



ALLEGHENY COUNTY AIRPORT AUTHORITY

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PITTSBURGH INTERNATIONAL AIRPORT  
ALLEGHENY COUNTY AIRPORT

# Building a Resilient Airport Microgrid Solution

IDEA 2019 Annual Conference, June 24-27, Pittsburgh, PA

# Agenda

- **Drivers for Airport Microgrids**
- **PIT Microgrid Project**



**Burns**

# Airports – Ideal Application of Microgrids

- **Large energy users**
- **Critical transportation infrastructure**
- **Growing energy requirements**
- **Cost reductions**
- **Carbon reduction goals**
- **Need for Resiliency**



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# Major Relevant Trends

- Growth of air travel
- Paradigm shift in electric grid
- Increasing threats to power system

*“Capital spending at U.S. airports grew by 24% to \$12.7 billion in 2017 from the previous year, the biggest increase since at least 2010”*

FAA

*“481 million new passengers for a total of 1.3 billion (2017-2037)”*

IATA

*“Distributed energy resources contributed 46.4 gigawatts in 2017”*

GreenTechMedia

*“At least \$70 billion in renovations is planned at medium and large U.S. airports over the next five years”*

ACC

*“As of 2018, an estimated 1,869 microgrids or 20.7 GW built or underway globally”*

Navigant



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# Atlanta Hartsfield-Jackson Airport Power Outage

- **Power Outage December 2017**
- **Cost Delta Air Lines ~\$25 million to \$50 million**
- **Delta canceled about 1,400 flights**
- **The world's largest airport, with 100 million passengers per year**
- **Took airlines several days to resume their normal schedules**



# Fork in the Road – Business as Usual or....?



- **Business as Usual**
  - Meet increased loads with new feeders
  - Improve reliability and resilience against threat vectors
  - Backup generators
  - Redundant feeders
- **Status quo, “head in the sand” and missed opportunities**
  - Trust and Reliance on the grid



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# Innovative Strategies & Alternatives

- **Save capital and operating costs**
- **Improve resilience and reliability**
- **Decarbonize and achieve goals**



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# Innovative Strategies & Alternatives

## **Understand that there are options**

- “Non-Wires Alternatives”

## **Commit to careful analysis & planning**

- Energy and resilience master planning

## **Optimize existing infrastructure, assets & systems**

- Right-size through efficiency and control

## **Leverage technology, capital, expertise, programs & markets**



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# Pittsburgh International Airport On-Site Generation Project



# About ACAA

- ➔ Allegheny County Airport Authority
- ➔ **Pittsburgh International Airport**
  - Midfield Terminal opened October 1992
  - 450+ Employees
  - 20 miles from Downtown
- ➔ **Allegheny County Airport**
  - Opened September 1931
  - Mainly Fixed Base Operations (FBO)
  - 4 miles from Downtown



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## VISION

To transform Pittsburgh's airports to reflect and serve the community, inspire the industry, and advance the region's role as a world leader.

