

BARRIERS AND ENABLERS FOR TRANSITIONING TO E-BUSES -AN STU PERSPECTIVE



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INTRODUCTION TO BMTC

- Bengaluru Metropolitan Transport Corporation (BMTC) is the largest urban bus fleet operator in India
- Our network covers 90% of residential areas and 82% of jobs in Bengaluru within a 250m access distance
- Our pre-Covid ridership and service efficiency was among the best in India
- BMTC has pioneered several innovations over the years like:
 - Bus Priority Lanes
 - Intelligent Transport Systems
 - Traffic and Transportation Management Centres (TTMCs)
 - Volvo AC bus services in cities

BMTC: Overview of operations (Feb, 2020)

Fleet size	6,563
Daily ridership	3.5 million
Number of routes	2,263
No. of bus stations	58
No. of depots	45
Road network coverage	2,522 km
Staff : Bus Ratio	5.4
Service-km per day	1.14 million-km

BMTC'S EFFORTS TO INDUCT ELECTRIC BUSES

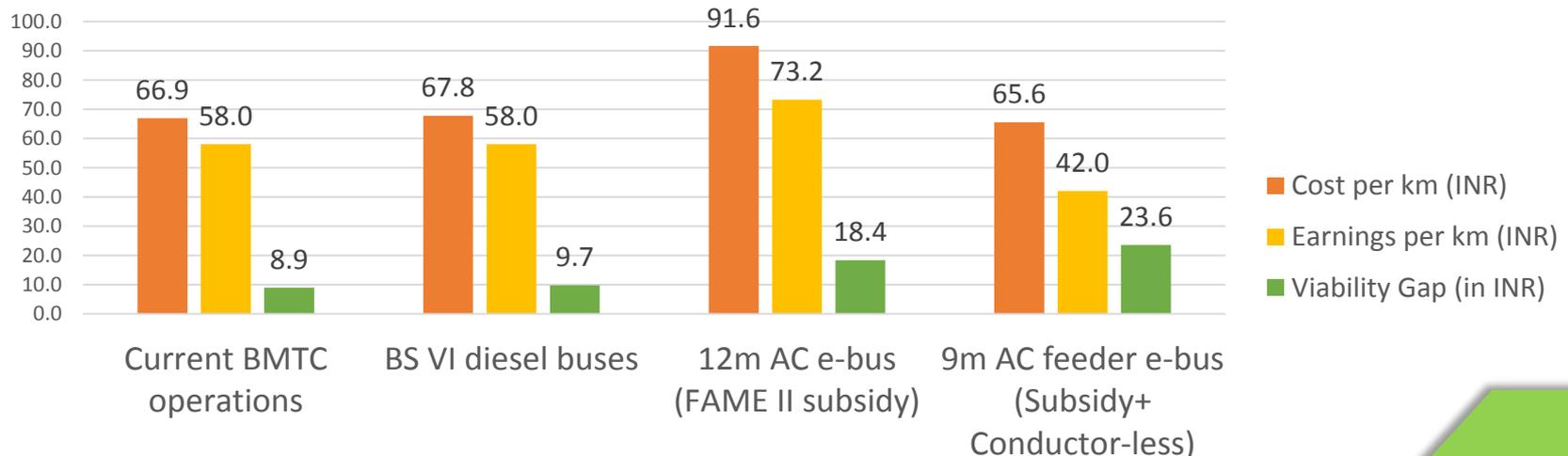
- Consistent efforts to induct e-bus haven't yet resulted in successful deployment
- Timeline of BMTC efforts and reasons for lack of deployment are the following:
 - 2014: Successful electric bus pilot for three months
 - No procurement due to prohibitively high cost of buses (INR 3 Cr per bus)
 - 2016: Developed a Detailed Project Report (DPR) for 150 buses
 - Lack of financial assistance for procurement
 - 2018: 80 e-buses sanctioned under FAME I
 - Project cancelled due to issues with moving from in-house operations to Gross Cost Contracts (GCC)
 - 2019: 300 AC e-buses sanctioned under FAME II
 - Price quoted (INR 89.93) among the highest in India
 - Limited participation of bidders
 - 2020: 90 e-buses sanctioned under Smart Cities program
 - Currently under evaluation
 - 2019: 300 Non-AC e-buses combining FAME II and State subsidy
 - CAPEX Subsidy increased to INR 88 lakhs
 - Procurement to be completed by Dec, 2020 as per DHI guidelines

BARRIERS TO E-BUS DEPLOYMENT: HIGH COST

STUs are currently tasked with leading the e-mobility transition at the cost of bus users

