

# MICROGRID KNOWLEDGE™

2023 CONFERENCE

# LIGHTS ON!

May 16-17, 2023 | Anaheim, CA

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# Airport Energy Transformation, Minus the Risk

Decarbonize Airport operations with  
Energy as a Service Microgrids

Steve Pullins, SVP CTO



**Alpha**Struxure

# JFK New Terminal One Microgrid

*Illuminating a new pathway to decarbonizing the air transportation sector*

**Pressure is mounting...**

...stay competitive, future-focused, and combat climate change

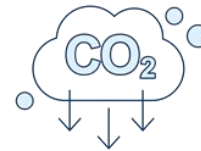


Achieving net-zero carbon emissions by 2050 will require airports to **convert ground fleets to electric vehicles**; electrify building systems; **generate renewable energy on-site**; and dramatically **improve energy and water efficiency**, through water reuse.

# The sustainability challenge

## GHG emission reductions

Airports announce plans to **more sustainable travel** and **net zero emissions by 2050**



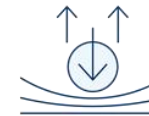
## Reliability

**Airport power outages** have plagued airports across the U.S. **disrupting operations and canceling flights**



## Resilience

April 2017 storms in Atlanta caused **4,000 canceled flights** and cost Delta up to **\$125 million**



### Scientists Just Warned We Need to Cut Emissions by 60 Percent, but the U.S. Is Years Away

The IPCC's latest climate assessment says the world must cut greenhouse gas emissions by 60 percent by 2035, but the U.S. is already behind on a less ambitious target

Transportation & Infrastructure

### Winter storm brings thundersnow, airport closure, and more power outages

CALIFORNIA

LAX power outage halts security screening, delays flights and traps some travelers

### Power Outage at J.F.K. Airport Scrambles Flights

A small fire caused an electrical panel failure at one of the world's busiest international airports, closing Terminal 1 to flight traffic for 24 hours.

# Increased Energy Demand for Airports of the Future



*Sustainable Airports of the Future will need to support increased power demand from the electrification of landside and airside vehicles and buildings, while maintaining reliability and consistent operations in the face of extreme weather and unpredictable power outages*

# The Operational Challenge



## Growing Expectations

- Airline corporate sustainability goals
- Demand for passenger and cargo vehicle charging
- Rental car agency fast charging for EVs



## Digitization

- Dynamic assets require active management to ensure longevity
- Data driven vs. intuitive decision making
- No single pane of glass view into the system



## Futureproofing

- Evolving energy generation equipment
- Various OEMs for land and airside vehicles
- Nascent renewable natural gas and hydrogen fuel markets

FAA JFK Enplanements



# The Solution: Airports Powered by On-Site Energy & Charging Infrastructure

## GHG Reductions

An avenue to reach net-zero emissions across all sectors with a flexible fuel transition from NG to RNG and/or green H2

## Increased Reliability & Resilience

Guarantees availability of power. Optimizes day-to-day energy usage and seamlessly transitions during an outage

## Support Increased Power Needs

Power generation near the load – avoids the time and cost of new utility service lines. Meets demand increase of EV and electrification transition.



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# JFK New Terminal One Microgrid

