



CFF IMPACT BRIEF | TRANSITIONING BANGALORE'S BUSES TO ELECTRIC BUSES

## Leading the Electrification Revolution in India

The C40 Cities Finance Facility (CFF) supported the Bangalore Metropolitan Transport Corporation (BMTc) to upgrade its bus fleet (mostly BS IV diesel buses) to e-buses. The BMTc is currently operating 6,697 buses on 2,000 routes, covering 45 million km annually and 1.2 billion passenger trips per year. The transition to an all-e-bus fleet has the potential to reduce greenhouse gas (GHG) emissions by up to 51,460 tons of CO<sub>2</sub> per year and generate savings from reduced fuel costs of USD 700,000 per day. The transition has begun with the gradual introduction of 300 newly procured e-buses.



The CFF helped the city prove that transitioning from a diesel to an e-bus fleet not only reduces GHG emissions, but also significantly reduces operating costs. The BMTc expects cost reductions of an estimated US\$ 9.4m over 10 years by transitioning to electric buses.

"The Battery E-Bus Adoption Support Tool developed with CFF and the skills and knowledge gained are one-of-a-kind. It helps us assess various aspects, such as electricity consumption, real-time mileage of the buses in comparison to diesel buses, and CAPEX cost of diesel buses versus our e-buses. This data is crucial for us to prepare a proper Request for Proposal to procure a good deal from bus vendors and to prove profitability to the government. The tool will have the longest impact and be used for the next 8-10 years to come."

**MR. SANTOSH BABU**  
Director IT, BMTc Bangalore



### Project Profile



**PROJECT PARTNER:**  
Bangalore Metropolitan  
Transport Corporation (BMTc)



**PROJECT SCALE:**  
Full fleet transition to e-buses  
(6,697 buses by 2031)



**GHG EMISSION REDUCTION**  
51,460 tons of CO<sub>2</sub> per year



**FINANCE LEVERAGED:**  
USD 1,239 billion (existing fleet)




**FINANCING SOLUTION:**  
BMTc has received approval for a grant of USD 74,262 per bus for 300 standard e-buses under the FAME-2 scheme of the national government in "Gross Cost Contract" mode.


# BMTC Made a First Step Towards E-Buses by Tendering 300 E-Buses

A full transition to e-buses is economically viable and will improve public health and air quality



  
**REDUCTION IN FUEL COSTS**  
USD 700,000 per day

  
**REDUCTION IN AMBIENT NOISE LEVEL**  
From 73dB to 50 dB

  
**ESTIMATED HEALTH BENEFITS**  
Aversion of 1,325 premature deaths and 1,815 annual hospital admissions  
Increase in average life expectancy by 32 days

  
**SAVINGS IN HEALTH CARE COSTS**  
INR 67 million (~USD 900,620) per year



“We had no clear concept of running e-buses. So, we needed to learn from experiences from around the world in order to make our own informed decisions. CFF helped us out a lot in this regard, providing detailed data in three case studies from different countries, which allowed us to approximate what is going to work and what is not going to work.”



“The Battery Electric Bus Adoption Support Tool provided by CFF and the skills and knowledge gained are one of a kind. We are not aware of similar tools in India. It helps us assess various aspects, such as electricity consumption, real-time mileage of the buses in comparison to diesel buses, and OpEx (Operational Expenditure) costs of diesel buses versus our e-buses. This data is crucial for us to prepare a proper Request for Proposal to procure a good deal from bus vendors and to prove profitability to the government.”



“BMTC has floated the tender for e-buses four times, whereas the first three times were not successful. The first three tenders were so strict that no bus operator applied. The cost was double of the cost of diesel buses. We incorporated all propositions from the CFF and received a good result. The cost of e-bus procurement is now comparable to Diesel buses.”



“CFF was listening to the needs of BMTC and supported us accordingly. This type of support was much appreciated!”



“The gender and leave no one behind study revealed that many initiatives can improve the safety and comfort of women in buses, like reserved seats in ordinary buses and CCTV cameras inside buses. Further, the user perception surveys revealed that 83% of female respondents were satisfied with BMTC services during the day, but this dropped to 68% for night services. We will now address the user concerns progressing on travel time, level of safety, security, and comfort.”



“Getting a tool and the knowledge to use it is much better than getting a report on the topic!”



**MR. SANTOSH BABU**  
Director IT, BMTC, Bangalore

## BEAST Tool

**A Battery Electric-bus Adoption Support tool (BEAST)** was prepared for BMTC to guide the selection of battery size and charging solution for a given route or schedule operation. The tool computes the most cost-efficient combination of battery size and charging solution. In this case, the tool compared depot-based slow charging and depot charging combined with opportunity charging. The CapEx and OpEx per kilometre are displayed for the recommended e-bus technology solution alongside the diesel BS-VI bus cost parameters. The tool additionally displays the reduction in annual CO2 emissions by shifting from diesel to e-buses.



## OUTLOOK

- With the present challenges of low ridership resulting from the COVID-19 pandemic, the CFF recommended the BMTC to develop a long-term e-bus adoption action plan based on the outputs from the city's cooperation with the CFF. As a result of the high potential for savings due to rising diesel prices and the positive impacts on public health through reduced air pollution, it is an opportune time for rapid e-bus adoption for the BMTC. However, a strong commitment and long-term planning are necessary to harness the potential of adopting clean technologies for public transport operations in Bangalore.

## FURTHER INFORMATION

- <https://www.c40cff.org/projects/bengaluru-electric-bus>

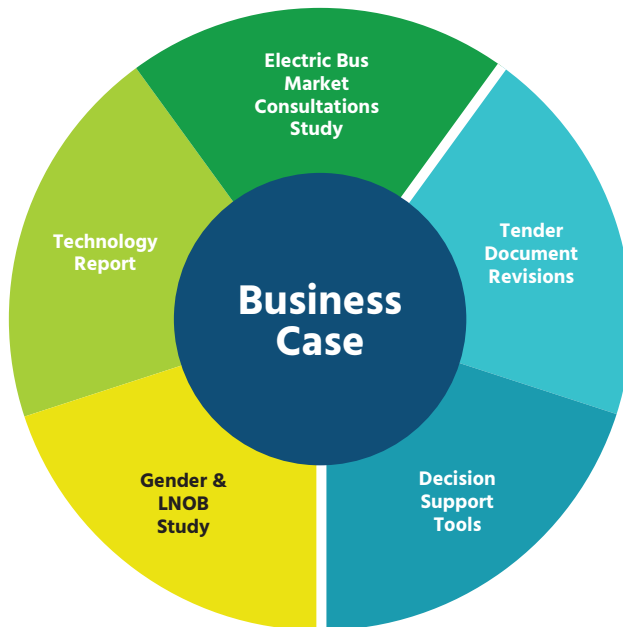


Figure 1: Project outputs and their integration

“We have worked with other organisations as well, CFF is unique as it was responsive and worked face-to-face. CFF was listening to us, worked with us from day one, and considered and valued our opinion.”

**Mr. Santosh Babu**

Director IT, BMTC, Bangalore

