

Modeling Energy Generation at Airports

Airports are mobility and cargo hubs, helping move millions of travelers and tons of goods every year at more than 5,000 locations across the country. Airports are becoming community energy hubs, too. Using rooftops and acres of underutilized land for renewable energy generation, airports can increasingly support electrified buildings, vehicles, and aircraft while supplying and storing clean energy for reliable power during off-peak hours and outages caused by natural disasters and other hazards. To realize the benefits of this untapped potential, planners need detailed models to visualize the costs, constraints, and advantages of adding more energy storage and generation at airports.

Understand the Role of Resiliency in Future Airport Energy Systems

Representing 9%–20% of all aviation carbon emissions, airports, bases, and vertiports are ripe with opportunities for lowering emissions, primarily through increased electrification of systems, vehicles, and operations. But with increased electrification—including the addition of electric aircraft—comes increased electrical loads and the urgency for energy resilience at airports.

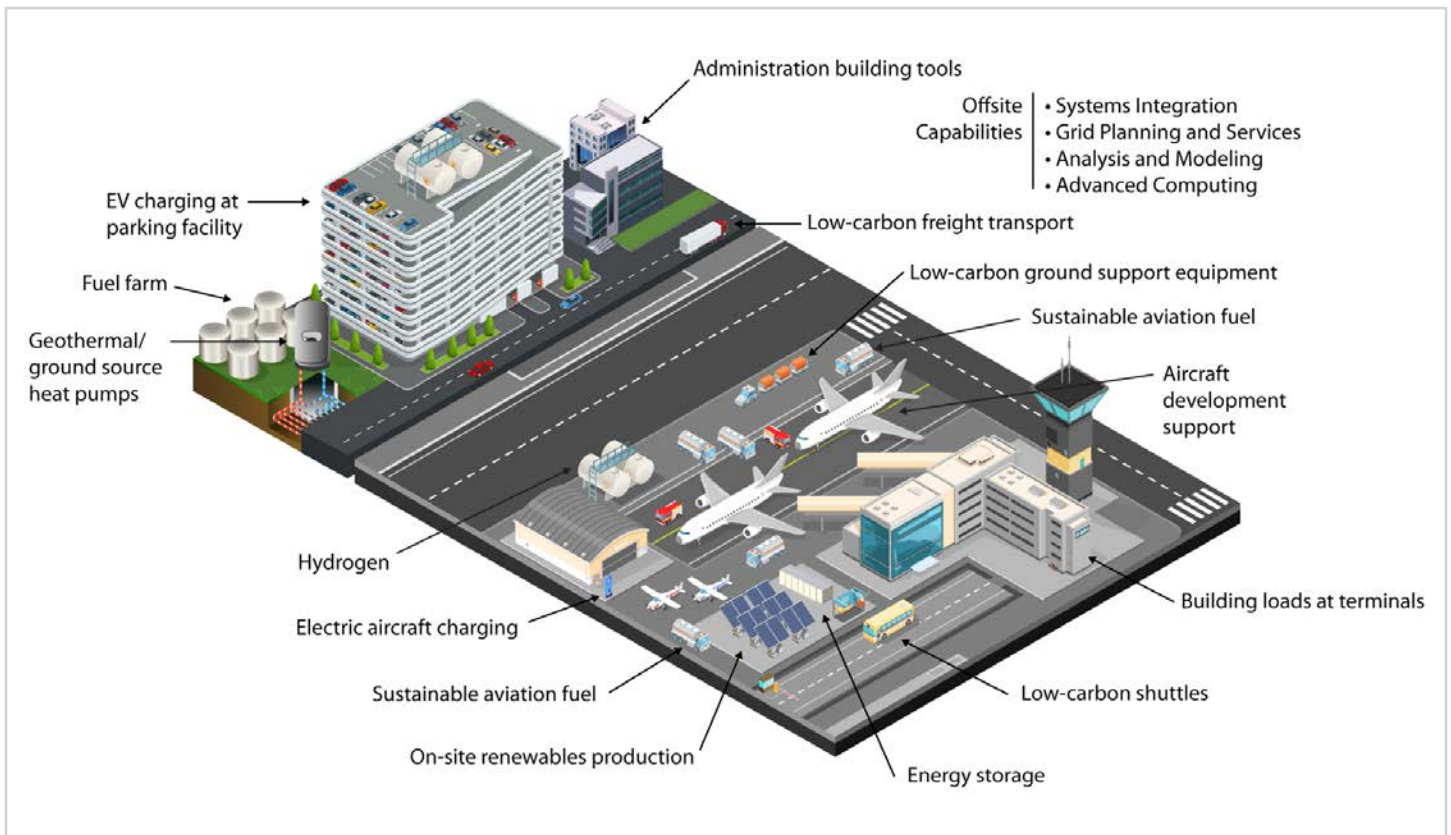
What You Need To Know

- 1. Infrastructure May Need To Be Expanded**—Growing airport electrical loads could outpace current infrastructure capabilities.
- 2. Energy Demands Must Be Negotiated**—Amid growing energy needs, airports and utilities need to carefully evaluate competing demands for available electricity.
- 3. Extreme Weather Presents New Challenges**—With a growing threat of extreme weather comes a heightened need for energy resilience at airports, which can serve as mobility and energy hubs to help communities weather the storm and recover.

The Vision: An Accessible, Web-Based Airport Energy Modeling Tool

By pairing NREL's energy techno-economic modeling tool, REopt[®], with geographic information system (GIS) resources from the Federal Aviation Administration, researchers can create an accessible online modeling tool to support airport energy planning. Local electric utilities, airport planners, and regulators can use this tool to understand how added sources of energy might support complex demands from airports and local communities.





NREL modeling links elements of airport energy landscapes, giving planners a birds-eye view of energy demand as it grows and evolves with changing regulations, technologies, and consumer habits. Illustration by NREL

NREL Can Illuminate Airport Energy Landscapes

The National Renewable Energy Laboratory (NREL) has proven expertise in analyzing and visualizing complex energy landscapes in support of bold energy goals—from renewable energy resolutions in large metropolitan areas to incremental changes in remote communities. Now, NREL is extending those same capabilities to airports of all sizes, creating actionable insights for the aviation sector as it works to become more sustainable, resilient, and economical.

Contact Us

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Unlock the Benefits of NREL's Energy Modeling Capabilities

- 1. Energy resiliency strategies** for airports and surrounding communities.
- 2. Electricity generation analysis and projection tools** to visualize potential on-site generation and energy storage.
- 3. Cost-optimal energy and procurement solutions**, including cost estimates across different technology systems.
- 4. Financial flexibility** through new funding sources and lower airport energy and infrastructure costs.
- 5. Insights on future energy needs of various transportation modes**, including air, rail, marine, and road sectors.
- 6. Forecasts on possible reductions in air and noise pollution** to inform energy justice planning with communities surrounding airports.