REPORT

Electric Bus Procurement under FAME II: Lessons Learnt and Recommendations for Phase-II

FINAL REPORT

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About Shakti:

Shakti Sustainable Energy Foundation works to strengthen the energy security of India by aiding the design and implementation of policies that support renewable energy, energy efficiency and the adoption of sustainable transport solutions.

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International Association of Public Transport (UITP) is a non-profit organisation headquartered in Belgium with a global network of offices including in Delhi and Bangalore. We're the only worldwide platform for cooperation on public transport with more than 1,800 members from 100+ countries representing public transport authorities, operators, policy decision makers, scientific institutions, public transport supply and service industry. We undertake research, advocacy, capacity building initiatives and provide networking platforms to advance public transport systems.

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1 Electric bus procurement under FAME II: The story so far

Transition to electric buses presents the potential to convert the maximum passenger-km of travel in Indian cities and can yield multiple benefits such as improved energy efficiency and air quality along with longer term climate change mitigation benefits. Despite these benefits the financial considerations such as higher costs associated with the transition to electric buses have so far determined the pace of electrification of the bus sector. Hence, this report presents the lessons learnt from the FAME II e-bus procurements carried out so far and identifies potential measures to improve the financial performance in future rounds of procurement.

In addition to the higher cost of electric buses, the Covid-19 induced financial constraints have set back Indian bus agencies' plans to pilot and scale up electric buses (e-buses) under the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME)-II scheme. However, before the COVID lockdown began in March, many of the urban and intercity bus agencies have made significant progress towards procurement of e-buses under FAME-II. Department of Heavy Industries (DHI) that administers this scheme has sanctioned a total of 5,595 e-buses in the phase-I of e-bus funding under FAME II. Out of these, the tenders for about 3,500 buses have been placed while the procurement process for about 2,450 buses has already been completed and approved for subsidy by DHI. The contracting and deployment of these buses are likely to be taken up in the second half of 2020 or early 2021, as India recovers from COVID and normal activities are resumed. This interim period presents us the opportunity to learn from the procurement efforts carried out so far and incorporate lessons in the future e-bus procurements under phase-II of FAME II and otherwise.

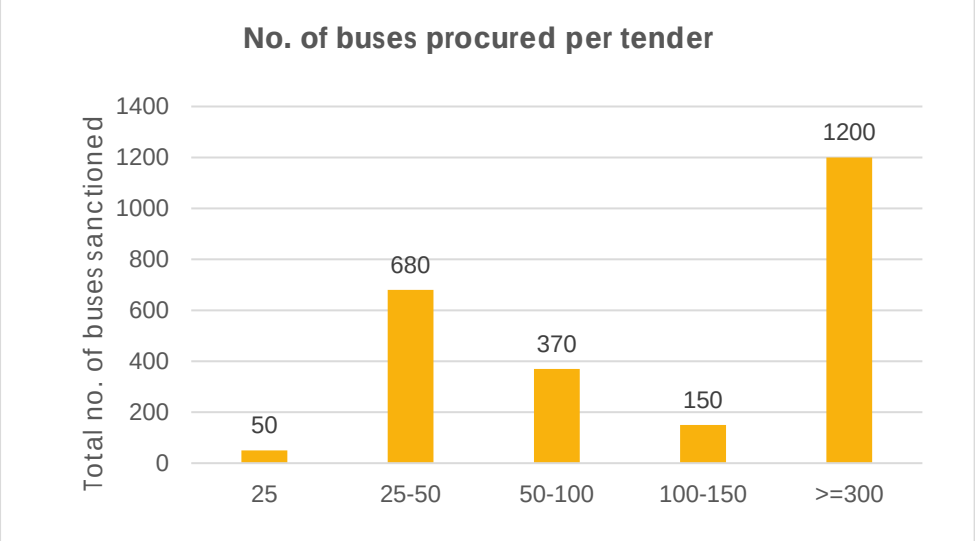
1.1 Objective of the report and data limitations

This report is intended to provide insights to policy makers and authorities tendering out e-buses based on learnings from tenders carried out under FAME II. We present the summary of data from the latest publicly available FAME II tenders and feedback collected by UITP India through various secondary data sources and interviews. Annexure 1 presents the comparision of key specifications from the Requests for Proposal (RfPs) and Model Concession Agreements (MCAs) for about 3,500 buses tendered so far under the FAME II scheme, that were accessed by our team. The finalised rates per km are also included for cities/ states which have completed the tendering process and were sanctioned subsidy from DHI. However, cities have been constantly updating their terms of operations and contracts towards reducing their cost of operations and hence it is likely that some of the data points may have changed since we collected the data. We may also have missed out on capturing tendering specifications of some cities which floated tenders under FAME II. Hence, we only present aggregated findings across cities in this report without comparing each of the terms across agencies. At the same time, it needs mention that some of the cities which floated tenders for e-bus procurement under FAME-II have cancelled their earlier tenders and are in the process of re-tendering. Higher than anticipated quotes during initial rounds of tenders and lack of active participation from bidders are the key criteria for such cancellation of tenders.

