EPRI | ELECTRIC POWER RESEARCH INSTITUTE

Stationary Electric Airport Ground Support Equipment



Electric technologies are revolutionizing the way busy airports operate around the world. In addition to using electric vehicles, which tow baggage and load it onto aircraft, push aircraft back from the gate, and drive a host of other airside and landside support vehicles, airports and airlines are increasingly relying on stationary electric-powered technologies to support parked aircraft. Most major and regional airports are preparing their infrastructure in anticipation of their airline tenants' increased electrification needs.

"It's a tremendous savings. We're saving at least $50–$60 million a year in fuel burn alone by switching from diesel APUs to electricity."
—Rick Waugh, Senior Manager, GSE Western Region, Southwest Airlines

Electric ground power and preconditioned air units replace jet engine and diesel auxiliary power units to support aircraft parked at the gate, reducing emissions and saving money for airlines and airports.

Ground power units provide electricity for parked aircraft. An electric GPU replaces either a portable diesel generator or the aircraft's auxiliary power unit, which burns jet fuel at a rate of 28 gallons per hour. Electric GPUs can be wired directly into AC power at the gate. Common operating profiles are 380–480 VAC, three-phase, 45–180 kVA. GPUs convert power from standard U.S. electrical grid service at 60 Hz to 400 Hz, which is the power level that aircraft need.

Typical Input Demand: 40 kW
Typical Annual Energy Usage: 262,800 kWh

Preconditioned air units blow fresh air into the aircraft while it is parked at the gate. Historically powered by diesel generators, "PC air" units can instead be powered by electricity and wired directly into AC power at the gate. Air-conditioning capacity is 30-, 60-, and 100-tons, with 30-ton units common for mid-size jets. They typically operate at 208–480 VAC.

Typical Input Demand: 105 kW
Typical Annual Energy Usage: 693,113 kWh

Power availability for ground support electrification can depend on many factors, including the age of the terminal building. However, power requirements are often less than expected, and creative solutions, such as power-sharing with a passenger loading bridge, show that power availability may be a perceived, not real, limitation. Since passenger loading bridges operate intermittently—an average of 5 minutes per hour—their electrical infrastructure can be used to supply power for other purposes, such as charging stations for electric ground support equipment, or PC air and GPU systems.



Stationary Electric GSE Manufacturers

Brand Name	Equipment Type	Contact Information
ITW GSE	GPU and PC Air	www.itwgse.com
JBT Corporation	GPU and PC Air	www.jbtaerotech.com

Additional EPRI Resources

Available for download at www.epri.com/ET.

Southwest Airlines Saves Money and Fuel, Cuts Emissions with Electrification, 2008, ID#1016392

Southwest Airlines developed a special tool and a procedure for ground support employees to follow to operationalize the airline's use of electrically driven PC air and 400 Hz power for parked aircraft. At the time, Southwest projected savings of $45 million in reduced diesel and jet fuel consumption, and significant emissions reductions.

Commercial and Industrial Guide to Electric Transportation, 2015, ID# 3002004898

This 16-page color brochure introduces the electric vehicles and equipment that are currently in use or being demonstrated, and the opportunities for further electrification in commercial and industrial applications.

Contact Information

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