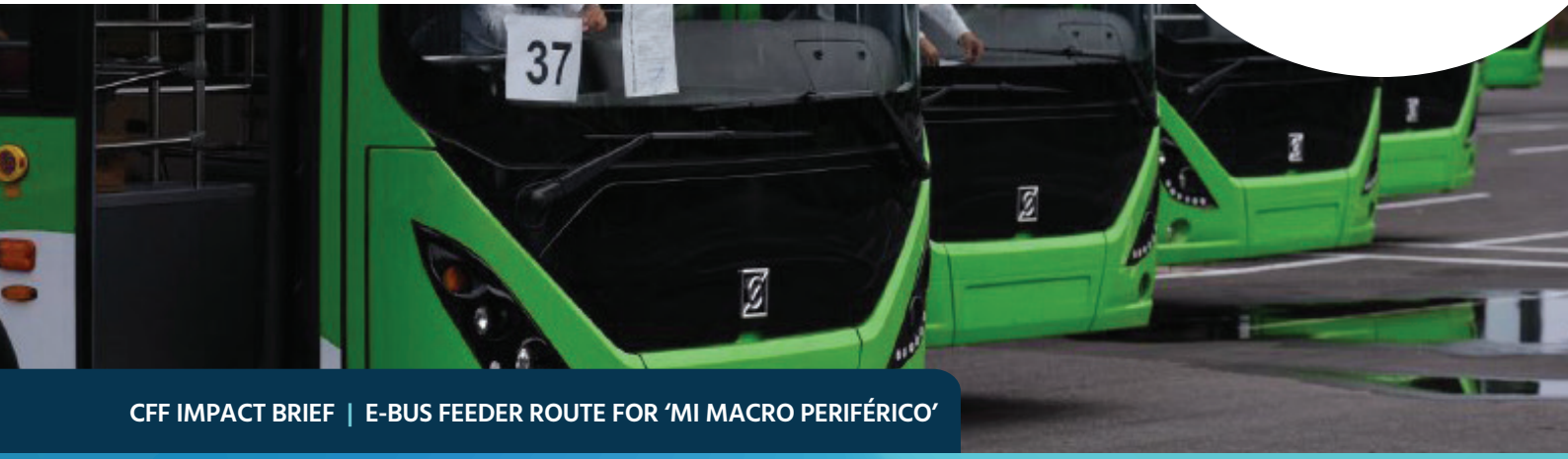
Funding Partners

Federal Ministry for Economic Cooperation and Development | CIFF CHILDREN'S INVESTMENT FUND FOUNDATION | USAID FROM THE AMERICAN PEOPLE | UK Government

Implementing Agencies:

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH | C40 CITIES

C40 CITIES FINANCE FACILITY



CFF IMPACT BRIEF | E-BUS FEEDER ROUTE FOR 'MI MACRO PERIFÉRICO'

Social Impacts with Zero Emission Buses in Guadalajara

The C40 Cities Finance Facility worked with the Metropolitan Area of Guadalajara to prepare a zero-emission bus corridor as a feeder route for the 'Mi Macro Periférico' Bus Rapid Transit System (BRT). The feeder route is 42.2 km in length and serves an estimated 12,000 users a day. Additionally, the feeder route extends the BRT system service to Guadalajara's International Airport and the Public State University CUT Tonalá Campus.

As one of the first bus corridors in Mexico using battery electric vehicles the project proves the business case for investment and will contribute to the transition towards cleaner transit technology and inclusive public transport across Mexico.

"For this project, we followed the methodology that CFF proposed. It included the analysis of possible routes, technical and operational expertise, for example on the durability of the fleet and of the batteries, as well as advice on financing options and on how to consider gender and social inclusion in this project. Having this structure from the beginning helped us a lot."