1.2 Summary of tenders closed and sanctioned for subsidy by DHI under phase-I of FAME-II

The 2,450 buses that have closed the tendering process with sanctioned subsidy from DHI included bus agencies from across 13 states. This includes 2,270 buses to be deployed in urban services across 30 cities and 180 buses for intercity operations across 4 State Transport Undertakings (STUs). Midi-buses (9m long) buses were the most preferred model across cities with 81% of the total buses (i.e. 1,990 buses) opting for this variant while the rest are standard (12m long) buses. Just three authorities i.e. BEST, Mumbai (300 buses) Janmarg, Ahmedabad (300 buses) and Uttar Pradesh (combined procurement of 600 buses for deployment across 11 cities) constitute about 50% of the total buses sanctioned so far. The second largest category of procurements is cities with 25-50 buses per tender which constitute about 28% (680 buses) of the sanctioned buses. Figure 1 presents the split of buses sanctioned for subsidy according to the parcel size of procurement.

Figure 1: Total buses sanctioned Vs Buses procured per tender



1.3 Suppliers of e-buses sanctioned for subsidy

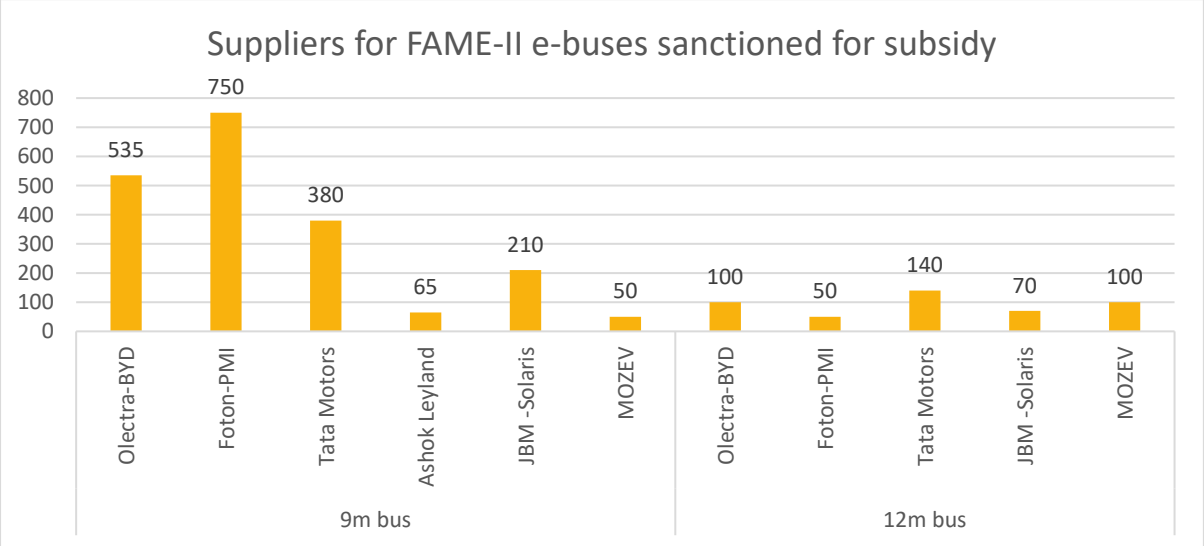
Many of the bids received across states were by consortiums led by the Original Equipment Manufacturers (OEMs) that will supply the buses. Figure 2 presents a summary of the suppliers identified so far under FAME-II, segregated by 9m and 12m buses. PMI Electro Mobility Solutions Pvt. Ltd. (referred from here-on as Foton-PMI) is the OEM with the largest no. of sanctioned buses- a total of 800 sanctioned buses comprising of 750 9m buses out of which 600 are through the single tender in Uttar Pradesh. Rajkot, Bhubaneshwar and Delhi Metro feeder services with 50 buses each comprise the remaining 9m buses to be delivered by Foton-PMI while the firm is also selected to supply 50 12m buses in Kolkata New Town.

Olectra-BYD is the second largest supplier with 635 buses including 535 9m and 100 12m buses. This includes urban services in Surat (150 9m buses), Bhopal, Indore (100 9m buses each), Jabalpur, Ujjain (50 9m buses each) and Silvassa (25 9m buses). Additionally,

Olectra-BYD was also selected to supply 50 12m intercity buses in Goa and 60 9m buses in Uttarakhand for a hilly terrain use case (30 each for Dehradun smart city Ltd. and Uttarakhand State Road Transport Corporation (UKSRTC).

Tata Motors was selected to supply 520 buses across Mumbai (140 12m buses and 160 9m buses), Ahmedabad (120 9m buses) and Jaipur (100 9m buses). JBM-Solaris is selected to supply 280 buses in Ahmedabad (180 9m buses) and Navi Mumbai (70 12m buses and 30 9m buses), Mytrah Mobility (MOZEV) is selected to supply 150 buses including 50 9m buses for metro feeder services in Delhi, 50 12m buses each for intercity services in Maharashtra and Rajasthan. Ashok Leyland was selected to provide 65 buses in Gwalior (40 buses) and Patna (25 buses).

