

EVALUATION OF USF BIODIESEL FUELED BULL RUNNER SERVICE

PROBLEM STATEMENT

In August 2002, the University of South Florida (USF) Bull Runner Shuttle service began using 100% biodiesel fuel (B-100), an alternative fuel used in place of and along with conventional petroleum diesel fuels, to run its campus-wide shuttle fleet. Biodiesel fuels are derived from sources including oils such as those found in rapeseed, corn, mustard, soybean, sunflower, macadamia, coconut, and peanut seeds. They are also derived from animal fats through a procedure that removes the glycerin from the oil, which results in a clean burning fuel product that can be used in conventional compression ignition engines. Twenty-two of USF's twenty-five shuttle service vehicles currently burn the B-100 biodiesel fuel. Currently, the cost difference, in terms of fuel efficiency, when comparing biodiesel to petroleum diesel is unknown.

OBJECTIVES

The objective of this research was to investigate the performance and benefits of using biodiesel-fueled transit vehicles as compared to traditional petroleum-fueled transit vehicles. Performance data per the use of biodiesel fuel was collected over a 6-month period (October 2002-March 2003) and compared to data per the use of traditional fuel for a similar period in 2001-2002. Performance data collected included the following:

- Maintenance data
 - Repair description
 - Scheduled
 - Unscheduled
 - Road call
 - Labor hours
 - Date of repair
 - Odometer reading
 - Parts replaced
 - Parts costs
 - Removed from service (if applicable)
 - Date returned to service
- Fuel data
 - Type and amount of fuel
 - Odometer reading
 - Date
- Oil data
 - Make, type and viscosity of oil
 - Amount
 - Odometer reading
- Fuel economy

FINDINGS AND CONCLUSIONS

Biodiesel has inherent advantages over other alternative fuel types insofar as having the ability to transition back and forth between it and conventional fuel at a moment's notice, e.g., when petroleum diesel fuel prices increase or biodiesel fuel prices decrease. An advantage of the biodiesel fuel product is that it is not only ecologically sound, but a fleet can easily be converted by simply putting the fuel in the tank (which will, however, necessitate a change to the maintenance schedule).

However, on the basis of cost analysis alone, given system performance and the comparable price between the fuel types, the transition from petroleum diesel fuel to biodiesel may not seem particularly worthwhile, especially considering additional system maintenance costs related to fuel filter replacement and the degradation of fuel hoses and engine gaskets contribute to vehicle adjustment periods. These costs will vary according to vehicle maintenance schedules and adjustments to the infrastructure in which the vehicle operates.

Furthermore, the biodiesel distribution infrastructure presently makes biodiesel seem a less-than-effective alternative to traditional fuel. Biodiesel does not have the same distribution infrastructure that petroleum diesel does despite being safer transport than petroleum diesel. Certain tank materials, such as polyethene, cannot be used because of the solvent properties of biodiesels, which limits tanks that can be used.

BENEFITS

Biodiesel is a renewable fuel source, over against finite petroleum diesel fuel resources. Research conducted by the National Biodiesel Board indicates that bio-diesel demonstrates a substantial reduction to nearly all regulated and non-regulated pollution components, which renders it a ecologically advantageous alternative. Further, as the supply of petroleum diminishes, with corresponding price increases, vehicle operators will be forced to seek alternatives. Biodiesel fuels are a viable alternative now with competitive prices, and will likely become increasingly attractive over time.

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