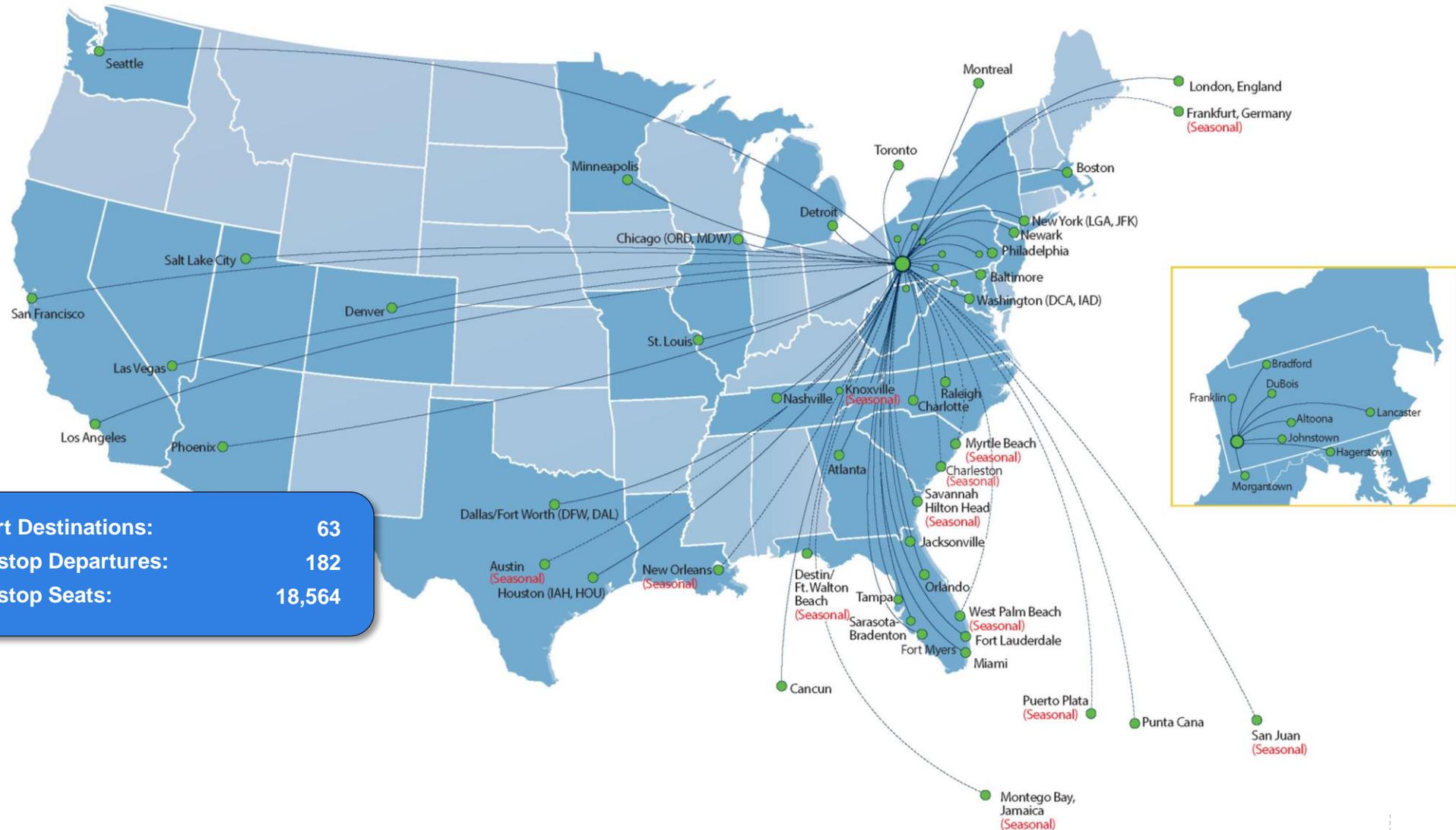


## MISSION

A global aviation leader driving innovation,  
regional growth and prosperity by investing in our employees,  
customers, airlines, and partners.



# Pittsburgh Currently Offers Nonstop Service to 66 Airports



**Nonstop Airport Destinations:** 63  
**Week-Day Nonstop Departures:** 182  
**Week-Day Nonstop Seats:** 18,564

Nonstop destination count includes seasonal service to AUS, CHS, FRA, MBJ, MSY, MYR, PBI, POP, SAV, SJU, TYS and VPS.  
 Source: Innovata schedules via Dio Mi (June 2019)

# Current PIT Site

- **8,800 Total Acres**
  - 3,500 acres are developable
- **Pittsburgh Airport Innovation Campus**
  - 195-acre parcel for office space, research/development labs, industrial manufacturing, town center, retail
  - 16 pad-ready sites by 2023
- **Terminal Modernization Program**