Figure 2: OEMs selected to supply e-buses sanctioned for subsidy under FAME-II



1.4 Cost of procurement of e-buses under FAME-II

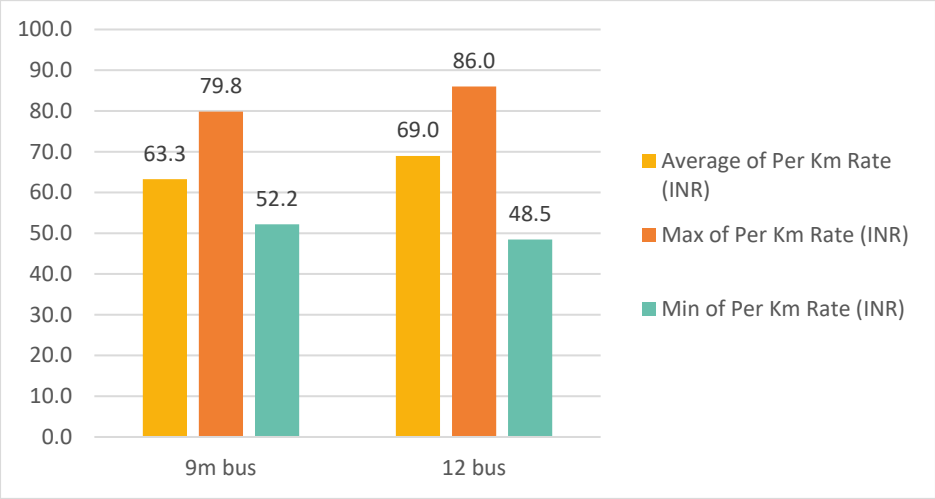
All the tenders adopted Gross Cost Contract (GCC) based procurement as recommended by the DHI, with the least cost (L1) quote per km of operations as the selection criteria for the winning bidder. Figure 3 presents the price-range of the bids finalised so far. The subsidy available on the vehicle for various bus types is pre-decided by the DHI and hence the quoted costs factor-in the subsidy available. It is re-emphasised here that key cities like Delhi, Bangalore, Pune and others in Tamil Nadu which together comprise more than 1,400 tendered e-buses haven't finalised their service providers yet and hence some of the findings explained here may need revision in the future.

1) Variation in quoted costs between different cities and states

Similar to the trend observed during FAME I, the L1 quotes varied significantly between cities. In case of 9m buses, the highest quote received was INT 79.8 per km, which is 53% higher than the least quote of INR 52.2. In case of 12m buses, the difference is starker with the highest quote of INR 86 per km 78% higher than the lowest quote of INR 48.5 per km. Despite similar vehicle specifications between cities, such high variance in rates can be attributed to the difference in contractual specifications between different tenders. As can be seen in Annexure 1, items like assured-km of payment to the service provider,

responsibility to pay for the electricity/ energy costs, financial obligations such as bid and performance security, penalty for non-adherence to Service Level Agreements (SLAs) (which is built into the bid value many times) each of which have a significant impact on the bid value vary widely between cities. Further, bidders also build in the cost of risk-premium on items impacting bankability of the project such as termination clauses, capability and track record of the contracting authority to ensure timely payments which are beyond the scope of analysis for the current report. Therefore, cities and states can use Annexure 1 to compare their tender specifications against the ones from other contracting authorities which attracted low rates and make necessary improvements, where applicable.

Figure 3: Range of L1 bids approved for 9m and 12m buses



2) High cost of e-buses compared to ICE buses

The total cost of operating electric buses includes additional costs to be incurred by the contracting entity in addition to quoted costs on items like cost of electricity (in cities where the contracting authority is responsible), conductor, depot development, contract management and other administrative expenses. Adding these costs to the quoted cost for the vehicle and driver makes the Total Cost of Ownership (TCO) over the lifecycle of e-bus operations 50-100% more expensive compared to the conventional diesel and CNG powered buses in some cities. This is despite the available FAME subsidy. At these rates, it is unlikely that cities adopt electric buses as their preferred choice in cases where FAME subsidy is unavailable and they have a choice of ICE bus. Strategies and business models to reduce the cost of e-buses further need to be explored

3) Relative costs of 9m and 12m buses

Of the buses sanctioned so far, the average L1 quote for 9m buses across urban and inter-city operations is INR 63.3 per km while it is INR 69.0 per km for 12m buses. Hence, on average 12m buses are only 9% more expensive compared to 9m buses. Notwithstanding the differences in contractual specifications, the limited difference in costs between different length categories of buses re-emphasises the fact that cost of service delivery over the lifecycle of a bus depends more on Operational Expenditure (OPEX) items such

as staff cost, energy cost, maintenance cost etc. more than the Capital Expenditure (CAPEX) on the bus, charging and other ancillary infrastructure. Cities need to evaluate this carefully due to the following reasons:

1) **Lower capacity and revenue potential of 9m buses**: While the cost of operating 12m buses is only 9% higher, their passenger carrying capacity is at least 25-30% higher compared to 9m buses. It is well-known that public transport demand is concentrated in the morning and evening peaks and hence the capacity needs to be maximised to carry as many passengers as possible during these hours. Therefore, 12m buses are likely to provide better payback compared to 9m buses in cases where the peak hour demand supports 12m buses.

