BATTERY POWER SYSTEM for Railways

Benefits
- Energy Saving
- No Regeneration Cancellation
- Peak Shaving
- Emergency Runs
- Line Voltage Stabilization
- Alternative to Substations

Installed BPS
- Osaka Subway
  - Location: Osaka
  - Battery capacity: 205kWh
  - Supply year: 2011
- Osaka Subway
  - Location: Osaka
  - Battery capacity: 204kWh
  - Supply year: 2013
- Tokyo Monorail
  - Location: Tokyo
  - Battery capacity: 203kWh
  - Supply year: 2013
- Tokyo Monorail
  - Location: Tokyo
  - Battery capacity: 203kWh
  - Supply year: 2013
- Sapporo Subway
  - Location: Hokkaido
  - Battery capacity: 204kWh
  - Supply year: 2013

Verification Tests
- Washington D.C. Subway (WMATA)
  - Location: Washington D.C.
  - Battery capacity: 385kWh
  - Supply year: 2012
- New York Subway
  - Location: New York
  - Battery capacity: 367kWh
  - Supply year: 2010

Interior of a BPS cabinet: High-capacity nickel-metal hydride battery GIGACELL® used for the BPS

Substation
Accelerating Train
Direct Charge and Discharge
Braking Train
**Benefits of the BPS**

**Energy Saving**
Reducing overall energy consumption by encouraging regenerative braking and then "recycling" it.
BPS accumulates excessive electricity when there are no powering trains nearby, enabling trains to fully utilize their regenerative braking function and maximize energy savings.

**No Regeneration Cancellation**
Stabilized line voltage prevents regenerative braking failure
BPS's line voltage stabilizing effect prevents the trains' pantographs from rising to the regeneration cutoff voltage.

**Peak Shaving**
Power discharged from the BPS reduces power demand at all times, including rush hours
Heavy train traffic causes higher power demand. Discharge from BPS decreases the substation's power demand.

**Emergency Runs**
Batteries will power trains to the nearest station during a power outage
In an event of a power outage, BPS will feed power to move stranded trains and evacuate passengers to the next station.

**Line Voltage Stabilization**
Charging and discharging stabilizes line voltage
BPS will assist in feeding power to accelerating trains, reducing voltage sags and enabling optimum train operation.

**Alternative to Substations**
The BPS can serve as an alternative to substations
BPS will support traction power and enable downsizing of substation facilities.

---

**Enhances Generation of Regenerative Energy**

**Voltage Stabilization**

**Emergency Runs during Power Outages**

---

**625 V DC Third Rail Voltage & Battery Power Waveforms**

---

**Direct Connection to System**

**Low Costs**
No power controllers needed

**No Delays and Losses**
Max. use of regenerative energy

**High Efficiency**
No loss through controllers

**No EMI**
No adverse effects to signal systems