ALLIANCE
FOR INDUSTRIAL EFFICIENCY

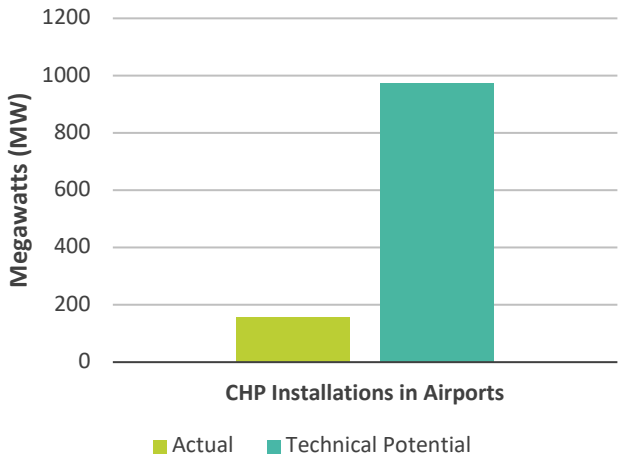
Combined Heat and Power (CHP) Potential in Airports

Across the US, nearly two-million travelers trust America's 5,000 airports each day to get them where they need to be safely and on time. Airports depend on reliable and affordable energy to meet their customers' expectations. Combined heat and power (CHP) generation systems are both efficient and resilient and provide airports with the energy security they need to keep their hectic operations running smoothly. In an industry where $68.48 is lost each minute a flight is delayed, dependability and affordability are key.[1]

Direct CHP Benefits for Airports:

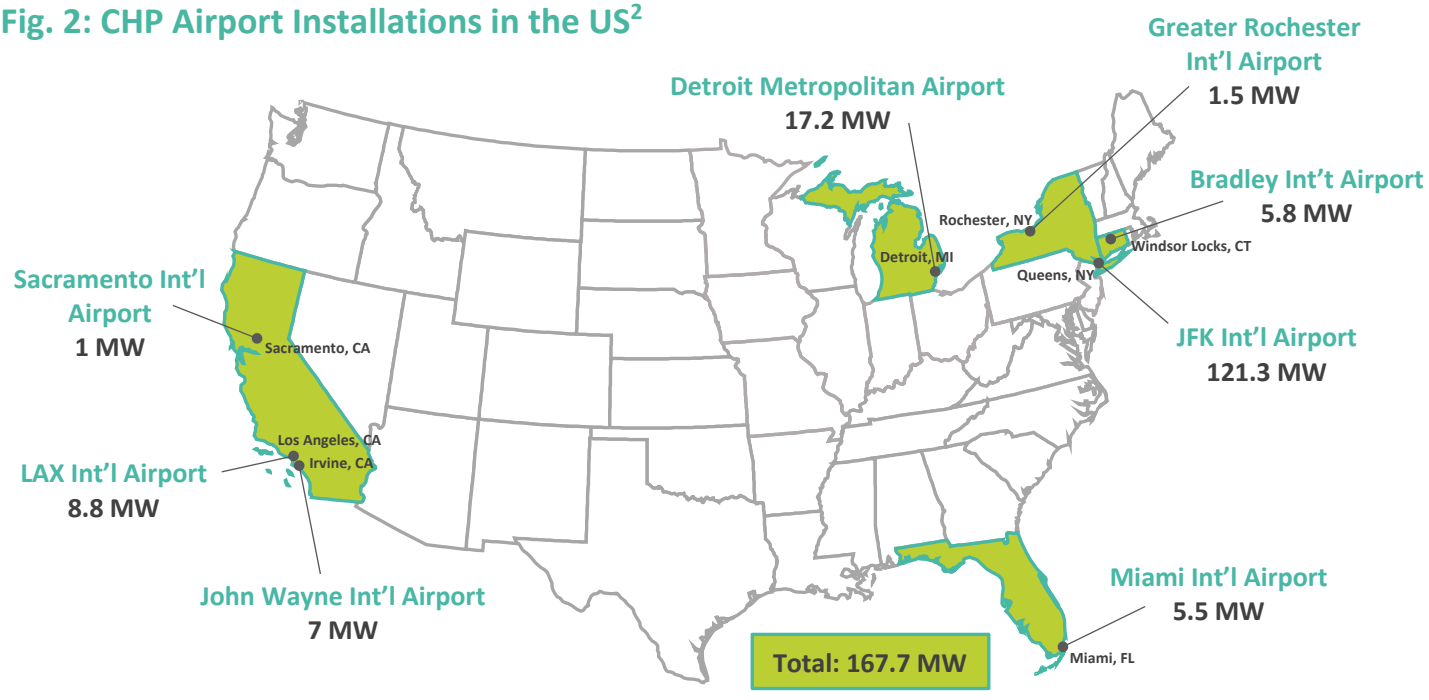
- Micro-grid capability
- Storm resilience
- Emergency preparedness
- Increased passenger safety
- Reduced flight delays
- Reduced energy costs
- Increased energy efficiency
- Reduced emissions of air pollutants
- Insulation from volatile electricity prices