# PIT Terminal Modernization Program



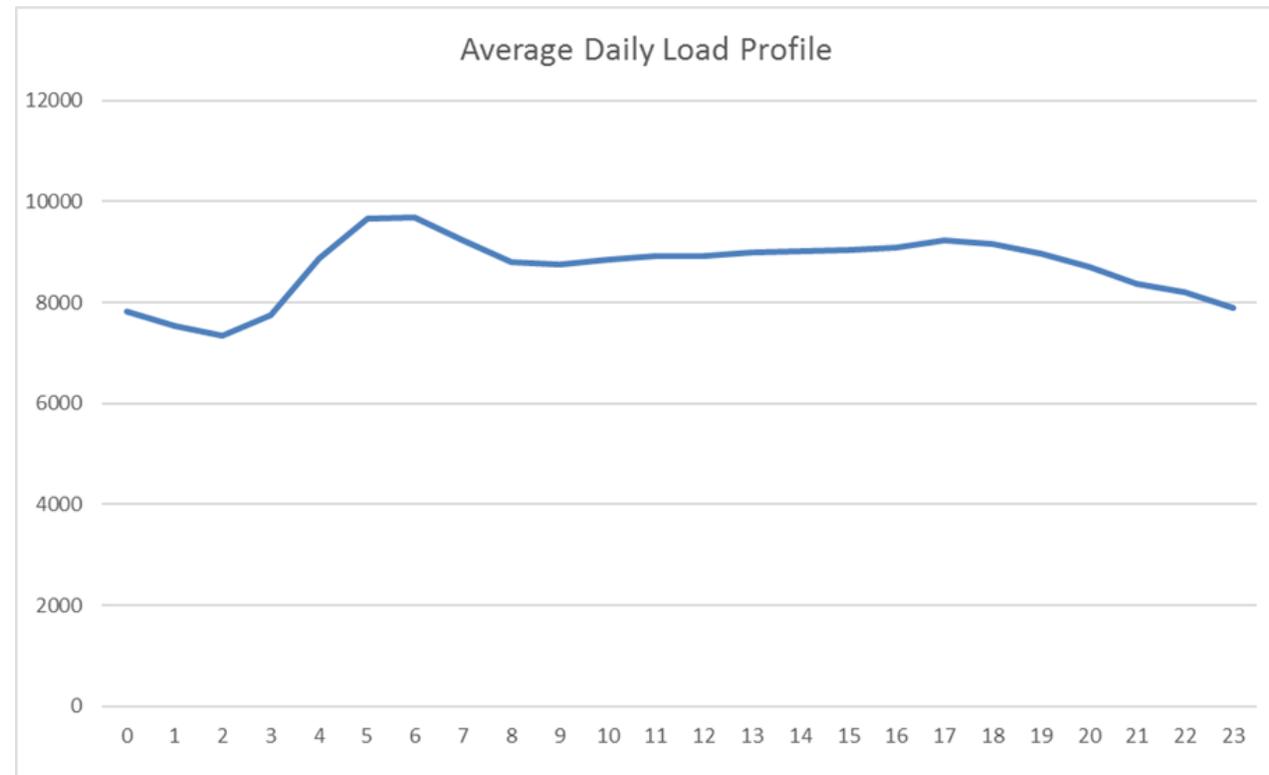
# PIT Energy Opportunities

- **8,800 Total Acres**
  - 3,500 acres are developable
- **Gas Transmission Pipelines On-Site**
- **Natural Gas Drilling On-Site**
  - 6 permitted well pads (2 producing) with on-site gathering lines
- **Existing Central Utility Plant**
- **Existing Gas Distribution**
- **Existing Electrical Infrastructure**



