

Sustainability Trends at Airports

— Reducing Emissions

by John Trendowski, P.E., LEED



The aviation industry is experiencing a huge upsurge in the importance of sustainability, climate change and ozone non-attainment. These challenging issues can have a great impact on the operation and potential growth of both large and small airports.

With the worldwide concern over global warming and the Environmental Protection Agency's (EPA) recent lowering of the ozone standard, the issue of airport air quality has grown significantly. One of the most important ways that airports can become more sustainable is to reduce reliance on the combustion of petroleum-based fuel. Emissions from aircraft, ground support equipment, heating systems, shuttles and passenger vehicles all affect regional air quality. Although aviation activity comprises only a small percentage of emissions in a given region, the aviation industry recognizes its responsibility to minimize consumption of natural resources and generation of emissions.

Greenhouse Gas Emissions

A 737 burns 800 gallons of fuel per hour. Multiply that by the number of aircraft that take off and land from a given facility in just one day, and the potential for significant emissions is clear. The source of greenhouse gas emissions varies depending on the size, operations and transportation system of an airport. EPA estimates that airports contribute between 3 percent to 4 percent of the nation's greenhouse gas emissions. And with the cost of oil topping \$100 per barrel recently, minimizing fuel is more than just an environmental benefit; it drastically affects an airport's bottom line.

Fuel Combustion Byproducts

The main products of fuel combustion are carbon dioxide and water, but byproducts also include oxides of nitrogen (NOx), volatile organic compounds, particulate matter and carbon monoxide. These products and byproducts affect





both the global and regional air quality. Carbon dioxide is a significant greenhouse gas and a chief contributor to global warming, and NOx and volatile organic compounds are precursors to ground-level ozone and smog. Quantifying greenhouse gases is an important issue for airports to address. Many municipal governments, including Seattle, San Francisco and Denver, now require a climate action plan, and state environmental regulatory agencies are requesting a greenhouse gas inventory as part of a state National Environmental Policy Act (NEPA)-like document.



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Ozone Standard

EPA recently announced new National Ambient Air Quality Standards for ozone, reducing the standard by 0.005 parts per million. While that seems like a very small reduction, estimates are that 345 U.S. counties will be affected — 260 more than the 85 counties still affected by the previous standard. These changes mean that many new airports that have not had to address ozone or be the subject of a conformity analysis will be required to do so before development projects can be approved by FAA. Several airports have provided leadership in reducing emissions by incorporating sustainable design into the construction of new facilities and eliminating sources of combustion. Detroit Metro is implementing many green technologies as part of its new North Terminal project. The airport received more than \$5 million in the largest Voluntary Airport Low Emission (VALE) grant issued




to date. The two Metro projects that had the most significant emissions reduction were the use of hydrant fueling to replace the fuel trucks at the airport and incorporating 400-Hertz power and pre-conditioned air into the design of the terminal to replace the use of aircraft auxiliary power units and ground power units. These reductions can save more than 400 tons of oxides of nitrogen over the life of the project. These sustainable principles can offset the growth in air travel, while reducing the effects on the environment and the community.

Significant reductions in combustion emissions also can occur on the landside by investing in public transportation, consolidated facilities and public transport connections to minimize the use of shuttles. Other sustainable measures include converting to more efficient boilers and heating units and use of alternative power-generating equipment. Photo-voltaics also are gaining popularity at airports as a way to generate power to offset the requirements of additional electrification.

The Green Requirement

Becoming greener isn't a choice for airports; it is a requirement. Reducing emissions by minimizing fuel combustion is a major step toward becoming more sustainable. This not only will reduce greenhouse gas, ozone precursors and other atmospheric pollutants, but also will position the airport as a community leader in environmental stewardship. Federal programs such as VALE



are helping to offset costs for emission-reducing projects, and, if the program is expanded to include greenhouse gas emissions, it can have a much bigger impact. Moving forward, airports must be proactive in quantifying their existing emissions, initiating dialogue with regulatory agencies, assessing mitigation projects and funding sources, as well as implementing effective measures as quickly and broadly as possible. 



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