

EMERGENCY ENERGY MANAGEMENT SOPS



EBUS ECOSYSTEM

EMERGENCY ENERGY MANAGEMENT SOPS



Responsibility

On-Duty Technician

Depot Manager

Electrical Safety Lead

Safety Officer

✓ 1. Emergency Power Shutdown

Objective: Rapidly de-energize the entire depot power system in case of a critical emergency.

Triggers:

- Fire, electric shock, equipment fault, alarms
- Major fire or explosion risk across multiple systems.
- Flooding or water ingress in electrical areas.
- Structural collapse or earthquake.
- Cybersecurity breach or control system failure.
- Emergency services request full power shutdown.



Responsibility:

Depot Manager

Safety Officer

Electrical Safety Lead

Procedure:

- Assess the situation and confirm need for full shutdown.
- Activate Emergency Power Off (EPO) switch or master breaker.
- Confirm shutdown of all systems: chargers, BESS, power distribution, auxiliary loads.
- Notify emergency services and internal safety teams.
- Secure the site and restrict access.
- After resolution, inspect all systems before re-energizing.
- Document the event and update emergency protocols.

✓ 2. Emergency Isolation for (Charging Infrastructure, BESS rack, HV Bus)

Objective: Immediately isolate power to a specific component (e.g., charger, BESS rack, HV bus) during a localized emergency.

Triggers:

- Fire, electric shock, equipment fault, alarms
- Visible smoke, fire, or sparks from equipment.
- Electric shock incident or near-miss.
- Abnormal sounds, smells, or overheating.
- Fault alarms from chargers, BESS, or HV systems.



Responsibility:

Depot Manager

Safety Officer

On-Duty Technician

Procedure:

- Identify the affected equipment.
- Activate local emergency stop or isolation switch.
- If safe, isolate upstream power (breaker/disconnect).
- Evacuate personnel from the immediate area.
- Notify control room and emergency response team.
- Secure the area and prevent re-energization.
- Conduct post-incident inspection and root cause analysis.



DEPOT OPERATIONS

SAFE ENERGY MANAGEMENT SOPS FOR PLANNED ACTIVITIES

✓ 1. PLANNED LOCKOUT/TAGOUT (LOTO) – ELECTRICAL SYSTEMS

Objective: Safely isolate electrical energy during scheduled maintenance or servicing of depot systems (e.g., chargers, switchgear, BESS, onboard HV).

Triggers: : Maintenance, inspection, upgrades

Responsibility: Maintenance Team Safety Officer

SOP for planned lockout/tagout (LOTO) – electrical systems

- Review electrical schematics and identify all energy sources.
- Notify control room and affected personnel.
- Shut down equipment using standard controls.
- Isolate energy at source (breakers, disconnects, service plugs).
- Apply lockout devices and tag with technician details.
- Verify zero energy using calibrated testers (Category III/ IV multimeters).
- Apply grounding if required.
- Perform maintenance using PPE and insulated tools.
- After work, remove tools, restore system, and remove LOTO devices.
- Document the procedure and close the permit.



Responsibility

Maintenance Team

Depot Manager

Electrician/ Technician

Safety Officer

🔋 2. SAFE BATTERY HANDLING & DAMAGED BATTERY MANAGEMENT

Objective: Ensure safe handling of EV and BESS batteries during maintenance and manage damaged batteries to prevent hazards.

Responsible: Battery Technician, Safety Officer

Triggers:

- Scheduled maintenance or replacement.
- Inspect for damage (swelling, leakage, odor) and avoid passenger overload.
- Post-incident checks (collision, fire, thermal event). Safe end-of-life disposal.



Responsibility:

Maintenance Team

Technician

Safety Officer

SOP for Safe Handling Practices:

- Only trained personnel to handle batteries.
- Wear PPE: arc-rated clothing, insulated gloves, safety goggles.
- Remove metal jewelry; use insulated tools.
- Follow LOTO before any battery work.
- Avoid dropping, crushing, or puncturing cells.
- Ensure proper ventilation; avoid water near battery terminals.
- Monitor for heat, swelling, or unusual odors.

SOP for Handling Damaged Batteries:

- Do not move or open damaged batteries without assessment.
- Isolate area and notify safety team immediately.
- Use insulated tools and chemical-resistant gloves.
- Place damaged batteries in fire-resistant containers.
- Store in a cool, ventilated, secure area with hazard signage.
- Arrange for certified disposal or recycling with support from E-bus OEM.
- Document incident and update battery handling logs.

STAFF AND PASSENGER SAFETY SOPS FOR FIRST RESPONDERS



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EMERGENCY SOPS FOR FIRST RESPONDERS



Responsibility

Maintenance Team

Depot Manager

Electrician/ Technician

Depot Supervisor

✓ 1. POLICE

Triggers: Accident/ collision, Crowd gathering near bus or depot, fire, smoke, escalated risk



Responsibility:

Police

SOP for Polices for on road accident or escalated fire risk

- Establish perimeter to keep public away from bus and HV components.
- Prevent unauthorized access to depot or accident site.
- Help move passengers and staff to safe muster points.
- Manage traffic and prevent panic situations.
- Liaise with depot manager and emergency services for updates.