- BMTC operates diesel buses in-house, given its cost & service efficiency
- Gross Cost Contracts (GCC) involves additional costs like financing costs of operators, building-in of penalties by operators
- Reduction in DHI subsidy from FAME I to FAME II also increased costs
- BMTC's viability gap per km will be about INR 18.4 to INR 23.6 for e-buses, which is more than twice the viability gap for BS VI diesel bus induction

Financial performance of Diesel Vs Electric Buses (Estimates for 2020-21)



BARRIERS: VEHICLE TECHNOLOGY ISSUES

Identifying vehicle specifications to meet BMTC operating conditions is a key barrier

- Deploying e-buses requires long-term planning
 - AC Vs Non-AC, Short range Vs Long range batteries etc. need to be defined
 - Depots and routes with least Total Cost of Ownership (TCO) need to be selected
- Identifying the right technical specs for BMTC operating conditions is a key challenge given the lack of expertise in e-buses
- With inputs from non-profit agencies like UITP and others BMTC identified the technical and functional specs with the least TCO
- The best TCO scenario isn't attracting many bidders
- Lack of vehicle models to meet our specs is a key constraint

OEMs need to develop more long-range bus models to meet operating needs. Potential for opportunity charging is limited.

BARRIERS: FAME II PROCUREMENT RULES

- **Mandatory transition to Gross-Cost Contracting (GCC)**
 - GCC for e-buses involves twin transitions of technology and business model
 - BMTC and other STUs lack capacity on GCC tendering, contracting and performance management
 - Limited technical support offered by DHI
 - The short timelines for procurement didn't allow adequate consultations
- **Model Concession Agreement (MCA)** by NITI-Aayog helped to some extent
 - To understand the key aspects of e-bus procurement
- **Some clauses of the MCA are quite restrictive & don't meet BMTC needs**
 - Payment frequency timelines (15 days)
 - Security deposit needs
 - Termination clauses
 - Force Majeure clauses

STUs need flexibility in contracting terms and technical support for efficient tendering, contracting and performance management

BARRIERS: COVID-19 INDUCED CHALLENGES

- **Operational and Financial implications of Covid-19**
 - BMTC is currently operating about 77% of the total fleet due to low demand
 - Even these buses operate at a load factor (LF) of 40% and Earnings per km (EPKM) of INR 25 compared to pre-Covid nos. of 68% LF and INR 51.8 EPKM
 - As a result BMTC is facing a revenue drop of about INR 3 Cr for every day of operation while fixed costs remain the same
 - Investing in high-cost technologies like e-buses will be difficult for STUs
- **Supply chain disruption due to Government of India guidelines**
 - All service providers from countries having a land border with India are now mandated to be registered with Department of Promotion of Industry and Internal Trade (DPIIT), Government of India to secure projects
 - The Phased Manufacturing Program (PMP) under FAME also requires most components to be made in India from April, 2020
 - Pace of e-bus deployment may slow down and cost of e-buses will increase due to these developments

Operational and financial disruptions due to Covid-19 and Government of India guidelines for OEMs are likely to reduce pace of implementation

PROPOSED ENABLERS TO ACCELERATE E-BUSES

- **Ensure e-bus component supply** through a combination of access to international markets and indigenous manufacturing
- **Allow subsidy for outright purchase** of buses for future subsidies
 - GCC model is restrictive, expensive and attracts limited players
 - In-house operations with maintenance contracts with OEMs will be cheaper for STUs
- **Make low-cost financing available** for capital and operating expenses
 - STUs are facing difficulty in raising financing from both commercial banks and International Financing Institutions (IFIs)
 - Capital needs: Fleet procurement, depot development, Power infrastructure
 - Operational needs: Staff, Energy, Maintenance and Contract management
- **Explore new models** like bulk procurement by STUs for in-house operation of e-buses
- **Provide capacity building support** to STUs to operate and manage electric buses

CONCLUDING REMARKS

- STUs are keen to adopt electric buses due to their benefits compared to BS VI buses like
 - Stable electricity tariffs Vs ever-increasing diesel prices
 - Low maintenance costs
 - Zero air-pollution
 - Similar lifecycle cost
- High costs are the key barriers for e-buses followed by technology, procurement, financing and capacity gaps
- Future efforts for e-bus deployment need to factor in impact of Covid-19 on user preferences and financial capability of STUs
- Flexibility in business models and subsidy structures, combined with easier access to financing will accelerate the deployment of e-buses across India

THANK YOU