Electric Vehicle Fleet Optimisation

Trapeze™
Here for the journey

Public transport authorities and operators worldwide are accelerating the introduction of electric buses into their fleets to help reduce greenhouse gas emissions and achieve sustainability targets. But electric buses introduce new challenges, like limited vehicle ranges, charging times, and energy consumption fluctuations.

Vehicle energy consumption depends not just on the distance travelled but on a range of external factors, including weather, traffic conditions, disruptions, and passenger numbers. Services and charging plans must be dynamically calculated and managed to accommodate this. But the vehicle is just the start of the challenge, with an entire electric bus management system required to ensure the fleet operates effectively.

Trapeze has developed a set of integrated electric vehicle (EV) fleet optimisation solutions that provide public transport authorities and operators with the end-to-end software that monitors and manages EV operations. They also provide valuable insights that enable the industry to deliver more efficient and effective services.

Trapeze offers three EV solutions:

1. **LIO-Volta** for electric vehicle dispatch, monitoring, and control,

2. **SmartCharging** to help manage charging infrastructure and processes, and

3. **SmartMonitor** for real-time vehicle status monitoring.

Depending on your fleet's specific needs and requirements, these solutions can be used separately or in combination.

LIO-VOLTA

Electric vehicle fleet monitoring and management

LIO-Volta is an integrated add-on to Trapeze's fleet control management system, LIO, and provides the connection between electric buses, charging infrastructure, and service control. LIO-Volta is the core component of Trapeze's EV solution suite.

It is a cloud-based system that helps control centre staff efficiently monitor and operate electric bus fleets.

LIO-Volta collects and consolidates energy consumption data for all EVs and monitors changes over time - considering variables such as vehicle charge, ambient temperature, traffic conditions, and route topography.

LIO-Volta automatically determines a vehicle's remaining range by continuously calculating and predicting future energy consumption needs based on real-time data.

The remaining (or surplus) range is calculated based on a vehicle's current location, operating time, and external factors.

Electric Vehicle Fleet Optimisation
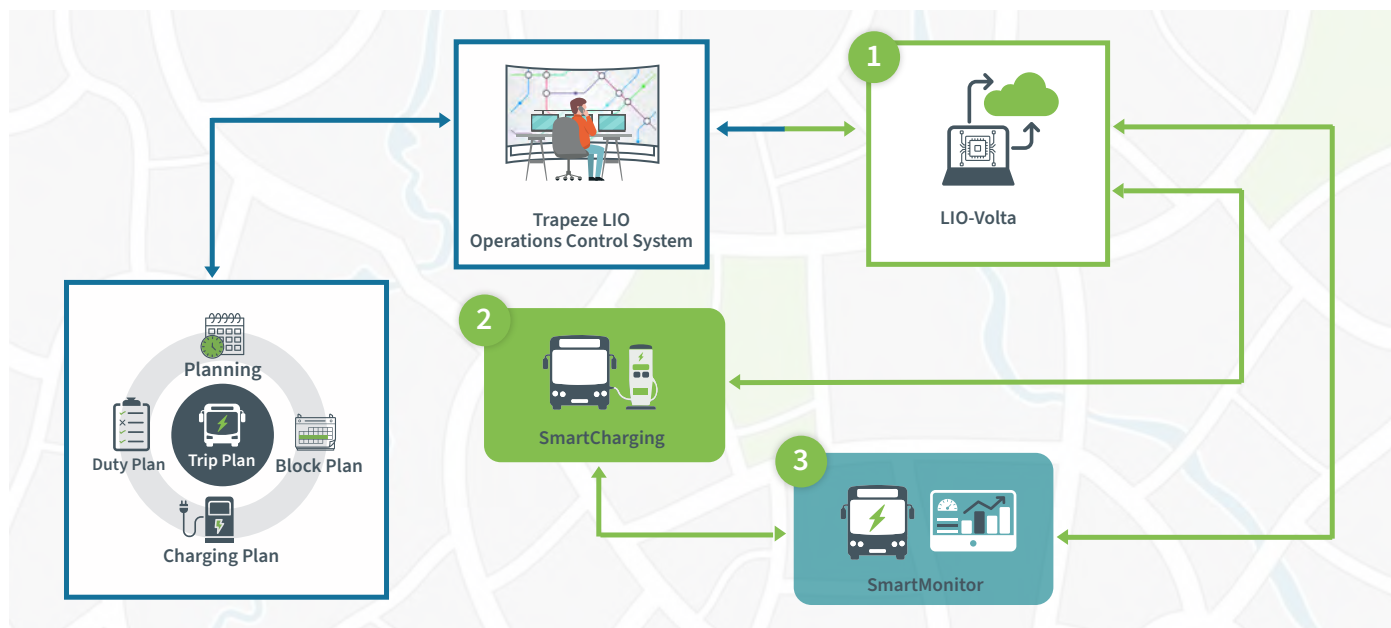
Control centre operators can view EV fleet information directly from LIO system views, such as vehicle details or route summaries, to ensure vehicles always have sufficient energy, even during disruptions.

