EPRI | ELECTRIC POWER RESEARCH INSTITUTE

Mobile Electric Airport Ground Support Equipment

Around the world, airports and airlines face pressure to meet increasingly stringent air quality standards and reduce costs. In response, many are replacing internal combustion ground support equipment with electric GSE that offers comparable functionality, reduces emissions, and lowers operating costs. Retrofit kits and new electric equipment are available.

"Give me electric. I'll take electric any day."
—Artis Johnson, Ramp Agent, Southwest Airlines

"They have good torque and they pull four full carts of bags with ease. They're great. They stop well, they handle well, they turn on a dime."
—Eric Colacioppo, Ramp Agent, Southwest Airlines

On busy airport ramps around the world, electric vehicles are towing baggage carts, loading baggage and cargo into aircraft, and pushing airplanes away from the gate. Electric service and lavatory trucks, maintenance and service lifts, and stairs are also commercially available for airside operations.

Tow tractors move equipment that cannot move itself, such as carts loaded with passenger baggage, lavatory carts, and mobile air conditioning units. Most electric tractors operate at 72–80 VAC, with a 30 kW AC motor and 500–625 Ah lead-acid battery. Drawbar pull capacity is 3,500–5,000 lbs.

Typical Input Demand: 10–20 kW
Typical Annual Energy Usage: 32,120 kWh

Belt loaders are self-propelled mobile conveyors used to load baggage and cargo into an aircraft cargo hold. Both AC and DC systems, operating at 48–80 V, are common. Electric belt loaders can service a range of aircraft sizes, up to large wide-body jets. Typical weight capacity is 2,000 lbs.

Typical Input Demand: 5–10 kW
Typical Annual Energy Usage: 4,941 kWh

Container loaders are self-propelled mobile vertical platform lifts used to load large containers and cargo into aircraft. An electric loader typically operates at 160 VAC and can lift 15,500 lbs.

Typical Input Demand: 20–40 kW
Typical Annual Energy Usage: 29,200 kWh

Pushback tractors push aircraft away from the airport gate. Electric pushbacks are capable of moving aircraft as large as 737s and 757s, and operate at 40–80 VAC and VDC. Some use a towbar, others use a cradle. Drawbar capacity is up to 28,000 lbs. Lift cradle capacity is up to 200,000 lbs.

Typical Input Demand: 10–20 kW
Typical Annual Energy Usage: 21,900 kWh

Mobile Electric GSE Manufacturers

Brand Name	Equipment Type	Contact Information
Charlatte America	Baggage and Tow Tractors, Belt Loaders, Pushback Tractors	www.charlatteamerica.com
Eagle Tugs	Baggage and Tow Tractors, Pushback Tractors	www.eagletugs.com
JBT Corporation	Pushback Tractors, Container Loaders	www.jbtaerotech.com
JetPorter	Pushback Tractors	www.jetporter.com
LEKTRO, Inc.	Pushback Tractors	www.lektro.com
NMC-Wollard, Inc.	Baggage and Tow Tractors, Belt Loaders	www.nmc-wollard.com
TLD America	Belt Loaders, Pushback Tractors	www.tld-group.com
TUG Technologies Corporation	Baggage and Tow Tractors, Belt Loaders, Pushback Tractors	www.tugtech.com

Additional EPRI Resources

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

Electric Retrofit for Airport Container Pallet Loader, 2009, ID#1020482

This case study documents the data captured during field testing of a JBT AeroTech Commander-15 aircraft container loader that was converted from internal combustion to electric drive. Lessons learned in the study led to the development of a conversion kit for older model-year equipment.

Electric Ground Support Equipment: An Airline's Success, 2007, ID# 1014421

This case study follows Continental Airlines' experience with conversion of GSE in Houston and in Southern California.

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

For more information contact Andra Rogers, Sr. Project Manager, Electric Transportation at 650.855.2101 (arogers@epri.com).

EPRI Customer Assistance Center at 800.313.3774 (askepri@epri.com).

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Electric Power Research Institute (EPRI)
3420 Hillview Avenue, Palo Alto, California 94304-1338 • PO Box 10412, Palo Alto, California 94303-0813 USA
800.313.3774 • 650.855.2121 • askepri@epri.com • www.epri.com