at optimum temperatures in trailers before delivery across the region. Figure 1 below identifies the tier levels using U.S. EPA’s Non-Road Compression-Ignition Engines: Exhaust Emission Standards.

Figure 1. Non-Road Compression-Ignition Engines: Exhaust Emission Standard Tier Levels

Rated Power	Tier ¹	Model Year
25 ≤ HP < 50	Uncontrolled	Pre – 1999
	1	1999 – 2003
	2	2004 – 2007
	4-Interim	2008 – 2012
	4-Final	2013 +

Emissions from non-road engines include nonmethane hydrocarbons (NMHCs), nitrous oxides (NOx), PM2.5, and carbon monoxide (CO). These chemical constituents, referred to as “exhaust emissions,” are major concerns, as they combine to form ozone and can adversely affect cardiovascular and pulmonary health. Figure 2 shows the emission standards at each Tier level interval as represented in units of grams of fuel consumed to produce one kilowatt-hour of energy output (g/kW-hr), where NMHC+NOx and PM2.5 emissions are reduced as tailpipe emission standards become more stringent..

Figure 2. Nonroad Compression-Ignition Engines: Exhaust Emission Standards

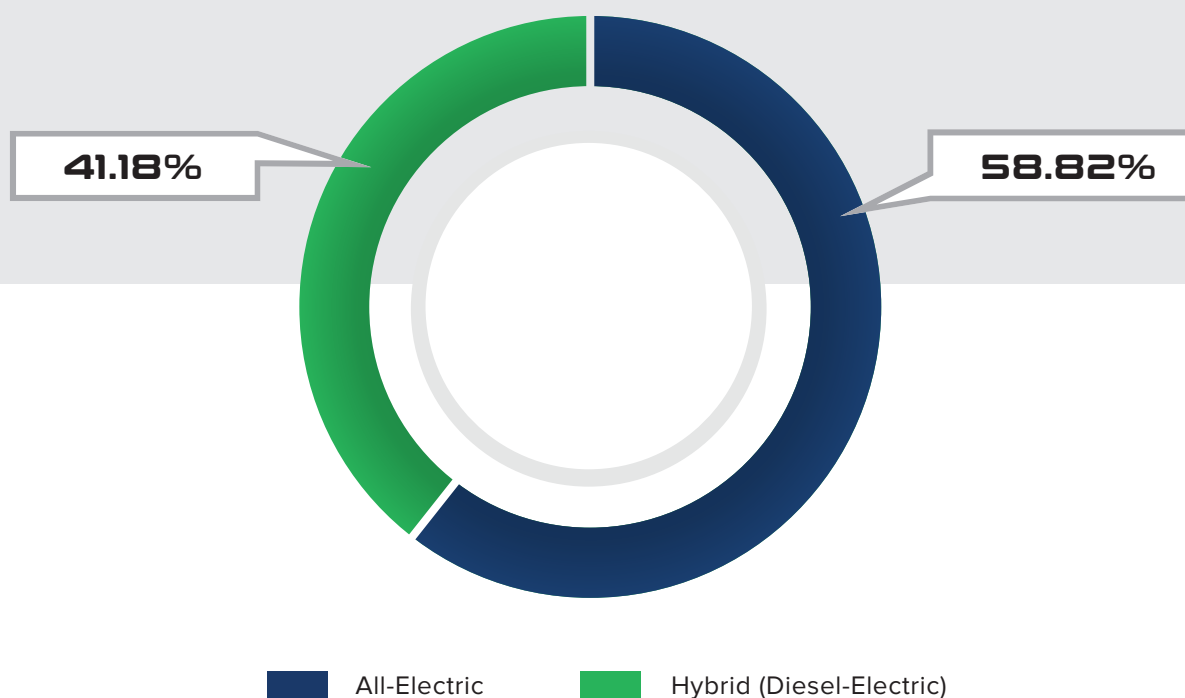


¹ Source: Nonroad Compression-Ignition Engines: Exhaust Emission Standards (EPA-420-B-16-022, March 2016)

Program Participation Results

During FYs 2017 - 2021, the NYC DOT TRU Incentive Program accepted applications from six (6) companies for a total of sixty-eight (68) replacements in the categories of hybrid-electric, and all-electric TRU model replacements. The twenty-eight (28) hybrid (diesel-electric) TRU replacements were new units with engines that met EPA's Tier 4-Final emissions standards. The forty (40) all-electric TRUs do not have engines and are categorized as zero emissions technology. The TRU Incentive Program successfully distributed a total of \$519,567 (or approximately \$7,600 average per incentive) for the replacement of 68 TRUs and the scrappage of 69 older heavy-polluting diesel TRUs.

