



CASE STUDY: Brisbane Metro

About the project

When completed, Brisbane Metro will be a key component of Brisbane’s public transport network, connecting Brisbane’s city to the suburbs. The high-capacity turn-up-and-go service will operate 24 hours on weekends – no timetables needed.

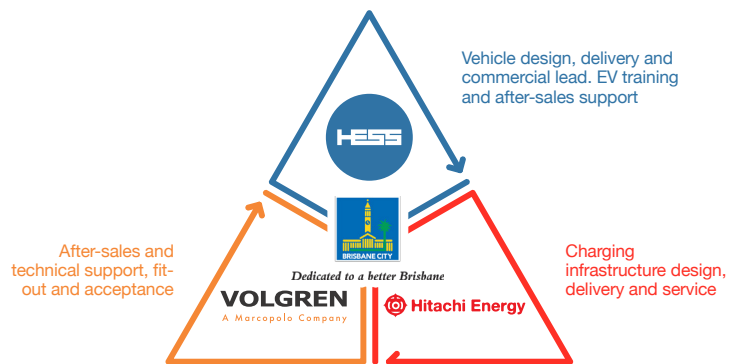
The fully electric vehicles will operate along a dedicated busway, providing a 21-kilometre service connecting 18 stations.

- Metro 1 — from Eight Mile Plains to Roma Street (36.2 km return trip)
- Metro 2 — from the Royal Brisbane and Women’s Hospital to The University of Queensland (22.6 km return trip)

A new generation of best-in-class, high-capacity vehicles

HESS, in partnership with Brisbane-based manufacturer Volgren, and electric infrastructure experts Hitachi Energy have been selected by Brisbane City Council to design and build the Brisbane Metro fleet, as well as its charging infrastructure.

HESS will deliver 60 of their high-capacity, zero-tailpipe emissions lightTram® 25 (bi-articulated) vehicles for the Brisbane Metro project.



Project specifications

Project owner	Brisbane City Council
Operator	Transport for Brisbane
Length of route	21km
Vehicles	Initial fleet: 60 lighTram® 25
Vehicle capacity	150 people in comfort, 170 in event mode
Average km/day (weekdays)	350 kilometres
Maximum speed	90 kilometres per hour
Operation	7 days a week, 24 hours on weekends
Charging	600kW flash charging and 50kW slow charging (metro depot)
Pilot metro delivery	April 2022
Operational commencement	Late 2024
Local partner	Volgren



Artist's impression

Best-in-class electric vehicles

lighTram® 25

The lighTram® 25 is HESS' flagship vehicle. It operates in a dozen European cities, carrying more than 3 million passengers every day.

As well as having zero tailpipe emissions, this range of vehicles solves problems where carrying capacity exceeds conventional bus limits and where light rail is deemed too expensive or infrastructure intensive to be feasible.

- Almost silent operation
- Capable of carrying 150 passengers in comfort and 170 passengers in event mode
- Customised interior, seat design and styling
- Zero tailpipe emissions
- Low-floor design from front to rear for accessible boarding
- Three large double doors for efficient all door boarding
- Dedicated door for driver compartment

Our flagship vehicle the lighTram® 25 is in operation in a dozen European cities carrying some 3 million passengers every day.

Brisbane Metro Charging

The Brisbane Metro project will incorporate Australia's first ever high-performance charging system with the ability to accommodate the daily operation of bi-articulated electric vehicles in Australia.