John F. Kennedy International Airport, NYC

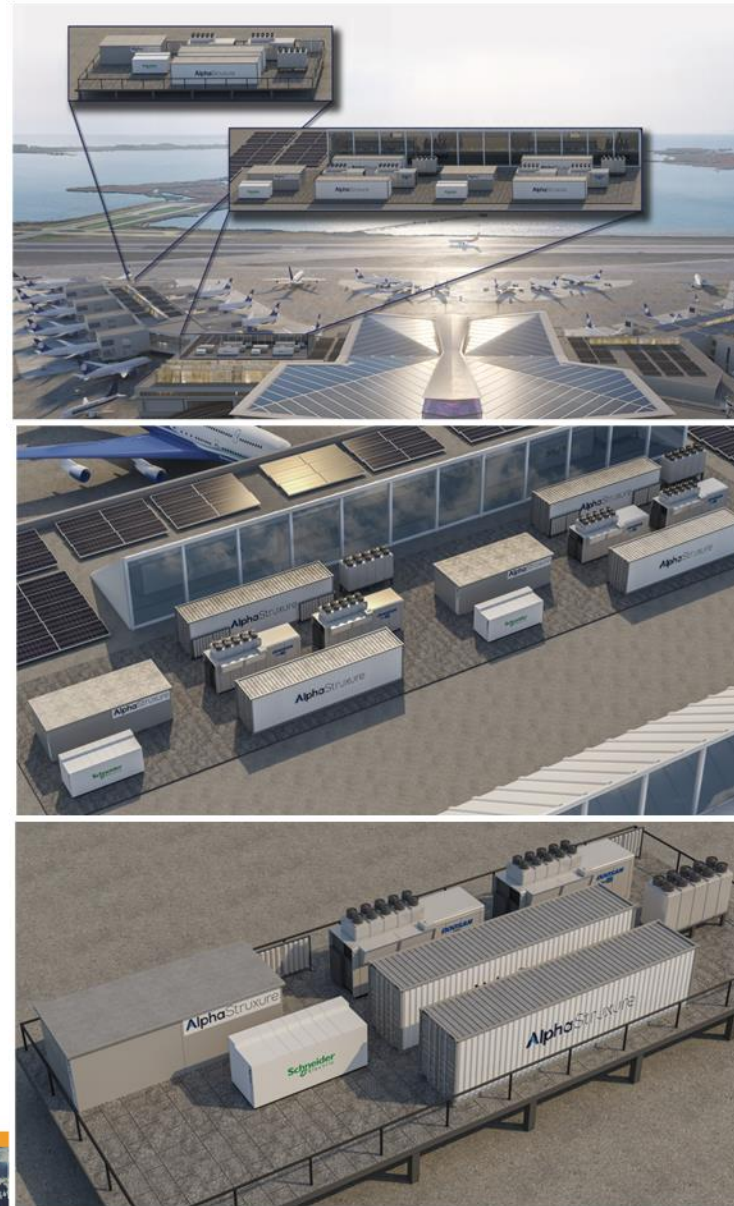
**THE NEW TERMINAL ONE**  
JFK INTERNATIONAL AIRPORT

## Challenge:

- Transform NTO into a resilient airport that can function off-grid during power disruptions
- Deliver on aggressive NY State and City sustainability laws
- Deliver energy reliability and resilience with guaranteed system-level uptime
- Produce lower carbon intensity, more efficient, locally generated energy
- Stabilize energy costs over the long-term

## Solution:

- **11.3 megawatt microgrid** comprised of 7.7 MW rooftop solar, 3.7 MW fuel cells, 2 MW/ 4 MWh battery energy storage, and a circular waste heat to chilled water system
- **Four power islands: each an integrated energy system** with generation, storage, and automation
- **AlphaStruxure Integrate digital platform** manages the performance and operations in a cyber-secure environment
- The **Energy as a Service business model** provides JFK NTO with long-term, **predictable operating costs** and **guaranteed performance without upfront capital expenditures**



## Results

Microgrid will deliver:

**Largest rooftop solar array in New York City**

and on any airport terminal in the U.S.  
13,000 solar panels cover all viable roof space



**38% decrease**

in immediate greenhouse gas emissions over source energy



**100% airport operations**

during power disruptions and the first fully resilient airport transit hub in the New York region