2) **Lower range of 9m buses**: The battery capacity and hence the km of range offered by 9m buses currently available in the Indian market is about 30% lower compared to 12m buses. As a result, these buses are more likely to require top-up charging during the day to meet the daily vehicle-utilisation targets, leading to loss of trips and hence revenue to the authority. This revenue loss is accompanied by lower staff productivity due to day-time charging. As a result cities will require more buses to provide the same level of service-commonly measured as replacement ratio or the ratio of number of e-buses needed to deliver the same service as ICE buses. Therefore, cities need to carefully evaluate the range implications and power availability for opportunity charging for the proposed e-bus routes while deciding on the vehicle specifications

3) **Infrastructure challenges for 12m buses:** Infrastructure availability also plays a key role in identifying the appropriate vehicle length. Use cases such as hilly operations, operations in smaller cities and metro feeder services in metropolitan cities are likely to require buses operate in constrained conditions without adequate Right of Way (RoW) or turning radius for 12m buses. In such cases authorities need to choose 9m buses

Therefore, authorities need to carry out a thorough demand and infrastructure availability assessment to identify the most appropriate length of bus for their operations. Considering these two factors, 12m e-buses are likely to deliver better financial performance compared to 9m e-buses, subject to availability of adequate passenger demand and street infrastructure for their operation.

2 Potential improvements in procurement to reduce costs

The TCO of e-buses needs to be reduced significantly from the current situation of being 50-100% higher than ICE buses to ensure sustained operations of the deployed buses and to scale up deployments across Indian cities. It is incumbent on all the relevant stakeholders involved in e-bus service delivery such as the bus agencies contracting these services, OEMs, operators, financing institutions and DHI to come together to identify a roadmap to reduce the cost of e-buses to be procured in the future.

We have identified changes needed in the terms of procurement of contract authorities as one of the critical areas of improvement needed to reduce the cost of e-buses. This section outlines specific terms identified through our internal analysis and stakeholder consultations that have scope for improvement in upcoming procurements.

2.1 Procurement process under FAME II

DHI mandated OPEX model of procurement for bus agencies to be eligible for subsidy from FAME-II, which resulted in all the agencies adopting the Gross Cost Contract (GCC) model of procurement for e-buses. The tendering process for bus procurement under GCC involves the cities issuing a Request for Proposal (RfP) accompanied by a Model Concession Agreement (MCA) that outlines the terms of procurement. The service providers interested in the project submit their bids, out of which the least cost (L1) bidder is selected and contracted. A draft MCA was issued by NITI Aayog, Government of India (GoI) that all the cities were mandated to adopt, after incorporating any necessary changes according to their local needs. Neither DHI nor NITI Aayog issued a model RfP and hence cities have developed their own RfP combining experience from previous procurements and guidance provided by available guiding documents such as the UITP toolkit for e-bus procurement[1][2] and Model RfP for diesel and CNG bus procurement issued by the Ministry of Housing and Urban Affairs (MoHUA)[3].

2.2 Review of RfPs and MCAs issued under FAME-II

While the available guiding documents brought in some consistency in the terms of e-bus procurements across the country, we observed significant variation in certain key clauses of the tenders and MCAs that determine the bidders' willingness to participate, the level of risk associated with the contract and eventually the financial quotes likely to be received by the contracting agency. The following four categories of terms in the RfPs and MCAs are identified to be the key differentiating factors between the FAME II bidding and results observed across India:

i) Eligibility criteria for service providers

ii) Contractual obligations on the authority and service provider

[1] https://india.uitp.org/uitp-india-develops-toolkit-support-e-bus-procurement-under-fame-ii
[2] https://www.uitp.org/sites/default/files/Tender%20structure%20Extract.pdf
[3] http://mohua.gov.in/upload/uploadfiles/files/ModelGrossCost.pdf

iii) Payment timelines and penalties

iv) Functional and technical specifications

This section summarises the key variations observed between the RfPs and MCAs of cities that have completed their procurement process and their corresponding subsidy is sanctioned by DHI.

2.2.1 Eligibility criteria for service providers

Encouraging more number of bids per tender can potentially lead to reduced costs due to competition between the bidders. Eligibility criteria of bidders can significantly influence the type and number of bids a city can attract and hence need to be defined in such a way that they are open enough to encourage competition while ensuring quality of the participating bidders. The following variations in eligibility criteria for service providers were observed between various RfPs. The qualification criteria can be standardised across India to develop a pre-qualified pool of service providers through a pan-India empanelment initiative under the FAME II scheme.