Figure 3. Percentage of TRUs Replaced by Technology



Operational Benefits and Challenges

New TRU technology improves operations of produce distributors by reducing energy usage, increasing temperature efficiency, reliability, and reducing maintenance cost. Some applicants indicated that the hybrid-electric TRU technology better aligned with daily operations, citing reasons that included the availability of charging infrastructure due to insufficient docking stations to plug-in all-electric TRUs, or trailers that were put in/taken out of service for routine maintenance.

Figure 4 shows the historical number of replacements over FYs 2017-2021. The program received great interest, but some applicants did not have consistent loading bay access or additional electrical capacity at their locations to be able to expand participation in the program.

Figure 4. Number of TRUs Replaced by Fiscal Year and Technology

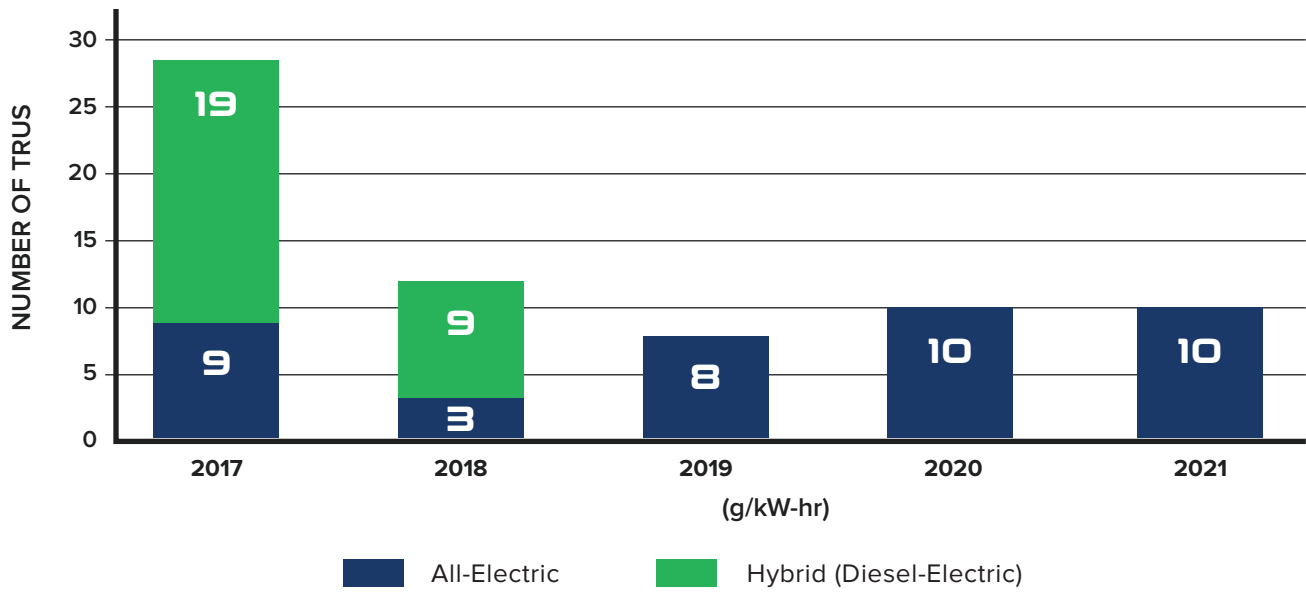
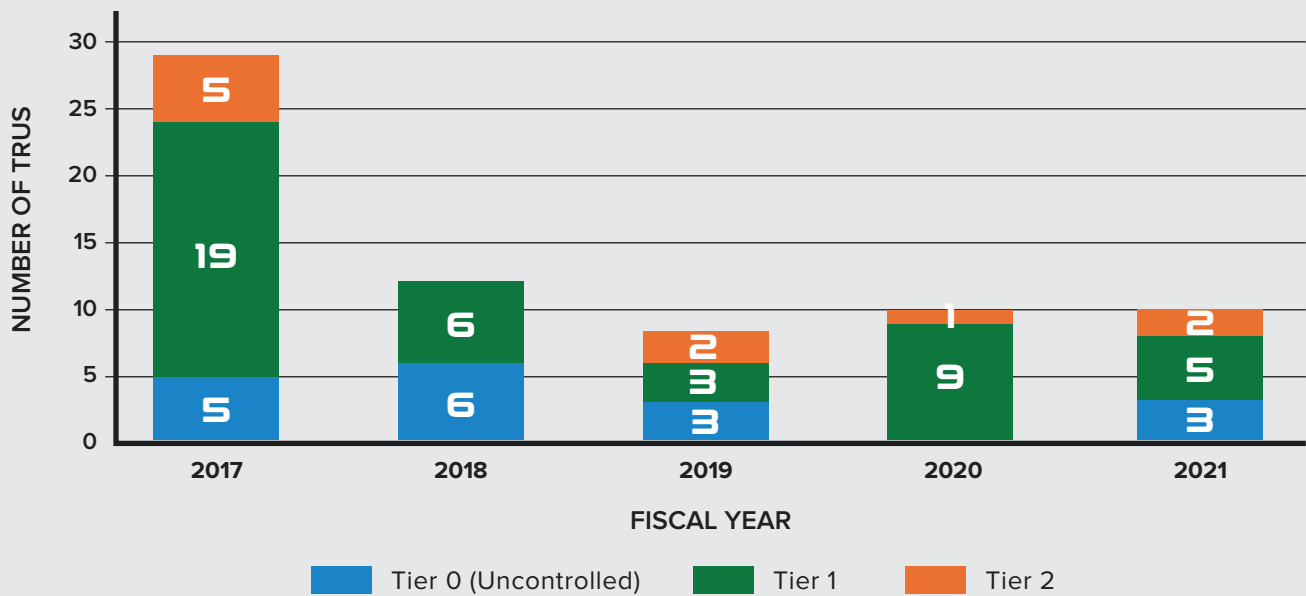