**Compliance** with ambitious New York State, City, and Port Authority sustainability mandates



**Long-term cost predictability** of energy supply

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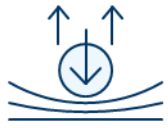
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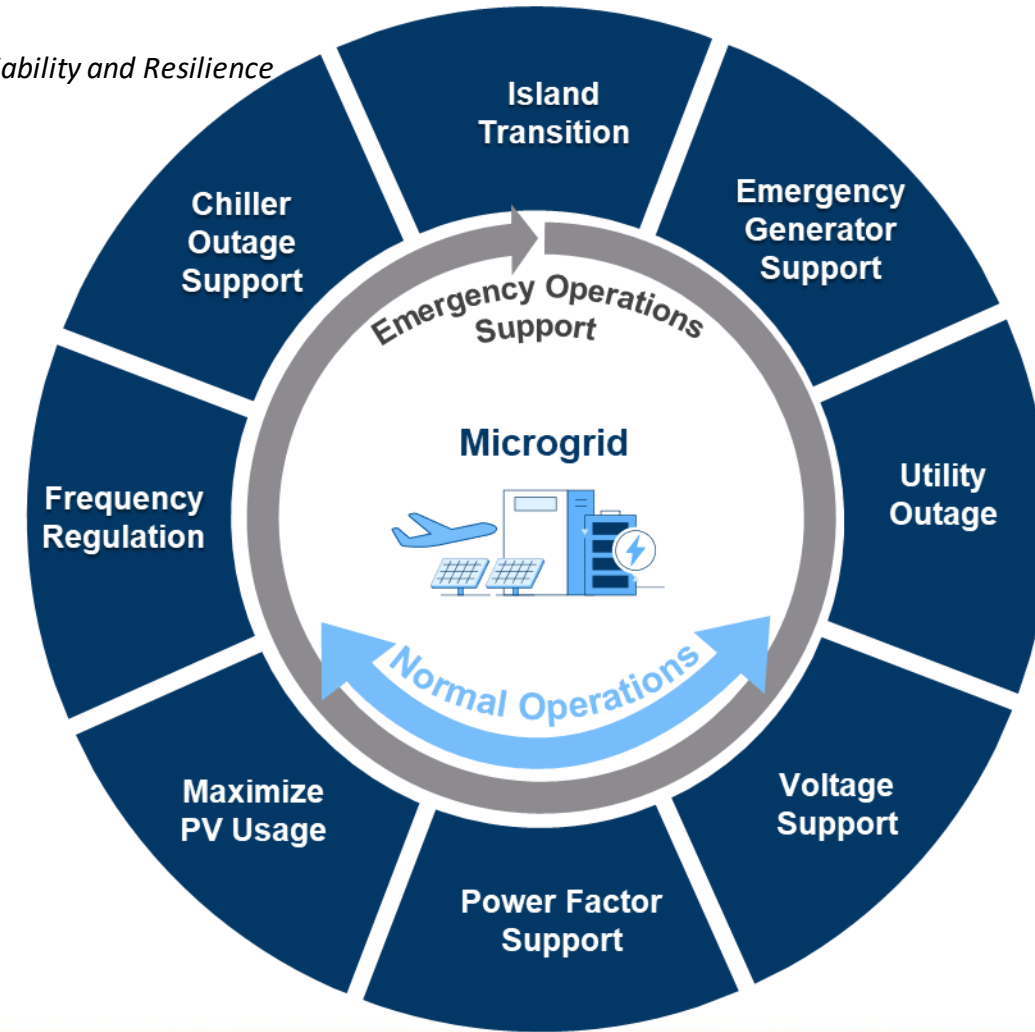
# Providing reliable, resilient, cost-predicable power



## Resilience and Reliability

- Provides **reliable, resilient, and cost-predictable power** for NTO
- On-site microgrid solution designed with **multiple power islands**, each with **energy storage**:
  - Delivers continuous operation with a **seamless transition (less than 100 msec)** in event of a grid outage
  - Provides continuity of service at **99.9% system uptime**
  - Eliminates **single points of failure**
  - **Normal Operations:** Microgrid provides day-to-day optimization of energy usage across all electrical loads and PV
  - **Emergency Operations:** Microgrid provides redundant capacity and additional services during outages

*Microgrid Sphere of Reliability and Resilience*



# Integrate™ customer experience

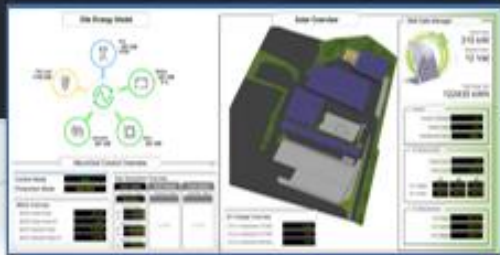
Real-time visibility into key performance metrics for on-site energy infrastructure

Cybersecurity

Operational Security

Key Performance Metrics

Project Lifecycle Management



1. Fleet and Site View



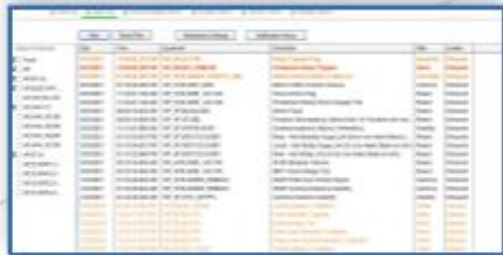
2. Live and Key Performance Insights



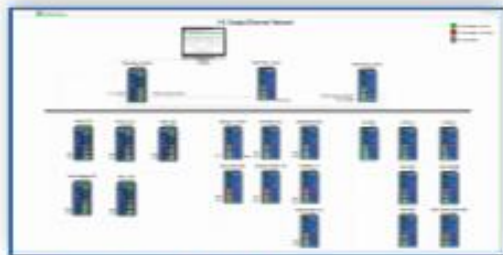
3. Sustainability, Resilience, Reliability and Cost-Stability Impact



4. Contract, Metering, Billing Management



5. Customer Support Alerts and Events



6. Assets and OEM Management  
Maintenance scheduling



7. Energy and Power Management



8. Compliance Management and Reporting

*Thank you...*

*Questions?*

**Alpha**Struxure

*The trusted partner in energy transformation*



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