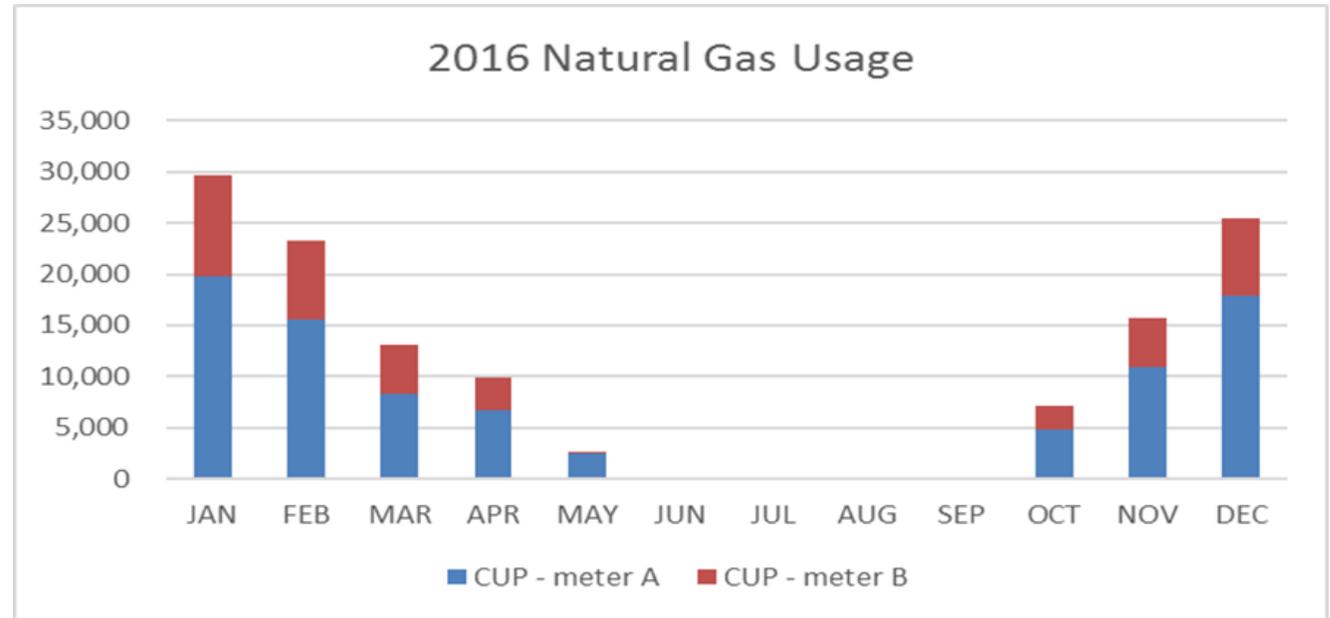
# PIT Electrical Demand

- **Annual Electric Use**
  - ~15MW Peak
  - ~100,000,000 kWh
  - ~\$7.2M

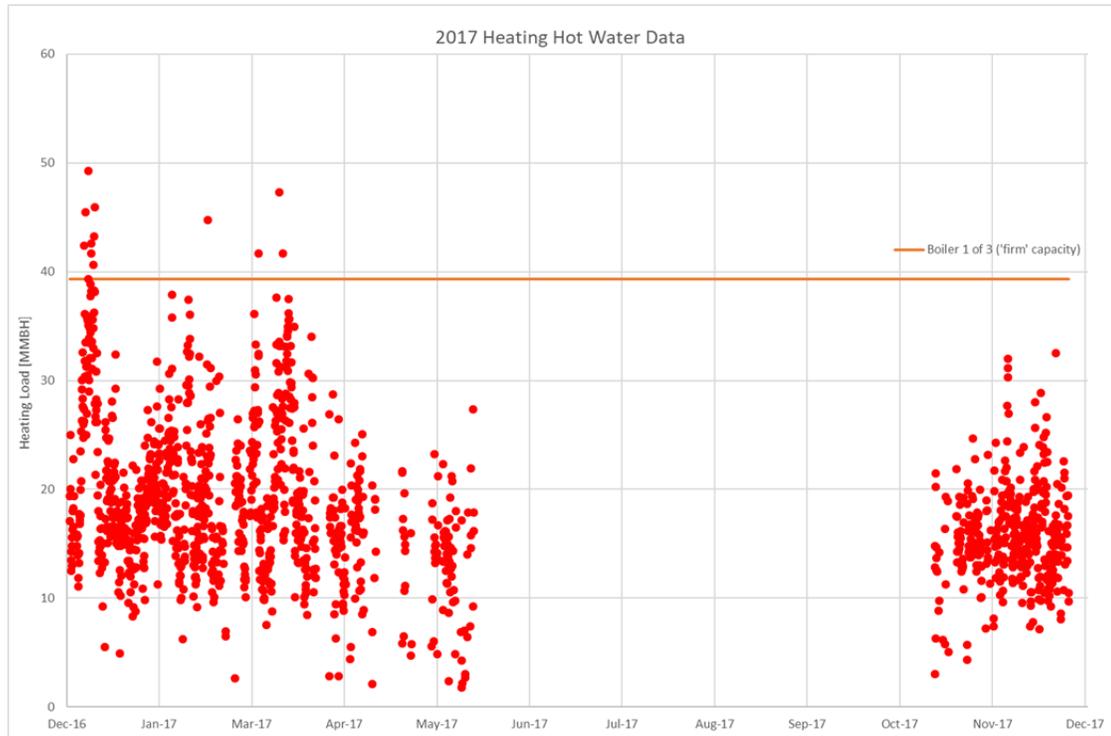


