Procurement of Electric Buses in India: FAME II and Beyond

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Soot-Free Buses in Africa
Electric Buses in India: The Story so far
**Electric bus deployment timeline in India**

Faster Adoption and Manufacturing of Electric Vehicles (FAME) is Government of India’s flagship scheme providing fiscal incentives for Electric Vehicle (EV) adoption.

- **2017-19: FAME I and City level procurement**
  - Included outright purchase and Gross Cost Contracts (GCC)
  - 425 e-buses across 10 locations
  - 150 e-buses procured separately by cities

- **2019-21: FAME II Phase I**
  - INR 35 billion for e-buses (USD 0.5 billion)
  - GCC & standard Model Concession Agreement (MCA) mandated
  - 3,200 buses sanctioned subsidy
  - ~800 buses operational. Others at various stages of deployment

- **2021-Ongoing: FAME II Phase II and City level procurement**
  - FAME II phase II focusing on 9 cities and 3,472 buses
  - Aggregated procurement by CESL with improved bankability
  - City level efforts like Mumbai (2,100 buses) and Delhi (3,000) buses ongoing

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### Incentive Scheme

<table>
<thead>
<tr>
<th>Incentive Scheme</th>
<th>Maximum subsidy available</th>
<th>Vehicle length</th>
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<tbody>
<tr>
<td>FAME I (up to 60% of bus cost)</td>
<td>INR 100 lakhs (~USD 140,000)</td>
<td>Any length</td>
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<tr>
<td>FAME I (up to 60% of bus cost)</td>
<td>INR 85 lakhs (~USD 120,000)</td>
<td>Any length</td>
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<tr>
<td>FAME II (up to 40% of bus cost)</td>
<td>INR 55 lakh (USD 80,000)</td>
<td>&gt;=11m</td>
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<tr>
<td>FAME II (up to 40% of bus cost)</td>
<td>INR 45 lakh (USD 60,000)</td>
<td>9-11m</td>
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<tr>
<td>FAME II (up to 40% of bus cost)</td>
<td>INR 35 lakh (USD 50,000)</td>
<td>7-9m</td>
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</tbody>
</table>
Electric bus deployment across India

2017-19: FAME I

2019-21: FAME II
Electric bus deployment across India

2017-19: FAME I + Cities

- Indore (40)
- Navi Mumbai (30)
- BEST Mumbai (40)
- Hyderabad (40)
- Lucknow (40)
- West Bengal (80)
- Guwahati (15)
- Jammu & Kashmir (40)
- Himachal Pradesh (75)
- Ahmedabad (50)
- Navi Mumbai (25)
- NMRDA (30 hybrid)

2019-21: FAME II + Cities

- Lucknow (100)
- Agra (100)
- Kanpur (100)
- Meerut (50)
- Moradabad (25)
- Prayagraj (50)
- Varanasi (50)
- Bareilly (25)
- Aligarh (25)
- Uttar Pradesh

- Chandigarh (40)
- DTC (300)
- DIMTS (340)
- DMRC (100)
- Dehradun Smart City Limited (30)
- UKSRTC (Inter City) (30)
- RSRTC (Inter City) (48)
- Ahmedabad (50)
- Rajkot (50)
- Surat (150)
- Silvassa (25)
- Navi Mumbai (150)
- BEST Mumbai (340)
- MSRTC (Inter City) (50)
- Kadamba SRTC (Inter City) (50)
- KSRRC (50)
- APSRTC (50)
- Bangalore (390)

- Jaipur (100)
- Bhopal (100)
- Jabalpur (50)
- Ujjain (50)
- Gwalior (40)
- Gwalior (40)
- Nainital (50)
- Pune (150)
- Nashik (50)
- Nagpur (40)

- Hyderabad (390)
- Bangalore (390)
- Kolkata New Town (50)
- Bhubaneshwar (50)
- Ghaziabad (50)
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Upcoming electric bus procurement under phase II of FAME II