1) **Annual turnover requirements of service provider:** The turnover requirements varied widely, with some cities not having any minimum turnover requirements to some asking for at least INR 500 Crore turnover for eligibility to bid for the project, thereby excluding some bidders

2) **Type of bidders**: Majority of the RfPs allowed operators and OEMs to either bid solely or as a consortium. In most of these cases, OEMs that have led the consortium along with an operator partner have won the bids. While tie up with an OEM was mandated for all bidders, tie up with a financing entity hasn't been mandated by many cities. Some cities have even excluded financial institutions from leading the bids. While mandating participation of a financing entity to be part of the consortium may restrict the ability of some bidders to participate, allowing financing entities from being the lead bidders can potentially lead to innovative business models that can reduce costs

3) **Manufacturing capacity**: Some cities have set a minimum capability requirement of 50 buses, which excluded some OEMs from participating in the bid given that e-bus manufacturing is still a fledgling industry in India and some OEMs haven't reached scale yet. At the same time, some RfPs didn't mandate ant minimum manufacturing experience of e-buses, thereby opening up the participation to all OEMs eligible for FAME subsidy. To safeguard against the risking of delivery associated with allowing manufacturers without prior delivery experience, STUs can seek proof of concept at an appropriate stage of tendering and contracting

4) **Operating experience of service provider**: Given the limited e-bus operating experience available in India, many cities have allowed operating experience of both electric and ICE buses to be eligible for bidding. The fleet size criteria for operating experience ranged between 10 to 100 buses. Given the limited number of large-fleet private bus operators in India with large fleet sizes, cities with higher fleet size criteria could exclude some local operators, thereby increasing the cost. At the same time, cities tendering larger fleet of buses identified this as a key criteria towards building trust on the bidder to deliver the operations at a scale expected for the FAME II buses sanctioned

5) **Timelines for bid submission and scope for consultation**: The time cities allowed for service providers to submit their bids varied between a minimum of 6 days and a maximum of 38 days. Timelines for bidding should ideally allow for adequate preparatory work for the bidders and consultations with the contracting authorities through pre-bid meetings. Such consultations help fine-tune to suit both the authority and service provider. However, the really short timelines adopted by some cities could have resulted in suboptimal bids due to the bidders being unaware of the specific operating conditions. Many cities have also observed multiple extensions to the original timelines and also cancellations or re-tendering due to the suboptimal bids in the first round. Cities can identify suitable timelines based on the FAME II results and adopt that in the future to streamline the bidding process.

2.2.2 Contractual obligations on the authority and the service provider

Clear definition of the obligations of the authority and service provider and their adherence is crucial for an effective long-term partnership in implementing a GCC contract. The following are the some findings specific to contractual obligations that could have influenced the cost of FAME II bids.

1) **Performance bank guarantee amount and duration**:

- Majority of the cities mandated 3% of the total estimated project as the performance bank guarantee to be deposited by the service provider at the beginning of the contract. The project cost is estimated based on the number of buses, quoted cost per-km and the assured-km of operation over the lifecycle of the contract. However, in some cases, performance security was fixed at 5% of the estimated project cost, i.e., 67% higher than the majority benchmark. Some cities have defined a per-bus value in the range of INR 30,000-INR 50,000
- The duration of performance security also varied between cities. Many of the cities mandated the performance security deposit to be made available 120 days beyond the contract duration, while some even extended this to 180 days beyond contract duration
- Increasing the performance security deposit amount and duration will increase the financing cost of the project and hence will be reflected in the cost of contracts, without making a substantial difference to the quality of service delivery

2) **Subsidy bank guarantee amount and duration:**

- In addition to the performance bank guarantee, DHI has mandated cities to collect subsidy bank guarantee from the service provider for a value equivalent to the subsidy the service provider is eligible for under FAME II which is to be secured for a duration of five years
- Given that the performance bank guarantee already safeguards the project interests, having an additional subsidy guarantee-equivalent to the subsidy given increases the project cost for the service provider without contributing to improvement in service quality

3) **Payment in case of termination of the contract**: The MCA issued by NITI Aayog defines the circumstances for Force Majeure, contract termination and the payment obligations on the authority or the service provider at the time of these events in significant detail.

While the terms of payment in case of service provider default were retained, many cities changed the termination clauses in case of authority default to relax their payment obligations. This severely impacts the bankability risk of the project for the service providers and their financing entities

4) **Depot development and asset transfer** is one of the key obligations on the contracting authority- to develop the necessary civil and electrical infrastructure needed to commence e-bus operations. While most cities have clearly committed to these obligations and identified the depots which shall be used for e-bus deployment, about 60% of the contracting authorities haven't identified the exact depots for deployment. Lack of clarity on such key obligations increases risk premium that service providers and their financiers associate with the project, thereby increasing the overall cost. In some cases, authorities have transferred depot development responsibilities to the service providers-either due to lack existing infrastructure or to benefit from the relatively faster pace of execution of the private service providers. This has led to a disproportionate increase in cost per km since the lifetime of the supporting infrastructure is 20-30 years, which is much longer than the contract tenure of 10-12 years.