# PIT Natural Gas Demand

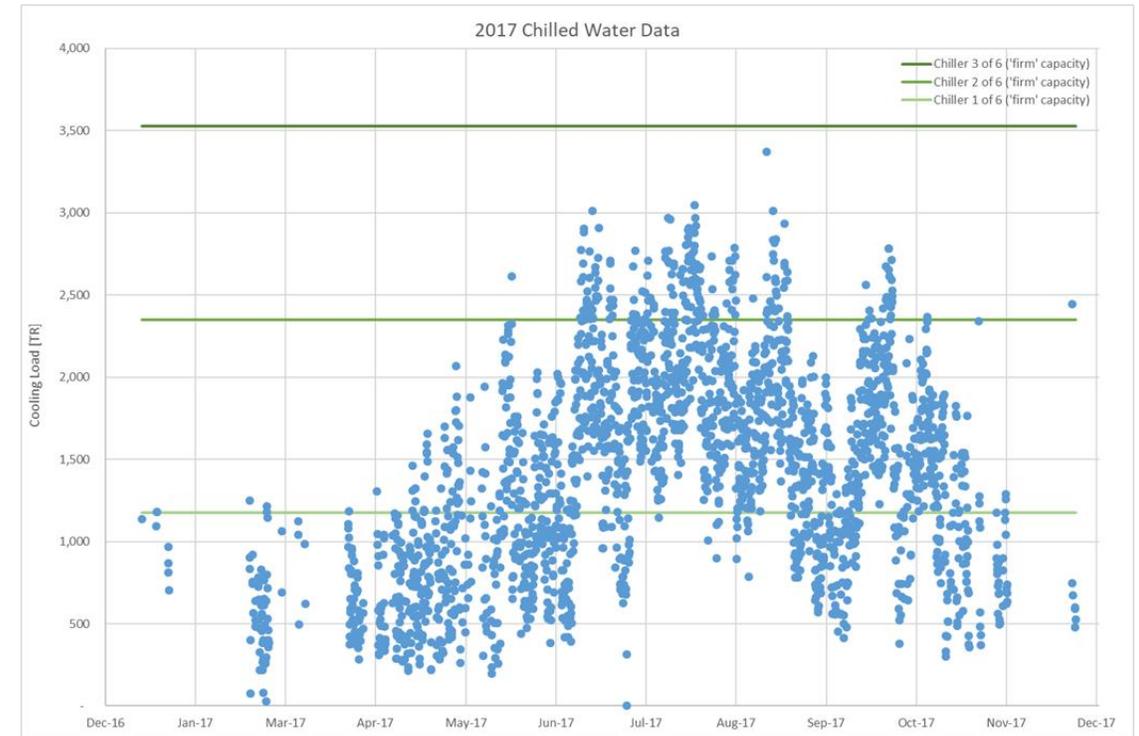
- **Annual CUP Boilers Gas Use**
  - ~127,000 MCF
  - ~\$878,000 Total Cost
  - \$353,000 Distribution
  - \$525,000 Retail
  - ~\$6.90/MCF