Fig. 1: CHP Installations in US Airports Compared to Technical Potential[2,3]



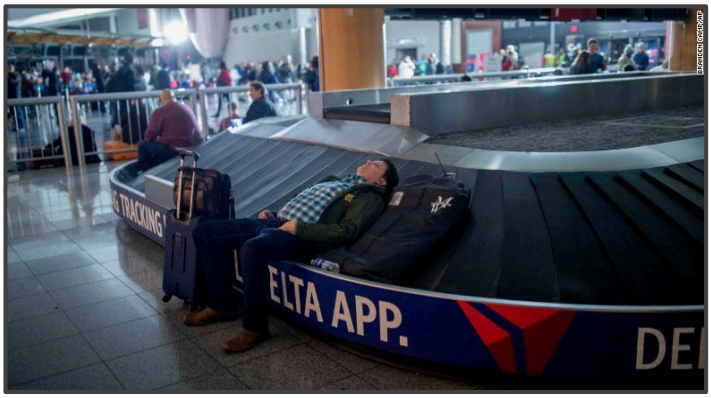
A power outage in an airport due to weather, a grid failure, or technical emergency puts a massive strain on airports, airlines, and their customers. CHP systems allow airports to operate as 'micro-grids,' meaning they can continue to run even during a grid-wide power outage, avoiding incredibly costly flight delays and cancellations and increasing passenger safety within the airport. Micro grids also eliminate the need for extensive back-up systems that don't always effectively protect airports in the face of grid failure. To date, eight airports have installed CHP systems totaling nearly 168 MW.[2] However, the US Department of Energy estimates that 973 MW of CHP potential remain in the US in airports alone.[3]

Fig. 2: CHP Airport Installations in the US[2]



Case Study: Why airports need dependable power

Hartfield-Jackson International Airport in Atlanta, Georgia is the world's busiest airport, with over 104-million passengers traveling through it each year. Therefore, when an 11-hour power outage struck the airport in 2017, the airport, airlines, and passengers had to cut serious losses. It is estimated that the airlines lost over $100 million dollars over the course of the day on canceled flights alone—over 3,000 flights were cancelled. Additional costs had to be managed including hotel refunds, lost revenue from airport businesses, additional employees brought in to manage passenger confusion, planes left to idle on runways wasting fuel, flight crews not arriving at their next destinations, and countless trickle costs that ensued from travelers not arriving at their destinations when expected. CHP increases airport energy resilience, preventing further disasters like the one at Hartfield-Jackson—protecting airlines, airports, and customers from future astronomical economic losses.



Man sleeps on baggage carousel waiting for the power to return

Airport CHP Success Stories

LAX International Airport (Los Angeles, CA): The 8.8 MW Combined Utility Plant installed at LAX International Airport is 25% more efficient than the plant it replaced, saving the airport $7 million in energy costs alone. The installation includes a natural gas combustion turbine that generates the electricity needed to operate the plant and to chill water used for air conditioning in the terminals. Additionally, the waste heat from the combustion engines is captured and used to heat the terminals. The system also includes a thermal storage tank that is filled with chilled water at night, which is redistributed to the airport during times of peak heat to cool the terminals (blue and gray cylinder in figure, above). This plant is a step toward the airport's goal to achieve LEED Gold certification.

John F. Kennedy International Airport (Queens, NY): Operating at 121.3 MW, this gas-fired system is the largest airport CHP installation in the country. The operation's two turbine generator sets and two heat recovery steam generators provide the entire electrical, hot water, and cold water needs of the airport. Excess electricity from the plant is pumped back into the utility grid. The system allows the airport to run as an independent micro-grid. Generating enough power to run the entire airport, the JFK CHP plant can keep the terminals operating, even during a grid failure.

[1] Airlines for America. "U.S. Passenger Carrier Delay Costs." 2017. http://airlines.org/dataset/per-minute-cost-of-delays-to-u-s-airlines/
[2] U.S. DOE. "Combined Heat and Power (CHP) Installation Database." Installations as of Dec. 31, 2017. https://energy.gov/chp-installs
[3] U.S. DOE. "Combined Heat and Power (CHP) Technical Potential in the United States." March 2016. https://www.energy.gov/sites/prod/files/2016/04/f30/CHP Technical Potential Study 3-31-2016 Final.pdf

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