5) **Statutory taxes**: Most of the RfPs and MCAs are silent on the statutory taxes applicable for e-bus service provision and their distribution between the contracting authority and service provider, thereby leaving scope for ambiguity among service providers while building-in the costs on taxes

6) **Asset ownership at the end of contract tenure** is with the authority in most cases. Given the rapidly evolving e-bus technology and the likely availability of better quality models at the end of the 10-12 year contracts, leaving asset ownership with the service provider can potentially reduce the bid-values

7) **Third-party Insurance** for buses and assets are mandated by most authorities, which adds 2-2.5% to the asset cost per annum. Given that in-house bus operations are exempted from third-party insurance, a similar arrangement for e-buses can contribute to reducing costs in the future. In addition to this, service providers are also obligated to insure the authority owned assets in the depots, which is increasing the quoted cost further

2.2.3 Payment terms and penalties

The terms of payment and penalties are at the heart of the payback period for the service providers who invested in the GCC operations. The following are the key payment terms that varied between cities and hence could have impacted their costs significantly

1) **Assured-km of payment**: This is the minimum-km of service for which the authority commits to pay the service provider and is central to the cost quoted in the bids. Different cities mention their assured-km differently, i.e., based on their daily, monthly or annual vehicle utilisation rates expected. Annexure 1 normalises these into monthly assured-km by each contracting authority. More assured-km ensure higher payback on the investments made by the operators, thereby improving the financial performance of the contract which further leads to a lower bid costs. At the same time cities need to identify the assured-km carefully as they apply for the entire duration of the project, i.e., at least 10 years or more. Given the increasing congestion in Indian cities, the vehicle utilisations have been declining consistently over the years and hence the current vehicle utilisation

rates may not be met in the future. On an average, the monthly assured-km committed by cities is approximately 6,000 per bus (~200 km per day). However, it varies widely between cities with Navi Mumbai committing to approx. 6,600 km of assured-km per month while Mumbai has the least assured-km of 4,200 km per month for their midi (9m) buses. As a result, Navi Mumbai attracted per-km quotes of INR 52.2 and INR 69.93 for 9m and 12m buses respectively while Mumbai's costs for the same buses are INR 74 and INR 83 per km

2) **Periodicity of payment and penalties for late payment**: The NITI Aayog MCA recommended that the payments to the service providers shall be made at the end of every 15 days to ensure adequate cash flows. However, some cities increased it to 30 days thereby impacting the cash-flow availability of the service provider. More importantly, it is important for cities to ensure payments as per the timelines they committed in the contract, for the service providers to meet their working capital and back-end loan payments. Many cities have committed to paying an interest of 2-3% above bank interest rates for every day of delay in payments while some haven't committed to any such commitments for delay in payments. However, the ability of the STUs to ensure timely payments is yet to be tested since they are not used to outsourced operations for many decades and are in poor financial condition, particularly due to the adverse financial implications of Covid-19 induced demand reduction

3) **Payment for additional-km of operation:** The payment terms for cases when service providers perform more km of service per day compared to their assured-km varies significantly between cities. None of the cities pay the assured-km rates for additional-km performed, probably with the logic that the assured-km take care of the service providers' investments and additional-km are only an incentive to perform better. Hence the per-km payment for additional-km is in the range of 30% to 75% of the payment made for assured-km. Some of the cities haven't even mentioned the possibility of additional-km of operation in their contracts. Such a high variance between cities can be key source of variance between quoted costs

4) **Payment for underutilised km of operation:** Even though every city commits to a minimum assured-km of payment, some cities also made provisions to reduce the per-km payment in case of under-utilised km, i.e., buses performing fewer than assured-km. The payment for the under-utilised km, calculated as the difference between assured-km and actual-km performed, ranges between 35-75% of the payment for assured-km. The payment for the actual-km of service provided continues to be at the per-km rate at which contract is issued. Such reduction in payment undermines the assured-km of payment committed by the authority, as the service providers can't plan for a predictable revenue. At the same time, incorporating a clause for under-utilisation indicated uncertainty of the authority on the routes of operation and their likelihood to perform the assured-km of service. This further results in increased risk-premium associated with the contract leading to higher financing costs. At the same time the service providers re likely to base their quoted cost per km for the assured-km of payment after deducting underutilised-km payment which increases the cost further

5) **Mechanism for payment revision**: The NITI Aayog MCA recommended a formula for annual revision of payment to the service provider is linked to Consumer Price Index –

Industrial Workers (CPI-IW) and Wholesale Price Index (WPI) which together incorporate the increase in staff cost and other materials needed for operation. Additionally, cities in Gujarat, Delhi Metro Rail Corporation and a few others have also included energy price inflation into the payment revision formula. However, many cities have removed the payment revision mechanism from their MCA's thereby asking the service providers to quote a flat rate for the entire contract tenure. Given the uncertainty in escalation of various cost items, such lack of payment revision can lead to higher risk premium being incorporated into the quoted costs, thereby increasing the cost of bids. Hence cities are encouraged to adopt a transparent annual revision mechanism that builds trust with the service providers and reduces the costs further

