

Workgroup Recommendations and Other Potential Control Measures
Diesel Initiatives Workgroup

DI006 – Leveraging Airport Leases to Achieve Reduction from Ground Support Equipment

DESCRIPTION

Newark Liberty International is owned by the Port Authority of New York and New Jersey (PANYNJ). PANYNJ then leases airport space out to the airlines and/or cargo companies. These leases are typically long in duration, extending up to 20 years. Therefore, any conditions contained in those leases would be long lasting. In recent years, it has come to light through several scientific studies that diesel emissions emanating from stationary and mobile sources are a significant health risk, especially to individuals who live in urban or heavily industrialized areas. In addition, Liberty International is located in an area that is already in non-attainment for ozone and fine Particulate Matter (PM). As of 2002, the direct contribution to PM emissions by Ground Support Equipment (GSE) at Newark Airport was approximately 333 tons.⁽¹⁾ In an NJDEP economic analysis⁽²⁾, if PM reductions in the State of New Jersey were reduced by 20%, there would be an economic benefit of at least \$770 million dollars (reduced lost workdays, reduced premature deaths and decreased hospital visit). Reductions in PM from airport GSE would contribute to this amount. In recent years EPA and the FAA began developing a voluntary emission reduction program for the aviation sector with the goal of avoiding mandatory or regulatory measures. Many stakeholders involved in this emission reduction program believed the EPA was not going far enough to implement worthwhile reductions, and subsequently withdrew from the program development process. As a result of this process breakdown, it is now incumbent on individual states to take action to reduce emissions in this sector. One method of enforcement would be to place emission reduction conditions on airline leases at the airport. Alternatively, rules could be adopted requiring a uniform phase-in of electrifying GSE.

From the Airline's point of view, ticket prices have not risen significantly since the late '80s, yet the airlines' operating expenses, such as fuel, labor and employee benefits have increased. Therefore, any condition that would increase the airlines' operating expenses could be met with some resistance. Thus, the task of reducing emissions in this sector may be difficult. Despite these difficulties, there are several initiatives being implemented throughout the country. Examples include:

- Part of the "green" effort underway at the Dallas/Fort Worth (DFW) Airport is an upgrade of the energy plaza and conversion of their ground fleet vehicles to run on alternative fuels.⁽³⁾ As part of this emission reduction initiative, American Airlines currently operates approximately 350 pieces of electric powered GSE at DFW.⁽⁴⁾
 - Southwest Airlines, which operates approximately 70% of all flights in and out of Bob Hope Regional Airport in Burbank, California, has

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committed to electrifying 70% of all of its ground support equipment by January 2006.⁽⁵⁾

- Denver International Airport is currently running 53 pieces of electrified GSE, which was implemented under the FAA Inherently Low Emission Airport Vehicle Pilot Program (ILEAV). Funding for DFW’s GSE was also supported through this program.⁽⁶⁾
- There was a recent proposal to build an electrical generation plant adjacent to Newark Liberty Airport. As part of their Carbon Monoxide (CO) contribution in a non-attainment area, the plant was going to electrify some of Continental Airline’s GSE to offset their CO emissions, which would also reduce particulate matter emissions. Although this proposal never came to fruition, this could be a method for other entities, such as a powerplant or refinery, to offset their emissions.

These previous examples demonstrate that reducing emissions at airports through the electrification of GSE is both a technically and economically feasible alternative to conventionally fueled GSE. However, both airport owners and the airlines have to be proponents of this alternative. To assist airlines in defraying the costs of conversion, EPA, DOE or FAA grants may be available for this use.

IMPLEMENTATION

In a July 2004 study conducted by the Electric Power Research Institute (EPRI), EPRI concluded that a rapid charging system, which would be critical for the deployment of electrified (battery powered) GSE, could be incorporated into the existing electrical infrastructure for the passenger loading bridge system. This loading bridge system is where passengers go from the gate directly into the airliner without being exposed to the outside elements. This is also referred to as a Jetway™ system. Each of these Jetways must have a dedicated electrical infrastructure, but only use electrical power for short durations. Because of these operating parameters, EPRI looked at a “sharing” concept of power between the Jetway and a rapid charging system for GSE. The preliminary results look promising. However, for the sharing of this power to be successful, the Jetway and rapid-charging system must communicate with each other to ensure that the Jetway always has first priority for available power.⁽⁷⁾ Therefore, if the results of this EPRI study are successful, the electrical infrastructure for the charging of battery powered GSE may already be in place, thus significantly reducing start-up costs.

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COST

It has been reported from United Airlines operating bag tractors at San Francisco Airport that there was a lifecycle savings of 40% over the diesel units replaced.⁽⁶⁾

One vendor of electrified GSE, Charlette, Inc. states that the operating costs of a typical piece of GSE equipment are approximately half of the operating costs of a comparable diesel powered GSE, and that the capital return payback is approximately 36 months.⁽⁸⁾

The initial cost of electrified GSE is typically 30 to 35 percent more than its diesel counterpart. However, initial cost cannot be the only determining factor when choosing an electric fleet over a gas fleet. To make the best fleet decision, one must consider the total cost of ownership. In the case of a baggage tractor with a useful life of 15 years, the estimated fuel savings alone will be more than \$40,000, factoring in new batteries every five years. If maintenance costs an average of \$2,000 per year for a gas unit, over the life of an electric the savings would add up to \$18,000. Over the life of a tractor, that is an annualized savings of \$3,866 per year per unit.⁽⁹⁾

EFFECTIVENESS

In terms of reducing emissions at DFW, the green effort has reduced aggregate air emission by 37 tons annually and resulted in an energy savings of 28%.⁽³⁾

At Denver International Airport, the electrification of 53 GSE units and the conversion of 71 other vehicles (shuttle buses, pick-ups and cars) to Compressed Natural Gas (CNG) will have the following reductions (in tons) over the life of the equipment⁽⁶⁾:

Nitrogen Oxides (NOx)	451 tons
Hydrocarbons (HC)	15 tons
Carbon Monoxide (CO)	1,356 tons
Particulate Matter (PM)	0.3 tons
Sulfur Dioxide (SO ₂)	30 tons

SOURCES

1. NJDEP Air Emissions Inventory
2. Economic Analysis performed by Bill Mates, NJDEP, July 15, 2004.
3. Dallas Fort Worth Airport Press Release, October 20, 2005.
4. Phone conversation on March 8, 2006 with David Hennessey of the Environmental Affairs Office at Dallas Fort Worth.
5. Bob Hope Regional Airport Press Release, dated January 6, 2005.
6. FAA ILEAV Program Final Report, January 2006
7. Airport Passenger Loading Bridge Electrical Load Study, EPRI, July 2004
8. “Green and Mean”, by Richard Rowe. Ground Support Magazine, June 2001

Disclaimer – The recommendations contained within this white paper do not constitute official state decisions nor reflect any pending regulatory or nonregulatory actions. The NJDEP welcomes public feedback on this (or any other) white paper.

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9. “The True Cost of Going Electric”, by Ryan Gibson. Ground Support Magazine, March 1,2006