

## AIRPORT MICROGRIDS: AN OPPORTUNITY FOR INVESTMENT



As airports are putting greater emphasis on sustainable aviation, many are looking for ways to reduce emissions while improving operational efficiencies. Historically, airports have sourced electricity from local utility companies, and have supplemented power with generators during an emergency. Over the last few years airports have begun examining the use of alternative power sources, including solar or natural gas supplied via a microgrid. While there is some public funding for investment in airport microgrids, more funding is needed, creating an opportunity for public-private-partnerships.

One dynamic option for investment in airport microgrids is for a private party to enter the market offering an end-to-end airport specific solution. Combining the financial and technical know-how that offers a one-stop solution for installing power generating equipment and microgrids at airports, whereby the investors put up the initial capital expenditure and get paid back over time from the proceeds of selling electricity generated.

### **Introduction**

A microgrid is a small-scale electrical network that can operate either in tandem or independently from a larger power grid. Airports are a natural fit for these systems given they have the necessary space needed for solar panel arrays either on existing structures or on other land available for development. Chattanooga Metropolitan Airport ("CHA") was able to install a solar farm on existing unusable airport land becoming the first U.S. airport powered entirely by solar energy, while Austin-Bergstrom

International Airport (“AUS”) doubled its shaded parking inventory after installing over 6,600 solar panels, and the New Terminal One at John F. Kennedy International Airport (“JFK NTO”) plans to install 13,000 solar panels on the roof of the new terminal building.

**Benefits**

In addition to providing a clean, sustainable, and reliable source of power, microgrids can provide other benefits to an airport, including:

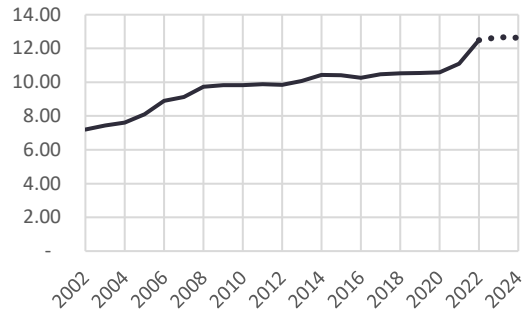
- A consistent supply of power for airport operations.
- The achievement of goals related to carbon neutrality, as well as a reduction in noise and emissions.
- Reduced energy costs.
- A new stream of revenue to airport operators.

Cash generated from selling energy produced on airport could be used to fund capital expenditure programs that further reduce the airport's carbon footprint, such as vehicle charging stations for ground services equipment (“GSE”) and electric aircraft. The energy used at charging stations could be sold to the end user. For example, Indianapolis International Airport (“IND”) sells the solar energy it produces to Indianapolis Power and Light Company, which then distributes it to its residential and commercial customers.

**Revenue Potential and Initial Projects**

U.S. electricity prices have increased at an annual average growth rate of 2.8% over the last 20 years, reaching 12.55 cents per kilowatt-hour in 2022. Short-term energy forecasts project prices will exceed this record level during 2024.

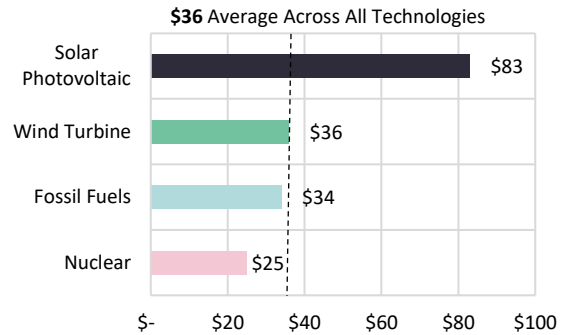
**Average U.S. Electricity Prices to Ultimate Customers (cents per kilowatt-hour)**



Source: U.S. Energy Information Administration

Furthermore, the U.S. Energy Information Administration reported that, “the average U.S. wholesale price for electricity generated by solar photovoltaic (PV) technology was significantly higher than average wholesale prices for electricity from other technologies”, at \$83 per megawatt-hour versus \$36 for wind turbine generated power, \$34 for fossil fuels, and \$25 per megawatt-hour for nuclear energy. Further highlighting the financial benefits of solar technology.

**U.S. Average Wholesale Electricity Prices by Generating Technology (2019) (dollars per megawatt-hour)**



Source: U.S. Energy Information Administration

While microgrid technology has been available for a number of years, its use in the airport sector is relatively new. Sustainability continues to gain traction in this space, with airports in California, Tennessee, Colorado, Texas, and Pennsylvania having already implemented alternate energy solutions, and new airport projects, such as the New Terminal One at JFK, incorporating renewable energy sources as well.

