A Sustainable Waste Management System for Hartsfield-Jackson Atlanta Airport

Engineers for a Sustainable World (ESW), Georgia Institute of Technology, Atlanta, GA, USA

Background:

Hartsfield-Jackson Atlanta International Airport (ATL) is owned and operated by the City of Atlanta Department of Aviation (DOA). Today, ATL is considered the economic engine of the metropolitan Atlanta region, with a direct economic impact of over $32.5 billion and a total economic impact on the State of Georgia of $68.3 billion.

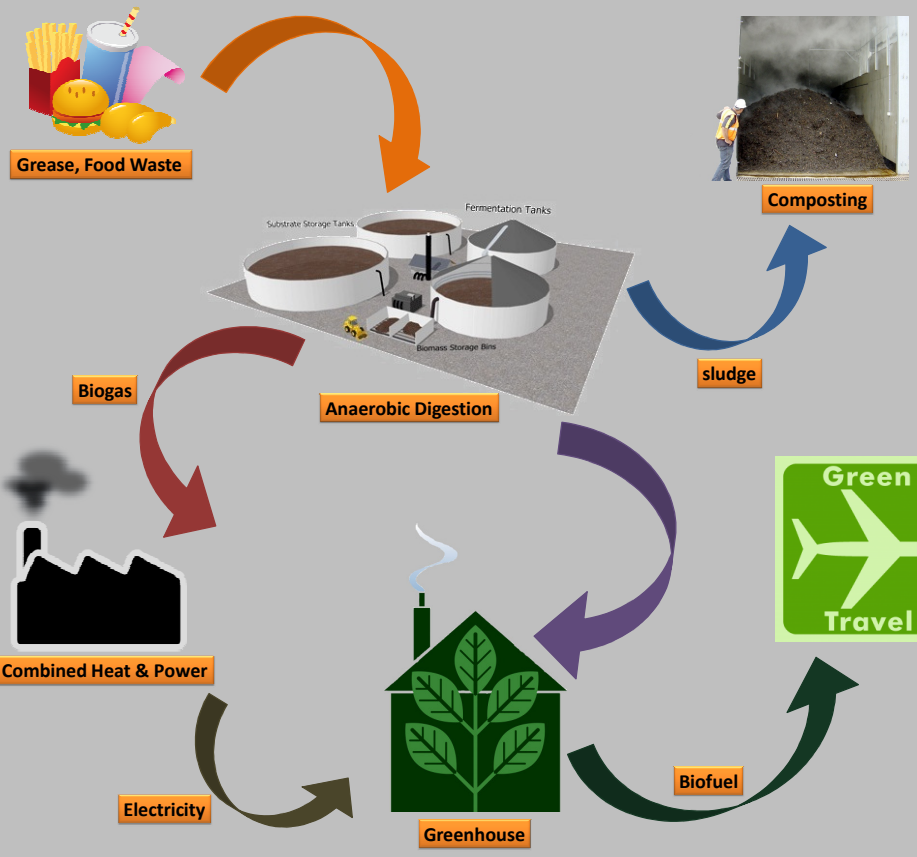
An Energy Park would provide an outlet for grease, compostables, yard trimmings, and food waste from the airport and the Southern Crescent community. Diverting these materials from landfills and turning them into energy meets the goals and objectives of the Airport's Sustainable Management Plan and the City of Atlanta's Zero Waste Zone.

Cooperation between Hartsfield-Jackson Atlanta Airport and Engineers for a Sustainable World at Georgia Tech:

1.Assessment of energy output associated with alternative biofuels within the greenhouse adjacent to the anaerobic digester and compost facility.
2.Assessment of the benefits of using by-products from the AD and compost facility in support of the greenhouse and biofuel production.
3.Assessment of the market, delivery, end user, and economics associated with alternative biofuels.
4.Recommend an approach for follow-on research within the greenhouse, including the potential for multiple biofuel options, to build on the preliminary assessment of the benefit and costs.
5.Draft and final report

Infrastructure	$1.5 million
Learning Center	$3.5 million
Receiving and Distribution Center	$5.0 million
Total estimated cost for Phase 1	$10 million

Process Flow Diagram for the Proposed Energy Park Development



Conclusion:

Creating biodiesel by recycling used cooking oil is another way to generate energy from waste. Biodiesel could be used in generators and boilers to reduce the amount of natural gas and diesel fuel needed. A combination system which could be called an "Energy Park" will minimize wastage, generate renewable energy and can be used as an educational tool for increasing awareness within the community. A preliminary conceptual site plan of the above described "Energy Park" is provided in this presentation and a flow diagram is included. ATL will further investigate the technical and economic feasibility of such a system and identify locations at which such a project can be successfully implemented. The Energy Park would include an anaerobic digester, which will convert waste to energy. To provide feed stock to the anaerobic digester, ATL could potentially partner with Atlanta Public Schools to provide a learning experience in sustainability for students and focus on food waste and compostable products. In addition, ATL could work with Georgia Tech to research biofuels technology and other alternative products that could be produced in greenhouses in the Energy Park.

Baseline Information for Resources of Concern

Category	2008	2010	Change
Electricity (kWh)	265,884,260	287,890,665	↑ +8.3%
Natural Gas (mmBtu)	81,563	63,665	↓ -21.9%
Jet Fuel (gallons)	16,172	13,789	↓ -14.7%
Diesel (gallons)[1]	26,194	31,756	↑ +21.2%
Gasoline	83,000	137,843	↑ +66.1%
Water (gallons)	307,788,536	252,622,788	↓ -17.9%
Emissions (tons of CO_2 equiv)	1,405,758	1,415,815	↑ +0.7%
Waste (lbs)	57,000,000	41,000,000	↓ -28.1%

References:

1.Hartsfield-Jackson Atlanta International Airport, Sustainable Management Plan, 2011
2.AIRPORT COOPERATIVE RESEARCH PROGRAM, The Carbon Market: A Primer for Airports, report 57, 2011