# PIT Thermal Demand



Current Peak ~50MMBH, Winter heating,  
350-degree High Temp Hot Water



Air Conditioning, Peak ~3500Tons,  
42-degree Chilled Water



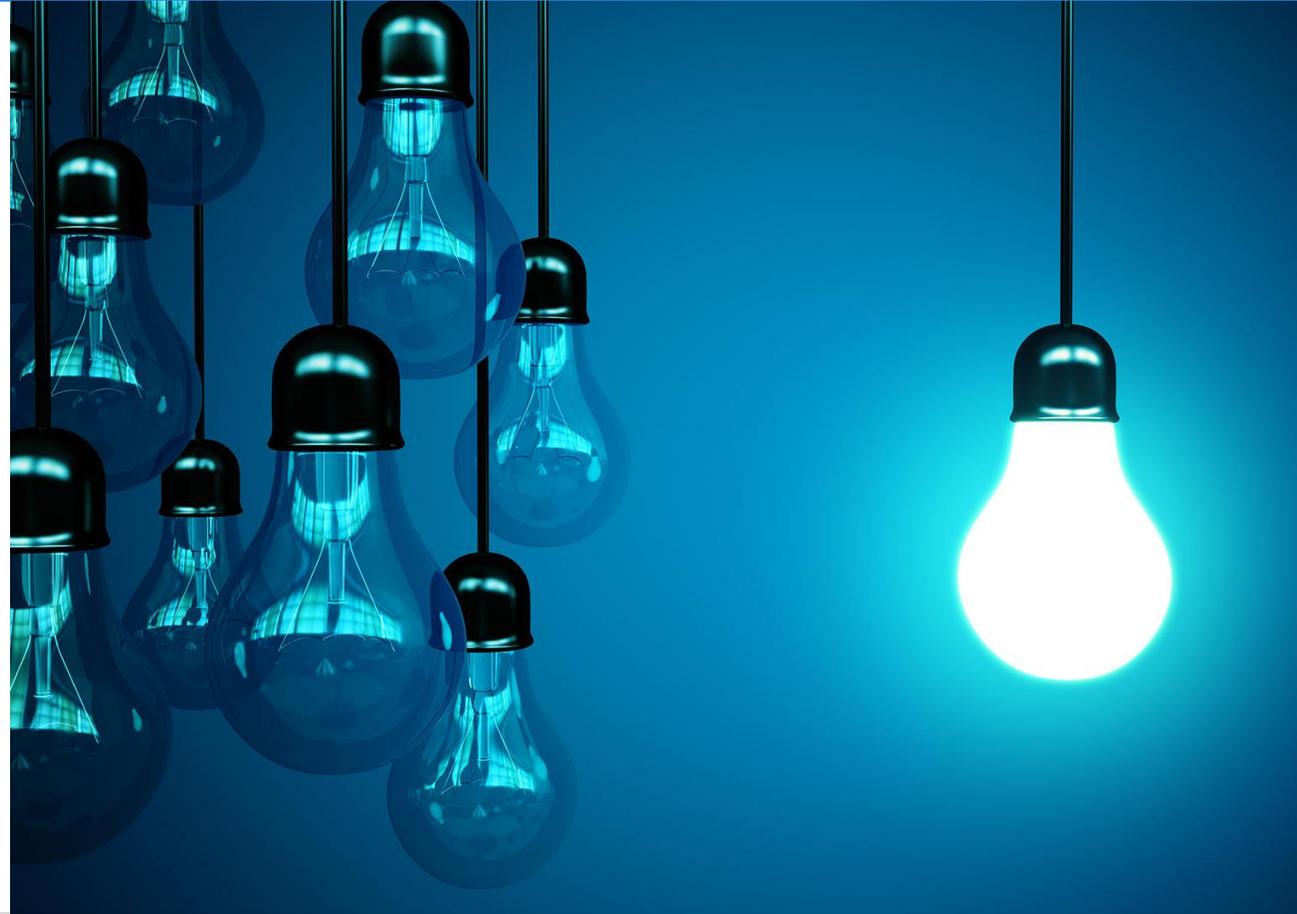
# Two Stage Selection Process

- **Public Advertisement**
- **20 year ESA/PPA Agreement**
- **Request for Development Qualifications (RFDQ)**
  - Solicited qualifications
  - Received 16 responses
  - Shortlisted 8 Qualified firms RFDP
- **Request for Development Proposals (RFDP)**
  - Evaluated responses against a variety of factors, critical factors were maximizing savings for ACAA and resilience, 20 year ESA agreement



