



3E. BIG IS BEAUTIFUL: ELECTRIFYING BUSES AND TRUCKS – POLIS CONFERENCE 2024





Electric and innovative BRT for green cities

- Project overall duration: 48 months
- Start date: 1/1/2023
- Total person month: 2823
- EU Grant: 22 776 213,57
- 49 partners (OEMs, Suppliers, Tech Providers, PTOs/PTAs, Research and networks) - Management:
 - Strategic and overall operational Coordinator: **UITP**
 - Technical Manager: VUB (MOBI-EPOWERS RG)

Grant Number: 101095882

Main Objective: Create a New Generation of advanced full electric, urban and peri-urban European BRT enhanced with novel **automation** and **connectivity** functionalities.

EU-funded project and major milestone in electric mobility that seeks to **support sustainable urban transport by proposing innovative solutions for electric Bus Rapid Transit (BRT)**



eBRT2030 project aims to reduce:

- Cost/km/passenger by 10%;
- TCO by 10%;
- Greenhouse gas and pollutant emissions by 70%, and
- Traffic congestion by 10%

01 January 2023

Duration: 48 months

31 December 2026



Why eBRT?

- If electric buses are the natural step in the evolution of urban bus systems, autonomous and electric Bus Rapid Transit (BRT) are the latest step towards the future, combining the best of electric technology (emission-free, silent), BRT (segregated lanes, priority measures) and autonomous and connected driving.
- "E" as European and Electric: both components need to be discussed in this context





There are still challenges to be faced regarding electric buses and electromobility in public transport. At the same time, a great opportunity: implementing innovative solutions and possibility to optimize the system.



The key objectives of the eBRT2030 project are:



Obj. 2

Obj. 3

- operations-focused demos: 6+1 demos of BRT system innovative solutions in real operation, both city-&operator-led and BRT system-focused, or focused on specific tech developments at system or subsystem level
- The development of technology-focused key innovative solutions for BRT, both at system and subsystem level, at level of vehicle, infrastructure, operation, and IoT connectivity
- The definition a **new European concept of BRT for year 2030**, benefitting of evaluation, multiplication and replication of the real-operation test of innovations

eBRT²⁰ **Current Status: Development and implementation**



First Year: Preparation; definition of the requirements

Currently: Focus on the development of the technologies and subsequent implementation in the Demos

- EPR 1: Planning Tool for eBRT concept
- EPR 2: Interoperable charging concepts with bidirectional features & battery buffering
- EPR 3: Advanced and efficient vehicle thermal management systems with preconditioning strategy and eco-comfort
- EPR 4: Smart trolley charging hub concept with multi-modal mobility
- EPR 5: IoT-based cybersecure eBRT networks for passenger safety and road safety
- EPR 6: Real-time monitoring and advanced Predictive maintenance strategies
- EPR 7: Smart, modular and highly efficient deport charging

- EPR 8: Safe automated assisted maneuvers considering functional safety and cybersecurity
- EPR 9: Disaster recovery and business continuity concept for eBRT
- EPR 10: Advanced docking and autonomous driving via novel narrow navigation system
- EPR 11: Reduction of TCO (~10%) and emissions (GHG, NOx)
- EPR 12: 6 demo in EU cities, 1 international demo + 5 feasibility studies + 3 T2O
 - EPR 13: New business model for eBRT
 - EPR 14: contribution to European and International standard for eBRT
 - EPR 15: eBRT concept for all



ON THE ROAD TO A CONCEPT FOR BRT

- State of the art of the BRT systems worldwide at the vehicle, infrastructure and operations level
- Definition for BRTs for different regions, contexts and purposes
- Scorecard adapted to eBRT2030 capturing the "double E" component of the Project: European and Electric.

Report: "ON THE ROAD TO A CONCEPT FOR BRT"







Technological Innovations

Vehicle

Charging

IoT Connectivity



Tech2OP approach for future eBRT solutions Tech2OP -1: Innovative hybrid battery concept (IVECO) Tech2OP -2: Smart Narrow Navigation (Volvo) Tech2OP -3: Advanced SRS solutionforeBRT2.0 (Alstom)



Demonstrations



BARCELONA

Upgrading a heavy-demand bus route with connectivity and high-service capabilities



AMSTERDAM

Using an innovative new hybrid charging system and smart control units to meet challenges of network capacity limitations



PRAGUE

In-Motion Charging of high demand bus line



ATHENS

Efficient hybrid mode charging EBRT



RIMINI

Advancing emissions and costs reduction, customer experience, and safety with EBRT



EINDHOVEN REGION

Advancing charging infrastructure and energy management



BOGOTA

Bogota as basis for an international demonstration and validation cluster



International activities

International Demo Cluster: Small scale demos/feasibility studies: Possible Cities: Quito, Dar es Salaam, Nairobi

Future eBRT cities User Group To C promote replicability: Representatives of cities and PTOs with an interest in implementing eBRT systems.

Potential Follower/Twinning Cities:

Latin America: Buenos Aires, Cali, Medellin, Pereira, Santiago

Africa: Cairo, Dakar, Kigali, Marrakesh

Bogotá EBRT demonstration

mall-scan demos in Quito, Dar es

Salaam and

Provide feedback to the European demonstration cases with different perspectives on technologies and operations

Training

FOCUS

activities



Prague: new eBRT IMC

On 6 March 2024, **DPP put in operation its newly built trolleybus line in the city** between Veleslavín Railway Station and Václav Havel Airport Prague.

Extremely busy line (>90,000 km/year/bus), 20,000 pax/day + air baggage

The city of Prague will increase the transport capacity on the line to/from Václav Havel Airport Prague by about 30%

In-motion (hybrid) charging systems, where the bus operation vehicles transitioned to a fully electric system, employing double-articulated battery trolleybuses optimizing the inmotion charging of the buses (23-25 m)

Infrastructure (750 V DC) **Charging rate in motion > 50%** Possibility of charging (static) (2x terminus + depot)





Innovations and Challenges ____

Access to the grid, peak shaving, self-production of energy

E-bus fleet upscale for any bus service, including BRTs.

Efficient depot Management

Smart charging strategies and energy storage systems

IT intelligence for optimized fleet operation and data-driven system integration

LCA & Circular Economy

Vehicle renovation to extend the life of the e-bus (average vehicle age above 8-10 years as for ICE buses), Second-life battery life, disposal, etc.

Synergies with Automation and AI:

Building and adopting autonomous driving advancements in specific bus operations use cases: depot automation, autonomous BRTs, ADAS, narrow navigation





THANK YOU !