Figure 5 provides additional details on the types of old TRUs replaced and scrapped. Holes are drilled into the engines of the older units to render them inoperable in the future. This ensures the emissions reduction benefits of the program. The older the Tier, the greater the emissions reduction value.

Figure 5. Total Number of TRUs Scrapped by Fiscal Year and TRU Technology



Note: Sixty-eight (68) TRUs were replaced for the scrappage of sixty-nine (69) TRUs. In FY 2017, one applicant voluntarily scrapped one (1) TRU.

Emissions Results

To protect public health and welfare nationwide, the federal Clean Air Act requires the U. S. EPA to establish National Ambient Air Quality Standards (NAAQS) for six common air pollutants also known as “criteria” air pollutants. The pollutants are PM, ozone, CO, sulfur dioxide, nitrogen dioxide and lead. Hydrocarbons (HCs) are a type of Volatile Organic Compound (VOC), that when combined with NO_x and sunlight help produce ground level ozone. The estimated emissions reductions for the 68 TRUs funded by the NYC DOT TRU Incentive Program were calculated through the U.S. EPA’s Diesel Emissions Quantifier (DEQ). The annual amount reduced after the TRU replacements are summarized in Table 1.

Table 1. Annual Emissions Reduction Results

Annual Results (short tons)	NO _x	PM _{2.5}	HC	CO	CO ₂	Fuel (gallons)
Baseline for Old TRUs	84.70	63.34	15.05	125.31	4,424.60	393,296
Amount Reduced with Replacement TRUs	75.98	63.29	14.67	124.87	3,392.40	301,544
Percent Reduced with Replacement TRUs	89.70%	99.92%	97.46%	99.65%	76.67%	76.67%

- Based on DEQ Version 8.1 (Released on December 19, 2019).
- Annual Results represents the amount of emissions reduced annually by the entire fleet.

Cost Effectiveness

In addition, the DEQ also calculates the lifetime cost effectiveness for the replacement of the 68 TRUs. Lifetime cost effectiveness is calculated by the total incentives awarded divided by the total lifetime emissions reduced and is represented in units of dollars/short tons reduced. Table 2, below, shows the lifetime cost effectiveness for NO_x, PM_{2.5}, HC, CO, and CO₂. The DEQ does not calculate cost effectiveness for fuel reductions.

Table 2. Lifetime Cost Effectiveness

Cost Effectiveness (\$/short ton reduced)	NO _x	PM _{2.5}	HC	CO	CO ₂
Cost Effectiveness	\$6,838.21	\$8,209.57	\$35,424.25	\$4,160.83	\$153.16



Summary

The TRU Incentive Program has shown that providing TRU incentives at the right price point will result in significant emissions reductions and will do so cost effectively. TRUs with the newest Tier 4 technology will improve operational costs for produce distributors by reducing fuel and energy usage, increasing temperature efficiency and reliability, and reducing maintenance costs. The HPPM is one of the largest food distribution centers in the United States. It is home to an estimated 1,000 TRUs that operate 24 hours a day, 7 days a week, ensuring food safety and freshness is delivered to New Yorkers and the tri-state area daily. Adjacent communities bear an enormous environmental burden from the use of old, inefficient TRUs that can easily be replaced through a well-designed incentive program that benefits market businesses and the health of the entire city. Modernizing the TRU fleet in Hunts Point drastically reduces PM2.5 and NOx emissions and will result in a reduction in greenhouse gas emissions by reducing the amount of diesel fuel required to safely operate the units. A reduction in emissions from TRU replacements in the HPPM helps address social equity concerns around health and safety in surrounding communities and the disproportionate environmental burdens those communities face.

Learning from the success and significant air quality benefits of the initial TRU Incentive Program, NYC DOT is gauging industry interest in a program expansion, with plans to initiate a new phase of TRU replacement incentives in 2025.



Interested in learning more?

Contact us at nycctp@tetrattech.com

Or call 877-310-2733

www.nycctp.com