In most situations, LIO-Volta resolves disruptions and deviations affecting EVs automatically unless system thresholds are exceeded.

If this occurs, the control centre is alerted. LIO-Volta gives operators options to deal with issues, like bringing in an EV for charging or dispatching a replacement bus.
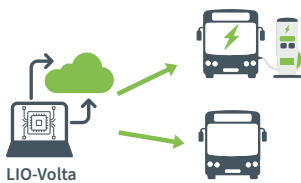
LIO-Volta

LIO-Volta benefits

- **Optimises** EV fleet operations
- **Monitors** real-time energy consumption
- **Calculates** remaining EV range
- **Disruption and deviation alerts**

SMARTCHARGING

Charging infrastructure management

SmartCharging provides monitoring, management, and remote maintenance of charging infrastructure.

It provides intelligent charging management, offering EV operators several important benefits and significant cost reductions.

With SmartCharging, EV operators can increase charging infrastructure availability, reduce energy costs by avoiding peak demand periods, and extend vehicle battery life by using optimum charging profiles.

Reliable charging infrastructure is essential for EV operations and requires constant monitoring.

This enables the early detection and quick rectification of outages or malfunctions.

SmartCharging lets operators identify disruptions while also conducting corrective actions - so all EVs are always charged at the right level at the right time.

SmartCharging does more than just monitoring. Since it is integrated with the Trapeze LIO control system through LIO-Volta, it can be used for the flexible rescheduling of planned charging operations when disruptions occur.

SmartCharging monitors charge levels and charging requirements across the fleet to accommodate charging plan disruptions like missed charging slots – enabling services to still be delivered.

Another important SmartCharging feature is EV charging coordination. Charging can be optimally spread out over 24 hours or occur outside of peak times, reducing energy consumption and costs.

Available energy can also be efficiently distributed across individual charging stations.

In addition, SmartCharging adapts charging processes so that the power supply is matched to a vehicle's battery and charging requirements.

SmartCharging benefits

- **Monitors** charging infrastructure
- **Coordinates** charging jobs efficiently
- **Significantly reduces** EV charging costs
- **Minimal downtime** from charging disruptions

SMARTMONITOR

Real-time electric vehicle monitoring

SmartMonitor provides real-time EV status monitoring data. It allows EV operators to run vehicles with higher reliability and provides flexible scheduling.

With SmartMonitor, transport operators have complete visibility into EV battery levels and vehicle status across the EV fleet, providing essential vehicle data to the control centre and depot staff.

With charging management, automated e-mail alerts, and real-time information via vehicle interfaces, operators can reduce EV range risks while increasing vehicle utilisation and reducing operating costs.

Charging cycles can be planned more effectively for optimum

integration with other operational activities.

Dashboards provide users with clear and concise vehicle status information. Operators can define who can access specific information by applying access and security levels.

SmartMonitor benefits

- **Displays real-time** battery status information
- **Presents** EV charge status clearly on dashboards
- **Reduces** EV range risks
- **Enhances** scheduling flexibility

END-TO-END EV MANAGEMENT

In addition to LIO-Volta, SmartCharging, and SmartMonitor, Trapeze also offers fully integrated solutions that enhance EV operations:

• **Planning and Scheduling** – which provides automatic run and roster optimisation for buses, drivers, and timetables, now also caters for depot and interchange chargers to produce charging plans for overnight and opportunity charging.

• **Enterprise Asset Management** – helps with the complexity of managing EV battery health and lifespan. By tracking asset information in an EAM system, EV operators can accurately measure charging events to track energy consumption and expenditure to quantify savings and identify potential battery issues while expanding lifespan.

• **Workforce Management** – automate and optimise EV staff schedules, forecasting, training, qualifications and compliance with an intuitive tailor-made-for-transport solution while positively impacting employee work-life balance.

Trapeze's EV solutions provide operators and transport authorities with the tools to deliver the most efficient and reliable service for the travelling public.

Contact us to find out more about how our EV solutions can be integrated with your operations.

TRAPEZE GROUP

Trapeze Group works with public transport authorities and their communities to develop and deliver smarter, more effective public transit solutions. For more than 25 years, Trapeze has been here for the journey, evolving with our public transport customers around the world, helping them to move people from point A to Z and everywhere in between.

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