

# Electrified Aviation Demand Modeling

With zero emissions and increased efficiency, electric aerial vehicles—including drones, single-aisle airplanes, and vertical take-off and landing aircraft—can reduce noise, lower greenhouse gas emissions and other pollutants, and expand mobility options for rural and urban communities. To harness the benefits of electric aerial vehicles, airports and utilities must first ready charging equipment, the local grid, and carbon-free electricity supplies.

## Plan Ahead To Meet Electricity Demand

Wide-scale adoption of electric aerial vehicles will represent a monumental shift in energy supply planning and delivery at airports, vertiports, and military bases across the country. Simultaneously charging multiple aerial vehicles would most likely exceed the current electrical capacity at many airports across the country. Considering the addition of electric ground support equipment, passenger vehicles, and buses, airports must begin planning for significantly more electricity use.

### What You Need To Know

- 1. Grid Upgrades Take Time**—From conceptualization to operation, grid upgrades can take up to 10 years to complete. It is critical to anticipate and plan for load growth well before electric aerial vehicles become mainstream.
- 2. Grid Modeling Can Bracket Large Uncertainties**—With a broad slate of energy futures possible, airport planners must analyze potential scenarios and compare plans in order to make informed, data-driven decisions about airport energy systems. That way, they can communicate grid supply needs to utilities and other stakeholders to support community-scale and regional planning.

## NREL Models Future Electricity Demand

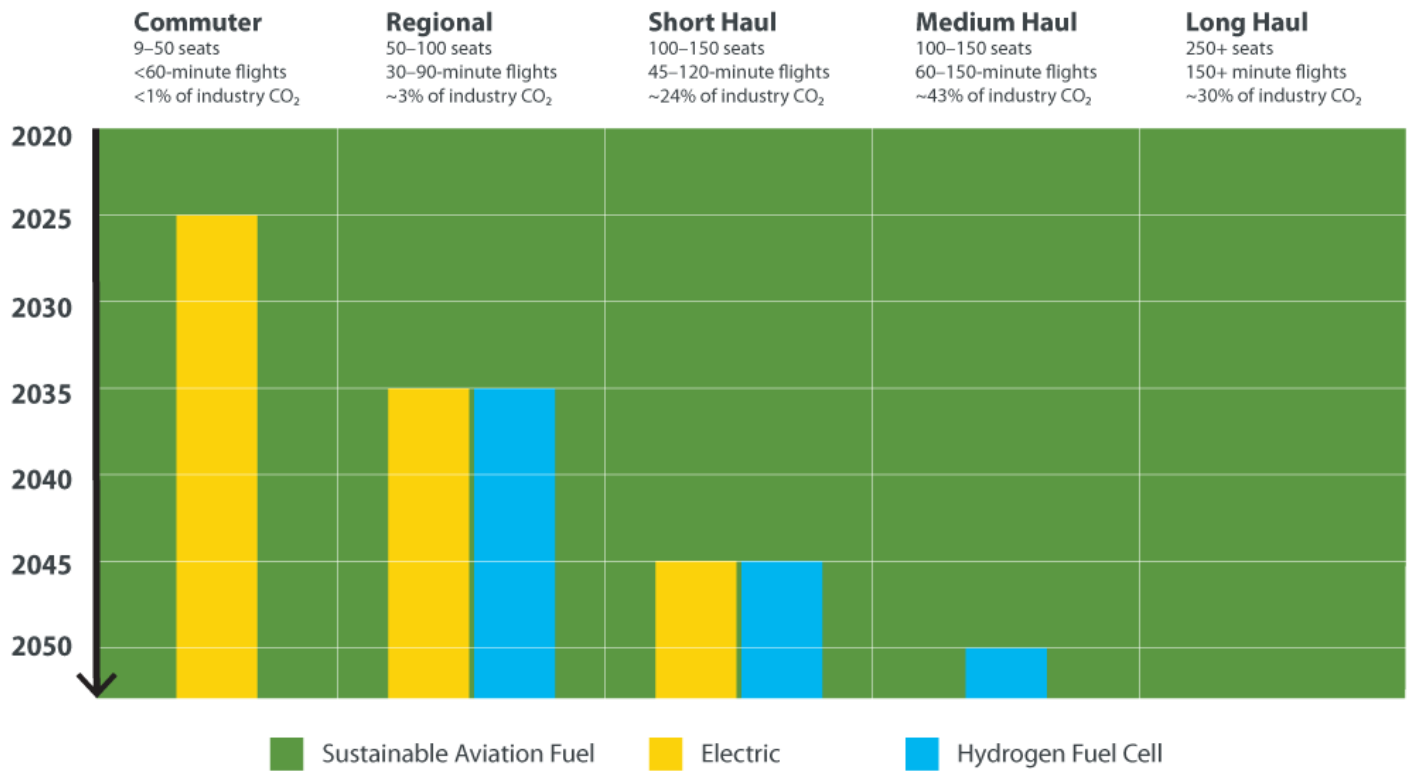
With leading energy experts, high-performance computing, and powerful analysis and modeling capabilities, the National Renewable Energy Laboratory (NREL) empowers aviation stakeholders with tools and data to project future energy demand and explore supply options. As a result, NREL can help electric utilities and airport operations identify aviation electrification opportunities and prepare for future electricity needs.

## Turn Flight Demand Into Charging Demand

NREL's suite of tools harmonizes energy delivery with mobility demand, making it easy to model the energy landscape of airports, vertiports, and military bases of all sizes:

- Demand-side grid (dsgrid) model
- Distribution Integration Solution Cost Options (DISCO)
- EVI-X modeling suite
- Regional Energy Deployment System (ReEDS)
- Renewable Energy Integration and Optimization (REopt®)
- Scalable Integrated Infrastructure Planning (SIIP) model
- And more.

# Multiple Pathways To Achieve Net-Zero Energy Delivery



Electricity complements hydrogen and sustainable aviation fuel as a viable energy pathway for achieving net-zero-emission flight. Source: ATAG Waypoint 2050 Report

## Unlock the Benefits of NREL's Demand Modeling

1. **Tools and data** to plan for and meet growing electricity demand.
2. **Less risk** for long-term energy planning and investment.
3. **Locally relevant insights** that match the dynamics of every airport, vertiport, and military base, whether in an urban core or the heart of rural America.
4. **Airport energy system validation and design** using NREL's Advanced Research on Integrated Energy Systems (ARIES) platform.
5. **Community energy resiliency**, where highly electrified airports with on-site generation support local communities of all sizes during extreme weather events.
6. **A head start on the electric aviation market**, embracing market growth with the confidence of robust energy supply and delivery to support future expansion.
7. **Supporting and integrating renewables** so airports can leverage cheap clean energy and behind-the-meter storage.

## Contact Us

**Brett Oakleaf**  
Strategic Partnerships Manager  
[brett.oakleaf@nrel.gov](mailto:brett.oakleaf@nrel.gov)  
[nrel.gov/sustainable-aviation](http://nrel.gov/sustainable-aviation)