✓ 3. Traffic Police

Triggers: Road accident involving e-Bus. Fire or thermal event blocking traffic.



Responsibility:

Traffic Police

SOP for Traffic Police on road accident or escalated fire risk :

- Block lanes around incident site to prevent secondary accidents.
- Reroute traffic away from incident location.
- Create emergency corridor for fire trucks and ambulances.
- Guide passengers to safe zones away from traffic.

✓ 2. Fire Department

Triggers: Visible smoke, flames, or thermal runaway alert. BMS alarm for overheating or fire risk.



Responsibility:

Fire Department

SOP for Fire Department for fire/ smoke/ thermal incidents

- Approach from upwind, maintain safe distance initially.
- Confirm emergency cut-off is engaged before firefighting.
- Use **Class D or clean agent extinguishers or water** for suppressing battery fires as suggested by OEMs.
- Ensure all passengers and staff are evacuated before suppression.
- Declare area safe for recovery after thermal risk is eliminated.

✓ 4. Hospitals / Medical Teams

Triggers: Injuries reported from accident or fire. Smoke inhalation or burns detected.



Responsibility:

Hospitals/ Medical Teams

SOP for Hospitals / Medical Teams :

- Immediate Medical Aid to treat smoke inhalation, burns, or injuries on-site.
- Arrange ambulances for critical cases.
- Keep burn units and emergency wards ready for mass casualty scenarios.

SAFE EVACUATION OF STAFF/ PASSENGER SOPS



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EMERGENCY SOPS FOR FIRST RESPONDERS



Responsibility

Driver

Technicians

Depot Manager

First Responders

Safety Officer

✓ 1. SAFE EVACUATION OF PASSENGERS ON ROAD



Responsibility:

Driver

Step 1- Driver Actions

- Stop bus safely, activate hazard lights.
- Switch off ignition and engage HV emergency cut-off.
- Announce evacuation calmly; instruct passengers to leave belongings.
- Guide passengers to move to a safe distance away from affected bus, preferably upwind.
- Call emergency services and control center.

Step 2: Passenger Safety

- Assist elderly, disabled, injured and vulnerable passengers first.
- Keep passengers together at a safe muster point.
- Prevent anyone from approaching battery or HV components.



Responsibility:

Traffic Police

First Responders/
Technicians

Fire
Department

Step 3: Support Team

- Traffic Police: Divert traffic, create emergency corridor for first responders.
- First Responders/ Technicians: Isolate HV system, assist evacuation.
- Fire Department: Suppress fire using **Class D or clean agent extinguishers or water** as suggested by OEMs

✓ 2. SAFE EVACUATION OF STAFF at DEPOT



Responsibility:

Depot Manager

Safety Officer

Step 1: Alarm Activation

- Automatic fire alarm or thermal alert (both visual and acoustic) triggers evacuation.
- Depot staff initiates Depot Evacuation Plan as practiced during the mock drills.

Step 2: Staff Actions

- Move all personnel to designated safe points/ zones.
- Account for staff using attendance logs/ manual counting.
- Lockdown depot to prevent unauthorized entry.



Responsibility:

Technicians

Safety Officer

Step 3: Hazard Control

- Technicians: Isolate HV systems, move buses away from fire zone.
- Safety Officer: Coordinate with fire department and emergency services

DAMAGE & SAFETY CHECK SOP (FIRE INCIDENT)



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EMERGENCY SOPS FOR FIRST RESPONDERS



Responsibility

Depot Manager

Technical Team

Maintenance Team

Safety Officer

✓ 1. DAMAGE & SAFETY CHECK SOP (FIRE INCIDENT)



Responsibility:

Safety Officer

Step 1: Ensure Scene Safety

- Confirm fire is fully extinguished and area declared safe by Fire Department.
- Wear arc-rated PPE, insulated gloves, and face shield before approaching.



Responsibility:

Technical Team

Step 2: High-Voltage Isolation

- Verify HV system is disconnected using emergency cut-off.
- Check voltage with insulated multimeter (category III or IV) before touching any components.



Responsibility:

Technical Team

Step 3: Battery Inspection

- Look for signs of damage: swelling, leakage, burn marks, odor.
- Use thermal imaging to confirm no residual heat or hotspots.
- Quarantine damaged battery in a fireproof container.



Responsibility:

Maintenance Team

Step 4: Structural & Electrical Check

- Inspect wiring harness, connectors, and insulation for burns or melting.
- Check inverter, charger, and control units for heat damage.



Responsibility:

Safety Officer

Step 5: Safety System Verification

- Confirm fire suppression system activation and refill if discharged.
- Inspect emergency exits and signage for damage



Responsibility:

Depot Manager

Safety Officer

Step 6: Documentation

- Record all findings in incident report.
- Capture photos of damaged components.
- Log actions in maintenance system for root cause analysis.