



## Elevator Emergency Backup Power Systems

Prepared by Myers Emergency Power Systems

### **Background:**

Emergency Backup Power Systems for elevators currently use mostly polluting 'diesel-generator' (DG) sets to provide power when the primary source is out and allow people to come out of elevator safely. But due to new 'Air Quality' regulation and 'high maintenance' requirements of DG, the UPS/EPS is becoming popular for back-up power application of Elevators. It also helps to build 'carbon-neutral' building for 'green' initiatives.

Myers Emergency Power Systems (MEPS) is a leading designer & manufacturer of highly engineered backup power technology for emergency lighting, traffic, rail, and broadband. Myers' product line includes Emergency Power systems (EPS) Inverters that provide power to lighting fixtures to illuminate the path of egress during an emergency situation. EPS Inverters are now also used as part of an Emergency Backup Power System for elevators.

"Inverter-based EPS" includes Inverters, Chargers and Batteries (UL 924 certified) that can be used to move the elevator up and down for the extended period (90 minutes) in the absence of normal power.

### **Elevator Market:**

Current installed base of emergency power systems for elevators are 1.1 million elevators growing at a 2.5% CAGR. Segmentation of installed base consists of diesel-generator sets (~60%); regular UPS & Inverter-based EPS (~25%); and other/no system (15%). Normally, back-up time of regular UPS is only 5 to 10 minutes and cannot work for extended back-up time.

UPS is used to move the elevators to the nearest lower landing so they can be evacuated. Once evacuated, the elevators are then shut down until normal power returns.

Approximately, 40,000 new elevators are installed in North America annually (estimates ranged from around 25,000 to over 50,000). Average lifespan of an elevator is approximately 25 years, which would suggest that 4% of the installed base should be replaced or modernized annually.

There are approximately twelve million buildings in North America, excluding single-family residential. There are over five million multi-family residential buildings, with forty million housing units, in the US alone. Commercial buildings (including institutional) are used for health care, educational, retail, food service, warehouse, religious and various public or private use. Installed base of elevators are found in multifamily residential buildings (~40%); commercial (35%) and other (25%).

### **Types of Elevators:**

The North American market opportunity for emergency backup power systems (EPS) includes both Hydraulic and Traction elevators, which can be conventional or regenerative.

- **Hydraulic Elevators** are powered by a pump system to push a cylinder/piston that pushes the cabin up. Generally Hydraulic elevators cost less than Traction elevators but are slower and typically limited to low-rise and mid-rise buildings. They can also carry large heavy loads, such as freight.

- **Traction (Electric) Elevators, aka Traction MR**, have a dedicated machine room (MR) above the elevator shaft. Traction MR elevators are used in almost all high-rise buildings, and in approximately 12% of mid-rise buildings (9-30 landings). Almost all buildings over 250 feet use Traction MR elevators. When power flows into the motor, it creates a lifting torque on the shaft and pulley, lifting the cab. When a cab goes up with a light load and down with a heavy load, the system generates more power (regeneration) than it uses.
- **Traction MRL (Machine Room-less)** elevators are found in 88% of mid-rise buildings and 50% of low-rise buildings (2-8 landings). They are faster and use less energy than Hydraulic but have more moving parts and higher maintenance costs. They require less space than Traction MR elevators, as they need no separate machine room. Almost all Traction MRL elevators use gearless synchronous motors.

Traction (Electric) Elevators can be further segmented into Conventional versus Regenerative:

- **Conventional Traction Elevators** are those that simply dissipate and waste the regenerative energy from the elevator in the form of a heat.
- An ongoing trend is for elevators to utilize regenerative drives for energy efficiency. When motor acts as a generator, transforming mechanical power into electrical power and pumping current back into the facility's electrical grid to use elsewhere. Regenerative Traction Elevators include regenerative drives that capture heat energy during regeneration and convert it to electrical energy that is transferred back to the building's power grid instead of dissipating as heat energy.

Myers' inverters are not currently serving the Regenerative Traction Elevator market, where kinetic energy is converted into electrical power that is transferred back to the building's power grid.

### **Buying Pattern:**

Owners looking for showcase 'green' buildings are reducing use of diesel-generators, looking for other ways to minimize the 'carbon footprints' of their buildings. ADA-related concerns about building evacuation during power outages are stirring up demand for extended runtime backup power that enables less-mobile occupants to evacuate the building and not just to get out of the elevator. Also, recent building codes need at least 90 minutes of full load backup power to ensure continuous mobility of passengers in spite of a power failures. Myers emergency backup power systems fill the void of extended runtime for elevators and simultaneously improve the air quality in spite of its long runtime. It can be used to back-up for both new and existing elevator systems.

### **Conclusion:**

MEPS is becoming a strong supplier in an emerging market for inverter-based extended runtime EPS for elevators. MEPS strengths include brand image, experience, complementary products (lighting), sales / distribution infrastructure.