2021-24:
FAME II Phase II (9 cities)
~3,472 buses
FAME II - Progress so far

• **Key trends observed**
  
  o Limited participation of bidders in many cities
  o Costs realised higher than anticipated
  o E-bus GCC cost per-km 15-30% higher than equivalent diesel buses despite subsidy
  o Significant variation in costs between cities despite similar bus specifications

• **Improved procurement can lead to reduction in costs and faster uptake of e-buses**
  
  • Approx. INR 6 Cr savings per bus for every 1 INR saved in quoted cost

![Comparison of FAME II E-bus Vs Diesel buses costs](image-url)

Source: DHI + UITP Analysis
Venues to reduce Total Cost of Ownership (TCO)

- Bus agencies need to target specific cost components to reduce TCO of e-buses
  - Capital cost and financing of buses, charging infra. and battery replacement constitutes about 37% of the total cost
  - Bidders building in cost of penalties for non-adherence to Service Level Agreements (SLAs) adds 7% to the cost
  - Other hidden costs: Bidders building in risk premium of likely delay and/or non-payment by authorities
  - OPEX cost on staff and energy contributes about 31%, but has limited potential for reduction

**National Incentives should focus on CAPEX to reduce TCO**

**Bankability risks on payments and penalties was the key reason for variable rates received by Indian cities**

Source: UITP estimates based on FAME II quotes
Recommended approach for electric bus procurement

Operations & Financial Planning
- Identify long-term vision for e-buses
- Set deployment timeline targets
- Assess Total Cost of Ownership (TCO)
- Identify priority routes and depots

Pre-qualification
- Pre-determine eligibility criteria
- Create a pool of eligible bidders

Tendering
- Functional and technical specifications
- Terms for payment and penalties
- Other contractual obligations

Bid evaluation
- Technical eligibility
- Financial eligibility
- Least Cost
UITP Tender Structure: Contents of the tender document

1. Main characteristics (summary) of the tender
2. Buyer and contact persons
3. Procedure
4. Tender time-table
5. Legal requirements and standards
6. List of legal documentation and company related information
7. Tender evaluation criteria including LCC concept
8. Presentation of the offer
9. Functional and technical specifications
10. Maintenance documentation
11. Spare parts
12. Training
13. Financial conditions
14. Vehicle warranty
15. Vehicle availability/unavailability
16. Change and acceptance procedures
17. Electromobility
Contents of a tender

Request For Proposal (RfP)
- Divided into two or three parts as per city bid document
- Covers Letter of invitation, Information to bidders and approach for the evaluation of proposal

Bus specifications
- Covers technical and functional requirements

Model Concession Agreement (MCA)/Master Service Agreement (MSA)
- Comprises of 42 Articles
- Covers the following aspects:
  - Procurement
  - Payment conditions
  - Bidder obligations
  - Implementation and Bankability
The RfP contains the following key items:

- Letter of invitation:
  - Authority details
- Nature of work
- Time schedule of bidding process

Information to bidders:
- Eligibility of the bidders
- Bid security details
- Preparation and submission of bid details

Evaluation of proposal:
- Evaluation parameters
- Opening and evaluation of financial bids
- Selection of bidder
- Fraud and corrupt practices

The bus specifications document covers more than 50 items. The key ones are:

- **General design specifications**
  - Battery cooling system
  - Suspension, Steering system, Wheel & Tires
  - Battery packs
  - Service doors, Guards and Windows
  - Passenger seats, Seat belts and Driver work area
  - Operation and Maintenance manuals
  - Statutory requirements etc.

