

CASE STUDY

RENEWABLE DIESEL, A POTENTIAL REPLACEMENT OF ALL FOSSIL FUEL FOR NEW YORK CITY'S TRUCKING FLEET AND BUILDINGS

BACKGROUND:

The City of New York operates the largest municipal fleet in the country with 30,000 total vehicles and over 13,000 trucks and off-road units which use diesel fuel. NYPD emergency response trucks, fire engines, ambulances, sanitation garbage trucks, forestry bucket trucks, street paving units, and other equipment support provision of essential public services every day. ¹

The City of New York is also the largest property owner in the City's five boroughs encompassing 362.1 million square feet, and nearly 5,000 buildings and parcels of land throughout the City. ² These buildings are used by city agencies, local government, schools, hospitals, libraries, fire houses, police stations and other municipal entities that serve the general public. In FY19, municipal trucks and buildings used 42 million gallons of diesel fuel.

THE ISSUE:

The City of New York recognizes the reality of climate change and the increasing effects of global warming. Greenhouse gas emissions are causing rapid warming of the Earth's atmosphere with the potential for catastrophic effects on public health. For these reasons, New York City made a commitment to reduce GHG emissions 80 percent by 2050 from 2005 levels (80 x 50), with an interim target to reduce emissions 40 percent by 2030 (40 x 30) and 50% for the City fleet by 2025. ³

NYC is pursuing many alternatives for its fleet and buildings including electric vehicles and natural gas for heating. However, there is an extensive existing legacy infrastructure that utilizes diesel fuel. NYC has already implemented biodiesel in blends of 5% to 20% as a fuel alternative for fossil fuel diesel in fleet and heating oil. These efforts are codified in NYC Local Law. Renewable diesel (RD) is a next stage biofuel that holds the promise of a complete replacement for fossil diesel fuel.

Renewable diesel (RD) - also known as green diesel, hydrogenated vegetable oil (HVO), and hydrocarbon diesel among other names- is a drop-in replacement for diesel that is derived from animal fats and vegetable oils. RD is an advanced biofuel that uses the same feedstock as biodiesel. RD differs from biodiesel in that its chemical structure is very similar to that of ultra-low sulfur diesel (ULSD) and contains no fatty acid methyl esters (FAME). RD is free of sulfur, aromatics and oxygen. With respect to renewable diesel, the following statements are noteworthy: ⁴

- **Renewable diesel (RD) reduces life-cycle greenhouse gas (GHG) emissions by up to 80% when compared to petroleum diesel;** Renewable diesel (RD) is chemically similar to ultra-low sulfur diesel (ULSD). Therefore, it is fully fungible and can be used in all existing diesel fueling infrastructure with no modifications.
- Renewable diesel (RD) can be blended with diesel and biodiesel in any proportion.
- Renewable diesel (RD) is produced from 100% renewable and sustainable feedstock.
- Renewable diesel (RD) passed EPA's Clean Air Health testing requirements.
- The California Air Resources Board (CARB) has certified renewable diesel's pathways with very low carbon intensity (CI) scores, as low as 16.89 gCO₂e/MJ for "used cooking oil" (UCO) feedstock. For comparison, CARB reported a CI of 100.45 gCO₂e/MJ for diesel. ⁵

Multiple cities and private companies have successfully replaced petroleum diesel with RD as the transportation fuel for their fleets without experiencing any issues. These include the cities of San Francisco, Oakland, Sacramento, and San Diego in California as well as the cities of Portland and Corvallis in Oregon. In addition, UPS, Google and Boeing are private companies that have also implemented RD in their fleets.

The state of California is one of the largest consumers of RD in the country, and its RD net supply has continue to grow ever since the State implemented the [Low Carbon Fuel Standard \(LCFS\)](#) program in 2011. The LCFS program is administrated by California Air Resources Board (CARB) and is intended to reduce

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the carbon intensity (CI) of California's transportation fuels by requiring that companies that sell or supply fuel in the State achieve carbon intensity (CI) targets. CI is a measurement of the fuel's life cycle (well-to-wheels) greenhouse gas emissions and is calculated by assessing the carbon emissions at every step needed to bring a fuel from well to the vehicle. CI credits are created when a fuel's CI is lower than its LCFS CI target. Thus, the lower the fuel's CI, the more LCFS CI credits it generates.

Under the LCFS Program producers and importers can generate, buy, transfer, bank, and borrow CI credits. Fuel companies that have fuels that do not meet the CI targets can purchase credits from producers that have fuels that generate them. In essence, the LCFS regulation imposes additional charges on high CI fuels that subsidize the cost of low CI fuels. The result is a reduction in the overall cost of low CI fuels. In 2017, California reported that nearly 10 million credits at a price of \$100/credit were generated by the fuel industry resulting in a total value of \$1 billion for those credits.⁶

THE SOLUTION/HOW AN LCFS WOULD HELP NYC FLEET AND BUILDINGS:

In pursuit of its commitment to reduce GHG emissions, the City of New York is considering using Renewable Diesel (RD) to fuel its city trucking fleet and is exploring the groundbreaking implementation of using renewable diesel (RD) as heating fuel for its municipal buildings. The "*Inventory of New York City Greenhouse Gas Emissions in 2016*," which was published by the City of New York in December of 2017, identified stationary energy use in buildings and transportation fuels as the main sources of GHG emissions in the City.⁷

On December 1, 2015, The City of New York announced and launched steps to implement its "*NYC Clean Fleet*" initiative, which fosters clean and renewable solutions for vehicles and fuels to reduce harmful pollutant emissions that are detrimental to the health of the City's residents and contribute to global climate change. As part of the plan, the City is looking to displace the use of conventional diesel fuel with alternative fuels, such as biodiesel and renewable diesel (RD).⁸

To that end, in the summer of 2018, the City successfully conducted a demonstration pilot with nearly one million gallons of renewable diesel (RD) that fueled city trucks across many agencies. Based on the operational success of the demonstration, the City of New York is in the process of bidding/implementing a long-term contract for the purchase of renewable diesel (RD) for its municipal fleet.⁹ However, with NY State lacking an LCFS, the high cost of RD fuels poses a potential roadblock for successful implementation of this critical initiative.

Adopting low carbon regulations, such as California's LCFS, that generates financial credits for low carbon fuels will persuade RD fuel producers and distributors to establish and invest in a supply chain infrastructure in the northeast and provide the RD fuel to the City of New York at a lower cost.

Renewable diesel production and consumption are expected to increase exponentially over the next few years due to its low greenhouse gas emissions, up to 84% lower CI than diesel, and credit incentives offered by legislation such as Low Carbon Fuel Standard (LCFS) in California, Oregon and British Columbia; and the recently proposed Canadian Clean Fuels Standard (CCFS).

A well-developed and successfully executed LCFS in New York would deliver tangible incentives for the production and supply of low-carbon fuels in the State. These incentives would open doors to competitive renewable fuel markets, such as renewable diesel, in New York City not only in the transportation sector, but also as heating fuels for city buildings. RD is also a potential alternative fuel in additional areas such as ferry service.

NYC has the capacity to quickly replace all fossil fuel use in government fleet and buildings. A New York State LCFS is the key.

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