

Opportunities for electrification of Airport Ground Support Equipment

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- ❖ **Equipment Type**
- ❖ **Equipment Population**
- ❖ **Current Challenges**
- ❖ **Current Technologies**
- ❖ **Futures Solutions**

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Equipment Type

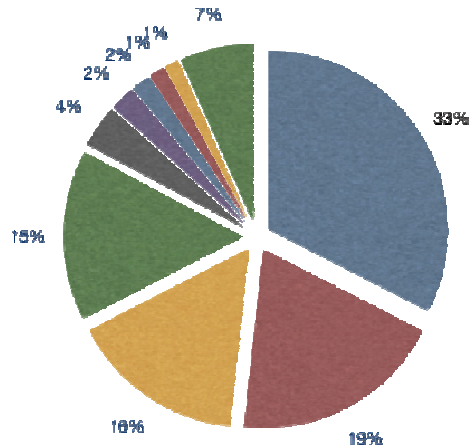
- ▶ **Air Starter Units**
- ▶ **Air Conditioning Units**
- ▶ **Aircraft Tugs - Narrow body aircraft; wide body aircraft**
- ▶ **Baggage Tractors**
- ▶ **Belt Loaders**
- ▶ **Buses**
- ▶ **Cargo Equipment - Cargo Loaders; Forklifts; Lifts**
- ▶ **Cars - Passenger**
- ▶ **Deicers**
- ▶ **Ground Power Units (GPU)**
- ▶ **Pickup Trucks**
- ▶ **Service Vehicles - Fuel trucks; maintenance trucks; lavatory trucks**
- ▶ **Vans**

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Equipment Population
Off-Highway Equipment

- Baggage Tractor
- Cargo Loader
- Belt Loader
- Tug Narrow Body
- Tug Wide Body
- Service Truck
- Forklift
- Fuel Truck
- Lift
- Others



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Electric Ground Support Equipment
Current Challenges

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Inertia
A property of matter at rest to remain at rest

- I** **Infrastructure** - Charging infrastructure; available electric power; space availability in ramp areas
- N**
- E** **Economics** - Charger cost; battery replacement costs; resale value
- R** **Regulatory environment** - Incentives for EV's
- T** **Technology** - Battery energy density; fast chargers;
- I** **Information** - Supplier base; technology advancements; marketing
- A** **Adaptability** - Operator training; maintenance training

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Electric Ground Support Equipment
Current Products

**Opportunities for electrification of
Airport Ground Support Equipment**



- ▶ AC & DC Drive systems available
- ▶ On-Board chargers or Fast charger capabilities
- ▶ Regenerative braking
- ▶ Dual motor models available
- ▶ Air conditioning and heaters available
- ▶ Rapid battery replacement configuration
- ▶ Hydrostatic steering
- ▶ Five year battery life

Baggage tow tractors

Speed = 12-16 mph
Range = 25 miles
DBP = 4500 lb.

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Electric Ground Support Equipment
Future Solutions

**Opportunities for electrification of
Airport Ground Support Equipment**

GSE Fact
Over 80% of combustion
powered GSE equipment
can be replaced with
current EV Technologies

- ▶ Regulatory mandates for airports to provide charging infrastructure funded by emission tax on current equipment being used
- ▶ Develop series hybrid vehicles as short term solution to overcome infrastructure issues
- ▶ All new airports and expansion projects required to incorporate EV charging infrastructure
- ▶ EV industry participants to standardize on charging methods
- ▶ Create performance and Industry test standards for Electric GSE equipment; all airlines and contractors to purchase approved equipment only

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