- **Technical bus specifications**
  - Type of battery
  - Power consumption
  - Operating range
  - Body dimensions
  - Seating capacity etc.
The critical parts of any tender document is MCA, also known as MSA. It comprises of 42 articles and schedules. The articles are mentioned below:

1. Definitions
2. Scope
3. Award
4. Condition precedent
5. Obligation of service provider
6. Obligation of authority
7. Representation and warranties
8. Disclaimer
9. Performance security
10. Land for depots
11. Utilities
12. Construction of maintenance depots
13. Procurement of bus
14. Entry into commercial service
15. Change of scope
16. Operation of buses
17. Maintenance of buses
18. Safety requirement
19. Monitoring of Operation and Maintenance
20. Key Performance Indicators
21. Financial close
22. Fee
23. Training and Deputation of government employee
24. Handover of maintenance depots
25. Insurance
26. Accounts and Audit
27. Escrow account
28. Traffic regulations and security
29. Force Majeure
30. Compensation for breach of agreement
31. Suspension of service provider rights
32. Termination
33. Divestment of rights and interest
34. Defects liability after termination
35. Assignment and Charges
36. Change in law
37. Liability and indemnity
38. Rights and Titles over sites
39. Dispute resolution
40. Disclosure
41. Redressal of complaints
42. Miscellaneous
FAME-II MCA: Key Articles

Terms of Procurement

Article 3: Award of the contract
• Fixed term/ years
• Add-on years
• Add-on criteria

Article 4: Conditions precedent
• Permit needed
• Damage for delay by authority
• Damage for delay by operator

Article 10: Land for depots
• Number of depots (Annexure number is mentioned in this article)

Article 13: Procurement of buses
• Penalty for late delivery

Payment conditions:

Article 20: Key performance indicators
• Penalty verification (ISO 18000)

Article 22: Fee
• Assured km per day
• Minimum payment
• Payment for additional km
• Deduction for under-utilized km
• Annual/ Periodic escalation mechanism including electricity
• Payment frequency timeline
• Interest on delayed payment

Article 27: Escrow account
• Escrow account and duration for prepayment

Article 38: Rights and title over sites
• Statutory taxes
FAME-II MCA: Key Articles

**Obligations for service provider**
- Article 5: Obligation of the service provider
  - Electricity infrastructure
  - Charging infrastructure
- Article 9: Performance security
  - Type of performance security
  - Amount and duration of performance security

**Obligations of the authority**
- Article 6: Obligation of the authority
  - Electricity infrastructure
- Article 10: Land for depots
  - Depot development
- Article 12: Construction of the maintenance depots
  - Electricity infrastructure (11 KV connection and permission of electrical drawings)

**Implementation and Bankability**
- Article 13: Procurement of buses
  - Trial run requirement
- Article 16: Operation of buses
  - Routes specified
- Article 17: Maintenance of buses
  - Warranties specified
- Article 20: Key performance indicators
  - Specified KPIs
  - Punctuality
  - Maximum penalty due to non-adherence to SLA
  - Monthly reporting of KPIs
- Article 25: Insurance
  - Insurance needs
- Article 32: Termination
  - Ownership of assets at the end of contract
  - Payment during termination at authority default
  - Payment during termination at operator default
Opportunities to improve procurement practices
Key drivers of number of bids and cost quoted

- Analysis of No. of bids received and Cost quoted per km of 36 electric bus tenders in India
  - We analysed 48 input variables to identify tender specifications with significant correlation with these outputs
  - No. of bids is driven by contract size, eligibility criteria, bankability, clarity on operational and financial terms
  - Cost quoted driven by bus specifications, payment and penalty terms
Key determinants of no. of bids and quoted costs

1. Eligibility criteria for service providers
   - Encourage higher participation
   - Reduce costs through competition
   - Encourage innovative business models

2. Physical and Financial obligations of the authority & service providers
   - Key to ensure participation and competitive rates
   - Clarity in obligations and transparency in risk allocation
   - Partnership approach to service delivery

3. Payment timelines and penalties
   - Determine payback period of the project
   - Transparency in payments key to risk mitigation

4. Functional and technical specifications
   - Identification of bus and charging technology needs
   - Matching technology needs with operational needs
1) Eligibility, functional & technical specs