6) **Penalties and Service Level Agreements (SLAs)**: Majority of the cities included fleet availability, punctuality and reliability as a part of their SLAs, the lack of adherence to which, attracts penalties on the performance security value (i.e. 3% - 5% of Project cost). Many cities capped the penalties at 10% of the total payment to be made to the service provider, as recommended by the NITI-MCA. Some cities have even reduced the penalty amounts to avoid the likelihood of bidders building in the penalty amounts into their bids while some of the others added additional SLAs beyond the ones in MCA. However, some cities have removed the cap on penalties thereby jeopardising the assured-km of payment calculations of the service providers and thereby the additional cost due to the associated risk premium. In many cases, even though the SLAs are mentioned, their method of monitoring, i.e., whether manually or using ITS isn't clearly mentioned which is an additional point of uncertainty in penalty calculations.

7) **Minimum amount to be maintained in Escrow Account**: While the terms of minimum balance amount to be maintained in the escrow accounts are defined by the NITI Aayog's MCA, some STUs have reduced this in their own MCAs. While the STUs made the revision according to their own financial capabilities, such changes increase the bankability risk of the project for the service providers and their financing entities.

2.2.4 Functional and technical specifications

Finally, the following key features of the functional and technical specifications of the outsourced services were observed to be crucial towards determining the cost of service provision:

1) **Charging strategy**: Most of the MCAs are oriented towards overnight charging of buses at depots, with an aim to replace ICE based buses with similar e-buses. The concept of opportunity charging for buses, thereby reducing the battery cost associated with a full-day range battery, hasn't been clearly defined in most of the RfPs and MCAs. Exploring such a strategy would require agencies to plan services in advance, which is different from the current operating practice of flexible deployment of buses on any route. Additionally, most cities only provide about 30 min for opportunity charging, while a few allow up to 75 min for top-up charging. The lack of adequate top-up charge and necessary inspection is important for the future RfPs on e-buses. Wherever possible, the top-up charging times need to be matched with the crew break times during the day or at the time of crew-shift to avoid loss of revenue making trips. However, such operational considerations haven't been explicitly stated in the RfPs and MCAs-which are likely to lead to a suboptimal range bus becoming the L1 bidder/ service provider-eventually leading

to loss of revenue which further results in increasing the overall cost of e-bus implementation

2) **Battery capacity requirements:** The maximum battery size needed on the vehicle is dependent on the charging strategy adopted by the city. In case of a depot-only charging with charging time of 30 minutes during shift changeover time, the ideal battery size will be based upon the daily utilisation of buses.

3) **Bus specifications**: Many of the city RfPs and MCAs mention Urban Bus Specification (UBS)-II as the specification for buses. Since UBS-II was designed for ICE buses, the specifics particular to electric buses were changed by local authorities. This leads to significant variance in bus-specs between cities which needs to be addressed with a uniform version of e-buses needed for alternative vehicle and charging technologies.

Various cities and states contracting e-bus services may review the learnings from the pan-India review presented in this chapter to incorporate relevant changes into their own procurement practices.

3 Recommendations to improve e-bus procurement under FAME-II

FAME-II laid strong emphasis on promotion of e-buses by allocating 35% of the scheme outlay for buses. While the scheme targeted induction of 5,595 buses as a part of its phase-I, the uptake, as explained in the previous chapter, hasn't met the set targets. This is due to the limited appetite amongst states and cities to adopt e-buses as a result of their higher costs. It is, therefore, an urgent need to address the issues faced by cities and service providers to reduce the costs and improve ease of implementation, to scale up e-bus deployment in the next round of funding. Based on extensive engagement in States and Cities involved in FAME-II, we identified the following key inputs that can make a difference to the Phase II.

3.1 Recommended measures to address high cost of electric buses

Across states and cities, the key concern in implementing e-buses has been the higher cost of e-buses compared to their conventional Internal Combustion Engine (ICE) based fleets. Contrary to public perception of falling electric vehicle prices, FAME II bids have witnessed higher costs compared to the FAME I bids-due to the lower per-bus subsidy offered by DHI and improved awareness amongst operators on the actual cost of operations. In this context, the following recommendations are identified to reduce the cost of bids

- **Harmonising RfPs and MCAs to improve bankability and to encourage competition**: It is understood that operating conditions vary across different cities and states resulting in the varying technical and functional requirements of e-buses. However, as explained in Chapter 2, there are many other terms and conditions of the RfPs and MCAs that can be tweaked without impacting the project quality adversely. Harmonising these item will bring-in greater level of consistency in procurement thereby encouraging more bidders per tender which can bring down the costs further through competition. At the same time, consistency in terms cross cities will improve the perceived bankability of the projects leading to reduction in financing costs and hence the cost quoted by bidders. We recommend active consultation between DHI and various STUs towards harmonising various terms in a mutually agreeable manner
- **Reduce risk of OPEX contracts:** Our analysis of FAME II bids shows significant variance in prices quoted for different cities even for the same vehicle specifications. This is primarily due to the risk premium being factored in by the bidders, which can sometimes comprise up to 30% of the actual cost of service provision. The reason for such high risk premiums is the operators' perceived inability of the State/ City to make timely payments and the lack of long-term bankability of the contract. DHI needs to address this as a priority for the sustainability of all FAME II contracts. The following are a few measures that may be taken up towards this:
    - **Guarantee mechanism for loans:** A National or State level guarantee mechanism for the loans raised by service providers for their fleet procurement and infrastructure development investments will improve the bankability of the project