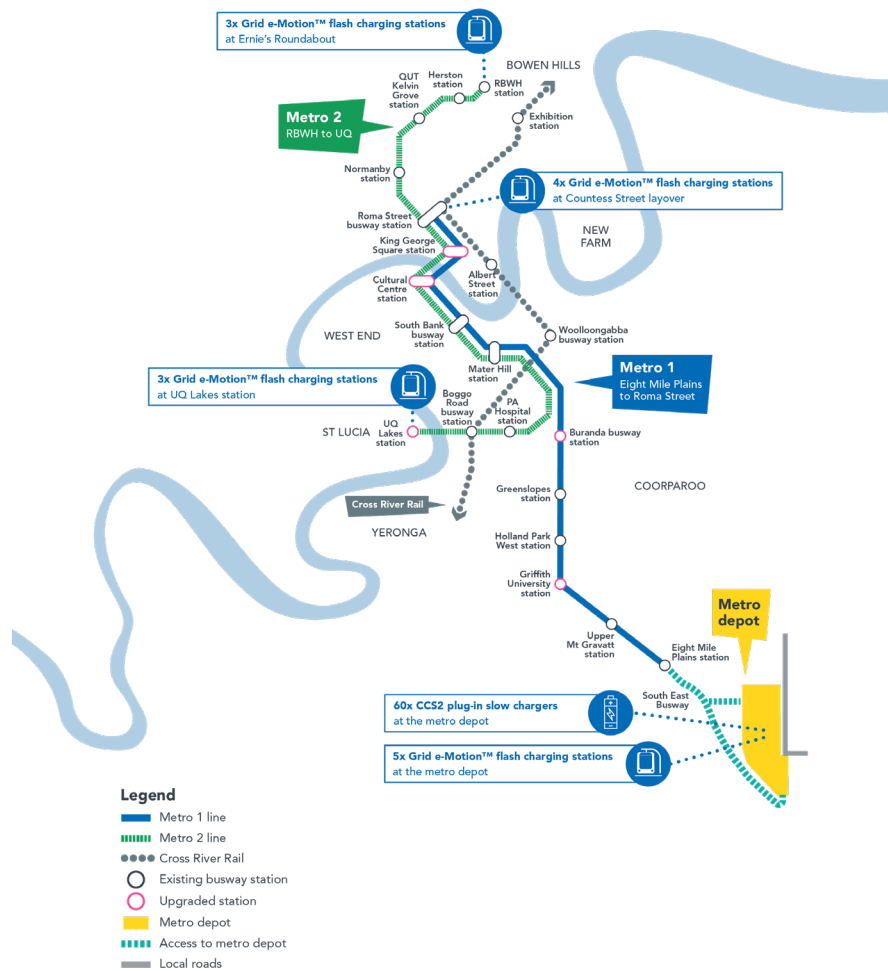
This will include:

- 15 (600 kW) flash charging stations at end of route locations
- 60 (50 kW) CCS2 plug-in slow charging stations at the depot

The charging solution is being delivered by Hitachi Energy in partnership with HESS.

A state-of-the-art metro depot is being constructed at School Road, Rochedale, adjacent to the South East Busway.

Brisbane Metro network map



Preconditioning

Thanks to an autonomous temperature control process called preconditioning, the lighTram® is brought to a comfortable temperature before the driver enters the vehicle every morning while charging at the metro depot.

The vehicle's sophisticated telematics system calculates various inputs, such as interior and exterior temperatures, weather forecasts and planned route operation, before determining when and how to precondition the vehicle.

The vehicle is preconditioned while connected to the charging stations at the metro depot. Preconditioning makes the vehicle more comfortable for drivers and passengers, saves time, increases battery life and saves energy (there's no use of battery power during the process).

This is only possible with zero emission vehicles, as turning on a diesel vehicle engine prior to route operation would lead to a dangerous build-up of idling exhaust fumes.

Artist's impression

Charging

The flash charging (TOSA) system for Brisbane Metro is the first of its kind in Australia, allowing vehicles to charge in under six minutes.

Flash charging (TOSA):

- has the fastest connection time, as well as the fastest time-to-commence-charge, of any charging technology available today, taking approximately two seconds in total
- is fully automated and requires no input from the driver
- is well-tested technology, having been used in Geneva, Switzerland, and in Nantes, France, for several years.

How does flash charging work?

Flash charging is made possible by pantographs, which are the moveable arms that physically connect a vehicle to (in this case) a charging station.

Once the connection between vehicle and charging station is made, the charging process can take place through conductive energy transfer. When the charge is complete, the pantograph disconnects and the vehicle can recommence its journey.

In the case of Brisbane Metro, the pantograph is called the Energy Transfer System and is mounted on the vehicle. It automatically recognises that the vehicle is approaching a charging point through radio frequency identification (RFID), raising and pre-positioning itself while the vehicle is moving. Advanced laser scanning ensures the arm and charging station connect perfectly during every charge. The Energy Transfer System is already in use throughout Europe and is designed with passenger safety as its highest priority.



Plug-in slow charging

Plug-in slow charging allows vehicles to be charged at depots during periods when they are not in operation. It is slower than flash charging, but uses relatively low amounts of energy. Using advanced computational technology (Power Load Management System), Hitachi Energy optimises the charging and reduces the peak load demand on the grid.

Timing

The pilot metro arrived in Brisbane in April 2022, completing comprehensive testing and commissioning activities including on-road testing activities.

Following the successful trial of the pilot metro, Brisbane City Council placed an order for the initial fleet of 59 additional metros. The fleet of 59 metros will be manufactured and progressively arrive in Brisbane ahead of operations commencing in late 2024, subject to approvals.