**Types of bidders**
- OEMs (or) Operator + OEM (or) OEM + financing entity
- Turnover requirements

**Manufacturing capability**
- Some RfPs needed OEMs which manufactured 50 e-buses
- Some RfPs didn’t mandate any e-bus manufacturing capacity
- Mandating proof of concept may be a better option

**Operating experience**
- Many cities allowed service providers with operating experience with both electric and ICE buses
- The fleet size criteria for operating experience ranged from 10 to 100 buses

**Timelines for bid submission and scope for consultation**
- Minimum of 6 days and a maximum of 38 days observed
- Timelines for bidding should ideally be 30 days, allowing for adequate preparatory work
- Short timeframes mean bidders being unaware of the specific operating conditions
2) Financial obligations

- **Performance bank guarantee:** Amount and duration
  - Varies between 3-5% of the total project cost in most cities
  - Some cities defined a per-bus value in the range of INR 30,000-50,000
  - In some cases this money shall be made available for 120-180 days beyond the contract duration

- **Subsidy bank guarantee:** Amount and duration
  - Equivalent to the amount of FAME subsidy for five years
  - Cities unwilling to relax criteria since it is mandated by DHI

- **Payment in the case of contract termination**
  - Balanced termination clauses key for bankability and financing
  - Cities relaxing definition of termination event and payment commitments

- **Depot development and asset transfer**

- **Statutory taxes:** Who pays for GST, permit fees etc.

- **Asset ownership at the end of contract duration / pre-mature termination**

- **Third-party Insurance requirements**
3) Payment terms and penalties

- Assured-km of payment
- Payment periodicity and late payment penalties
- Payment for additional-km
- Payment for under utilised-km
- Mechanism for payment revision
- Payment for electricity
- Penalties and Service Level Agreements
- Minimum amount to be maintained in escrow account
4) Functional and technical specifications

**Operational needs**
- Depot selection
- Route selection
- Schedule definition

**Bus specifications**
- 9m bus / 12m bus
- AC/ Non-AC
- 400mm / 900mm floor height
- UBS/ AIS 052 specifications

**Charging strategy**
- Depot charging / depot + opportunity charging
- Time allowed for depot and top-up charging
- Charger specification

**Battery capacity requirements**
- Minimum battery size
- Minimum range
- Minimum energy efficiency
Way Forward on procurement

1. **Recommendations to reduce costs**
   - Harmonise RfPs and MCAs to improve bankability & encourage competition
   - Reduce risk of OPEX contracts
     - Establish loan guarantee mechanism
     - Reduce bank guarantee requirements
   - Improve predictability of payments to operators
     - Guarantee mechanism for timely payments
     - Cap on penalties for non-adherence to SLAs
     - Ensure payment for assured-km of operation
   - Provide civil and electrical infrastructure

2. **Improve readiness of cities**
   - Technical support to selected cities in project planning ahead of the tender
   - Evaluate cities’ readiness during the city selection phase
   - Extend tendering and contracting timelines
   - Focus on select cities with capacity for implementation
   - Improve the operator ecosystem
     - Create a pool of pre-qualified service providers

3. **Other key enablers for e-buses**
   - Explore other business models: Allowing CAPEX/ leasing
   - Consistent Viability Gap Funding (VGF) to bus agencies
   - Allowing private bus operators to avail FAME II funding
   - Recognise the crucial role of discoms and engage with them actively
UITP’s recent work on electric bus procurement
UITPs ongoing work on electric buses in India

- Roadmap for transition to soot free and zero emission buses in Bangalore
- Electrification of longer distance bus market: Operations and Technology planning
- Improving access to finance for e-buses
- Performance monitoring of e-buses to inform future procurements
- Capacity building of STUs transitioning to e-bus fleets
- E-bus Upschool
- Electric bus schedule optimisation
- Developing a handbook of electric bus specifications in India
- Introduction and scaling up electric buses in hilly states of India (Uttarakhand)
Thank You
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