LUIS ALONSO MARTÍNEZ SAENZ,
Director of Multimodal Transport,
Sistema de Tren Eléctrico Urbano of Jalisco

Project Profile

PROJECT PARTNER:
Secretary of Transport (SETRANS), Jalisco Government

PROJECT SCALE:

- 47.25km one way and additional 41.75km return route
- 38 e-buses
- 1 main depot with 14 dual chargers for 28 charging stations
- 1 back-up depot with 5 dual chargers for 10 charging stations

FINANCE LEVERAGED:
USD 18,000,000

FINANCING SOLUTION:
The project was financed by the Government of the State of Jalisco, through SITEUR. The city thoroughly tested different operational models for financial feasibility and consequently procured 38 e-buses through a leasing model.

The First E-Bus Corridor in the Metropolitan Area of Guadalajara

The new line will increase connectivity in a historically underserved part of the city

PROJECTED GHG EMISSION REDUCTIONS
58,317 tCO_2e (2030 – 2050)

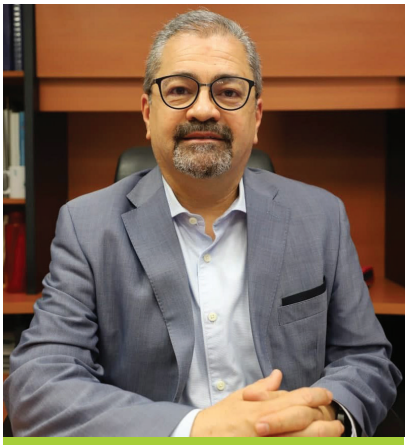
PASSENGER NUMBERS
12,000 passengers per day
4.9 million passengers per year

INCREASED SERVICE REACH
20% of Guadalajara's population will gain access to the public transit system

"CFF supported the project from the beginning by sharing experiences and best practices from other cities, as well as developing a strategy on how to structure the project with us."

"The consultancy on financial models helped a lot as the consultants created a solid finance model for us that considered all the initial and the operational costs. This made us feel more secure about the decisions we had to make."

MARIANA BULOS
Management of the Integrated Collection System, Secretaría del Transporte del Estado de Jalisco



"The feeder route for Mi Macro Periférico is very special because it is the first electromobility project for this Government. The CFF support was very useful because they gave us the information and tools that allowed us to structure the operation."

"We are taking a lot of actions to achieve social inclusion and gender equality. For example, we are the only private or public transport company in Guadalajara that has a route entirely operated by women."

LUIS ALONSO MARTÍNEZ SAENZ
Director of Multimodal Transport, Sistema de Tren Eléctrico Urbano of Jalisco

Proving the Feasibility of New, Clean Technologies That Incorporate Social Impacts

- In due time, the city will enjoy emission free connectivity in the eastern area of the metropolitan region, which has historically lacked efficient mobility services. The project will elevate areas with high inequality and provide social and environmental benefits that will, for instance, provide citizens with access to further employment opportunities. The business model for the project establishes the legal feasibility of the project and supported the city to establish a Special Purpose Vehicle for the implementation of the project.
- The implementation of the first electric transportation corridor to reduce pollution emissions sets the tone for cleaner project approaches that promote a healthier city and simultaneously addresses challenges caused by the COVID-19 pandemic.
- The zero-emission bus corridor is part of the administration's most important mass transit project, paving the way for a more integrated and better-connected city.

Leaps and Bounds for the Transition to Clean Technologies in Public Transport

Proving the technical, financial and legal feasibility of clean technologies in Guadalajara

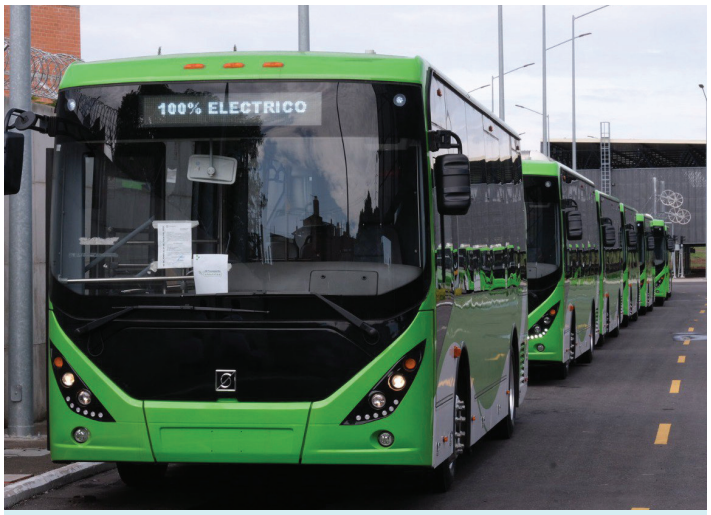
A technically-sound and finance-ready project for a 42.2km e-bus corridor, providing connections with the International Airport, University Campus and BRT System "Mi Macro Periférico". The preparation of the electric bus corridor included the operational plan for the route, a financial plan, a gender action plan, the legal specifications for the procurement, and a detailed plan for the implementation of the project.