Solar power technology is used at 20 percent of airports across the U.S. according to researchers at the University of Colorado Denver, including several airports in California, CHA, AUS, IND, and Denver International Airport (“DEN”). CHA, IND, and DEN reported energy outputs between 3.8 and 36.1 million kWh/year, equating to 4.5 and 7.3 kWh/year per square foot of solar panel acreage, while California Redwood Coast Airport (“ACV”) reported an output of 3.1 million kWh/year or 10.2 kWh/year per square foot. In addition to solar technology, some airports have begun drilling for natural gas, including Dallas/Fort Worth International Airport (“DFW”) and Pittsburgh International Airport (“PIT”). As more airports realize the benefits of renewable energy and a microgrid system, the demand is likely to increase.

**Technical Expertise**

Renewable energy technology has evolved over the last decade, with engineering firms having developed the technical expertise needed in designing and implementing microgrids at airports. Collaborative ventures have also begun to emerge such as between The Carlyle Group and Schneider Electric which provides power generation and microgrid solutions under the AlphaStruxure brand. AlphaStruxure has been tasked with the design, build, and operation of JFK’s New Terminal One microgrid. Additionally, Avports and Baker Hughes also announced a new airport specific solution.

**Need for Financial Partners**

While the technology and expertise needed to implement these systems is now available, they typically require significant capital investment. Current funding options include federal, state, and local grants, debt, and private investment, with the latter being relatively rare.

- CHA (2019) was able to secure funding for the \$10 million project through a series of FAA grants, including a Voluntary Airport Low Emission (“VALE”) Grant and Section 512 energy efficiency grant.

- PIT’s (2021) microgrid was financed, built, maintained, and operated by Peoples Natural Gas.
- ACV (2022) funded its microgrid via a \$5 million grant from the California Energy Commission’s EIPC Program, and \$6 million from the Redwood Coast Energy Authority’s CCE Program, which is supported by a loan from the USDA.
- SNA funded the entire \$19.6 million project itself with the exception of a \$1.4 million California’s Self-Generation Incentive Program (SGIP) grant.

The FAA has expanded the Airport Improvement Program eligibility to include Energy Supply, Redundancy and Microgrids Program projects, and has allocated \$46.8 million to sustainability projects. However, there continues to be a need for financing that could be fulfilled by private investors providing funding for the development of electricity generation at airports and to be paid back over time with the funds generated by the project. While AlphaStruxure provides this in other sectors, it has not yet been market tested at airports. Avports and Baker Hughes may provide a solution for airports, but the collaboration is new and has yet to be seen in the marketplace.

**Conclusion**

There is a market opportunity for an organization and/or investors to form a one-stop shop incorporating airport knowledge, technical expertise, and financing, to provide an airport specific microgrid solution focused on revenue generation and environmental benefits. Airports currently apply this type of outsourcing model in areas as diverse as airport retail, car parking, and airport maintenance.

## About the Authors



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*Founder & Managing Director*

Ken heads Skylark's Americas operations. Having successfully managed projects throughout Asia, the Caribbean, Europe, the Middle East, and North and South America, Ken is an expert in activity forecasting and business plan development. He focuses on legal and economic analysis of airline and airport issues, with particular emphasis on operating economics, the regulatory system, and the international competitive framework of the industry. He also has a wealth of experience in the use of aviation statistics to forecast aviation activity, air service development, and airline and airport revenue and cost issues.

Ken earned a Juris Doctor from the University of Texas School of Law, and a Bachelor of Arts in Economics from Wesleyan University.

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Kelly has over ten years' experience in the aviation industry. She specializes in financial and market analysis/forecasting. She has worked with a diverse range of clients including airports, major aviation original equipment manufacturers, maintenance, repair, and overhaul companies, commercial airlines, aircraft operators and lessors, financial institutions, and government agencies. She has been engaged in numerous due diligence reviews that include evaluating comprehensive market outlook reports, providing key analytical work highlighting supply and demand trends, assessing competition and developing financial benchmarking.

Kelly received a BS in Finance from Bentley University.

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## About Skylark

Skylark Consulting Group provides business planning advisory services to the aviation industry including airlines, airports, investors, and aviation service providers, and is available to discuss the development of microgrids.

Skylark has considerable experience in evaluating and developing ancillary airport services across the Globe.

To learn more about Skylark's expertise, visit us at [skylarkcg.com](http://skylarkcg.com).