# Biofuel Feasibility Study at an Eco-Industrial Park, Fairless Hills, PA

The 2,600-acre Keystone Industrial Port Complex (KIPC), formerly known as U.S. Steel Fairless Works, operated as an integrated steel mill from 1952 to 2001. While still undergoing remedial measures, the site was transformed into an eco-industrial park. The community's goal for the KIPC site is to put the land back into productive industrial use and attract "green" technology jobs from around the world. More than 20 companies located in this industrial park, including several companies from the renewable energy and recycling sectors. A recent addition is a biofuel manufacturer that plans to construct a pilot facility to produce an algae-based biomass for use in biodiesel and other commercial products.

*Entry to KIPC eco-industrial park*

With an algae-based biofuel manufacturer coming to the complex, EPA Region 3 and KIPC conducted a feasibility study to assess the potential environmental benefits and economic feasibility of using the biofuel as a replacement fuel for diesel vehicles that regularly enter the site. KIPC, along with two adjacent landfills and a waste-to-energy plant operated by Waste Management Corporation (WM), attracts heavy diesel vehicle traffic, creating significant potential demand for the biodiesel produced at KIPC. Region 3 aims to provide a qualitative estimate of the potential environmental impacts, and the costs associated with replacing biodiesel in vehicles currently using diesel fuel at the site. The methodology is expected to be useful in analyzing the use of biofuels at similar sites with a heavy volume of diesel truck traffic.


*Aerial view of KIPC*

The study identifies B2 (i.e., 2 percent biodiesel blend) as the baseline fuel because it is the minimum biodiesel content required in Pennsylvania (B2 represents a blend of 98 percent ultra low sulfur diesel and 2 percent biodiesel). The target fuel is B20 blend, the maximum percent blend that can be used universally in diesel engines without retrofitting fuel systems and other engine components.

Summary of Analysis and Results:

- Approximately 4,400 vehicles servicing three sites were included in the analysis. An estimated 39,194,000 gallons of fuel are replaced with biofuel in these vehicles.
- Evaluated switching from B2 (baseline fuel) to B20.
- Biofuel decreases fuel efficiency by 1.5 percent (i.e., more biofuel is required to power a vehicle the same distance as when using diesel fuel).

- The greatest environmental benefits are reductions in discharges of air pollutants: VOC, CO, PM (2.5), $CH_4$ (see Figure).
- Biofuel increases NOx emissions by 2 percent.
- There is no significant increase in $CO_2$ emissions at the combustion stage, but due to decreased fuel efficiency with the used of soybean-based biodiesel fuels, emissions increase 1.35 percent.
- All GHG emissions (CO, $CO_2$, $CH_4$) as $mTCO_2e$ result in a 1.24 percent increase in emissions.

| Pollutant | From B2 to B20 | |
|---|---|---|
| | Emissions (mT) | % Change |
| VOCs | -36 | -18% |
| CO | -49 | -8% |
| $PM_{2.5}$ | -4 | -7% |
| $NO_x$ | +72 | +2% |
| $CH_4$ | -2 | -18% |
| $CO_2$ | +5,811 | +1% |

*Estimated Change in Annual Emissions from Vehicles Switching from B2 to B20*