Improved capacities and skills of state officials to plan, implement and operate e-bus routes independently in the future. Overall, the capacities of ~11 officials from three state departments were strengthened to address key barriers to the technical implementation of the project, the inclusion of gender perspectives in the project, financing options for the project and institutional coordination models to consolidate e-bus projects.

The inclusion of gender perspectives in the project was a key pillar for the development and operation of the corridor. A gender action plan was created jointly with the city to address gender considerations in project planning and operationalization. Specific recommendations were provided for the e-bus project and have already led to the inclusion of 60 female bus drivers.

Guadalajara benefited from direct exchanges with international peer institutions with more than 10 years of experience in the preparation and operation of electric bus corridors. As a result, specific tools for calculating the total cost of ownership and maintenance were provided.

Cooperation and exchange schemes were established with institutions that operate routes with similar technologies along with technical consulting companies and e-bus manufacturers.



▸ TOTAL COST OF OWNERSHIP TOOL

The total cost of ownership (TCO) model allows the comparison of two different technologies, such as diesel versus electric vehicles. The objective is to investigate the profitability of electric vehicles compared to conventional vehicles (Diesel), comparing the costs that occur during the expected life of the vehicle such as: purchase cost (CAPEX), maintenance cost, replacement cost of the battery, the cost of fuel or electricity and the interest value for financing. The results are shown for each technology and the participation of all cost components is evidenced during the useful life of the vehicles.

KEY CHALLENGES

- A key challenge the project faced were the knowledge gaps in the implementation of innovative transport systems that represent a major shift away from the traditional transportation system planning.
- A second major challenge in the project preparation process was to financially structure the project to incorporate future costs. Innovative financial models were employed to create a financially sound project concept, incorporating necessary immediate and future investments (i.e. battery replacements).

LESSONS LEARNED

- It is important to find a balance between political expectations and existing capabilities for the implementation of projects with new technologies.
- Disaggregating the systemic and social impacts resulting from the implementation of innovative projects is essential to identifying needs and prioritizing them throughout project planning.
- Cross-departmental cooperation structures are extremely valuable for project preparation processes as they ensure a continuous dialog between different city departments and ensure that project concepts incorporate multiple needs. Projects with extensive stakeholder involvement mechanisms, both within the city administration and with other stakeholders, tend to have farther reaching benefits and impacts.

BEST PRACTICES

- Coupling project preparation processes with capacity development measures for decision-makers and technical staff ensures the viability of projects in the short- and medium term.
- A timely market analysis of existing products and services allows for the identification of the optimal technologies for the operation of the project in the local context.
- An extensive analysis of the legal feasibility of the project allows for innovative solutions for the technical and financial structuring of projects.

OUTLOOK

- The 38 e-buses arrived in May 2021, serving Guadalajara's citizens today.
- The Total-Cost-of-Ownership tool can be used by other Mexican cities to understand the long-life cost of electric vehicles. The tools can be used to demonstrate that despite the high upfront cost of e-buses, long-term savings can be achieved through low operational and maintenance costs, and more importantly, the long-term environmental benefits of e-bus technologies for cities.
- The CFF supported the creation of a report on the funding options and legal requirements for e-bus routes in Mexican states.
- Since the Jalisco state government is in transition, the project will continue to grow in the coming years.