# Variety of Proposed Solutions

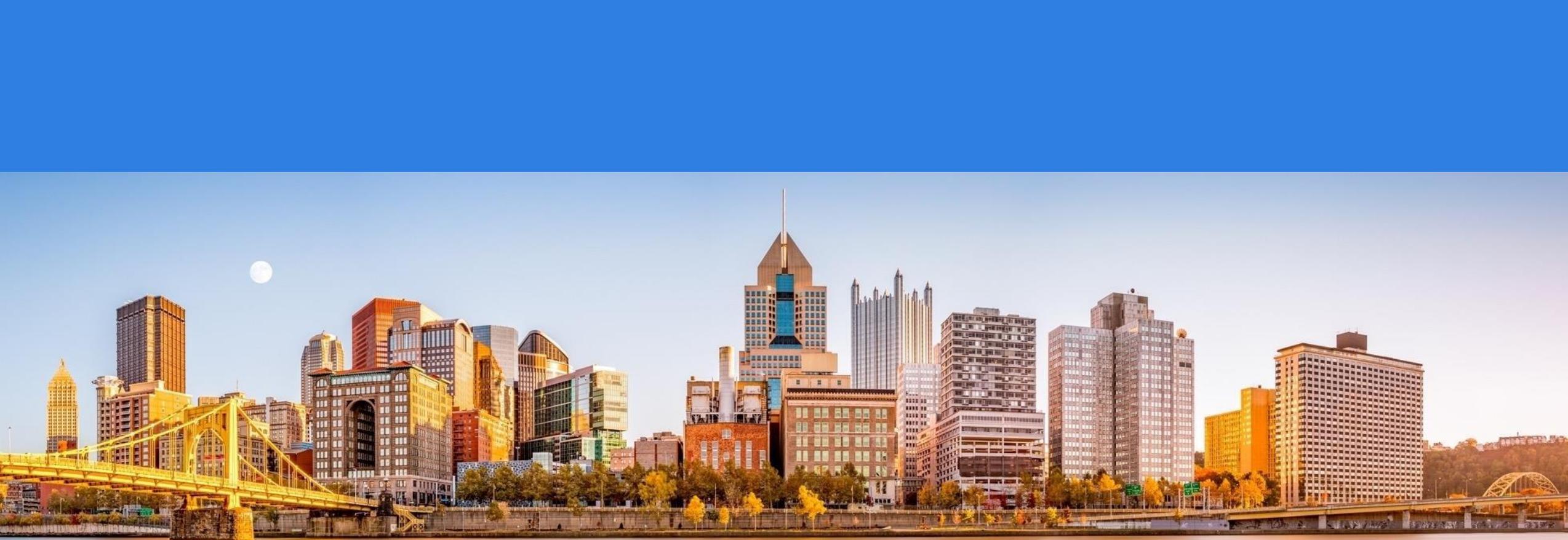
- **Satellite Tri-Gen Plants**
  - New NG generation assets between 6-10MW
  - Heat recovery used for hot/chilled water generation
  - Provides efficient base load supply for PIT
  - Standby power for a portion of PIT load
- **Generation Plant**
  - New generation assets up to 20MW
  - No heat recovery
  - Low cost gas
  - Standby power for entire PIT load
- **Ground Mounted PV Arrays**



# Next Steps

- **Finalize the ESA terms and conditions**
- **Anticipate award of contract by 3<sup>rd</sup> qtr 2019**
- **Start design and permitting in 2019**
- **Construction is anticipated in 2020**
- **Assumed on-line date in the 2<sup>nd</sup> qtr 2021**
- **Coordination with Terminal Modernization Program**
  - enhance diversification and redundancy of the power distribution system with the goal of a grid independent, 100% resilient airport





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