  - **Reduce bank guarantee requirements for operators:** The performance security/ bank-guarantee specified for service providers is currently fixed for the entire contract tenure while the cost of the assets depreciates every year. In some cases, the performance bank guarantee is additional to the subsidy amount for the contract duration. Hence an annual reduction in performance security which is consistent with the asset depreciation rate can help reduce financing costs for operators
  - Additionally, cities can merge subsidy and performance bank guarantees needed from the service providers and reduce the overall financing needs of service providers for the guarantees, without adversely impacting the sustainability of the project
- **Improve predictability of payments to operators**: Two key measures need to be taken to ensure return on investments for operators:
  - **Guarantee mechanism for timely payments:** While most cities are establishing escrow accounts as suggested by the Model Concession Agreement (MCA) issued by NITI Aayog, the timeliness of payments is yet to be proven. Therefore, any additional guarantee mechanism for payment will help build investor confidence. For eg., a performance bank guarantee or Letter of Credit (LC) mechanism can be undertaken by contracting authorities
  - **Capping penalties for non-adherence to Service Level Agreements (SLAs)**: Gross Cost Contracts typically have penalty mechanisms for non-adherence to SLAs concerning service delivery such as vehicle availability, punctuality, cleanliness. These are typically capped at 10% of payment to assure a min. of 90% payment to service providers. However, some FAME II tenders don't have a cap on these penalties–thereby increasing the revenue risk for the service providers. This penalty risk is built into the quoted cost of operations-leading to the overall increase in costs- SLA based penalty percentages may be defined or a cap on penalty percentage may be defined
  - **Payment for assured-km of operation**: Many cities have included provisions to deduct the payment to be made on assured-km of service, in case they're unable to complete the committed levels of daily-km. This undermines the objective of assured-km mentioned in the contract and thereby increases the risk of underpayment to the service providers. Hence it is advised that cities strictly adhere to assured-km of payment and limit deductions for underutilised-km-thereby making the contracts more transparent for all stakeholders. The cities can be asked to justify the reasoning behind committed kilometres based on their current state of operations and where possible, shouldn't deduct the payments for under-utilised km in case the shortage is due to reasons beyond the control of the service provider.
- **Provision of civil and electrical infrastructure**: The NITI Aayog MCA places the obligation for the development of depots and other supporting infrastructure with the contracting authority. This requires establishing civil and electrical infrastructure required for bus maintenance, charging and operations management as explained in these 'Bus Depot Design Guidelines'. In some cases, authorities have transferred these responsibilities to the service providers-either due to lack existing infrastructure or to benefit from the relatively faster pace of execution of the private service providers.

This has led to a disproportionate increase in cost per km since the lifetime of the supporting infrastructure is 20-30 years, which is much longer than the contract tenure of 10-12 years. Hence it is recommended that authorities ensure provision of operations ready civil and electrical infrastructure before commencement of the contracts.

3.2 Improve readiness of States and Cities to induct electric buses

Given that e-buses are still in their nascent stages of deployment, many states and cities are underprepared to ensure their successful implementation. The following are a few suggested actions to improve their readiness for implementation:

- **Technical support for selected cities in project planning ahead of the tender**: It is recommended that cities identify the depots and routes of operation for the proposed e-bus deployment upfront so that both the contracting authority and service providers are clear on the likely costs involved in fleet deployment, infrastructure development and expected operational conditions. The lack of such implementation plan can also lead to the uncertainty cost being built into the cost of contract. Planning for e-buses requires specialised skillsets to factor-in items such as charging time and location, depot layout planning, revised scheduling to meet battery range constraints etc. Many cities lack the technical expertise for such planning and would benefit from technical support from DHI in developing such an implementation plan. UITP developed a framework for depot and route selection that has been used by Bengaluru Metropolitan Transport Corporation (BMTC) which can be built upon and offered as guidance to other cities
- **Evaluate cities' readiness for e-buses during the city selection phase**: The first round of e-bus funding under FAME II saw many cities tendering out 50 buses each or even lesser in some cases. Many of these cities don't have the readiness to induct e-buses due to issues such as lack of supporting infrastructure and limited experience with city bus services (eg. Madurai, Kakinada, Solapur, Ujjain). In such cases, the additional cost of power and depot infrastructure development can become a significant barrier for successful implementation of the contract thereby impacting the sustainability of the project. It is recommended that DHI evaluates cities based on their preparedness before sanctioning buses. Few criteria to evaluate the preparedness include prior experience in deploying/operating e-buses, operating buses under GCC model, financial commitments beyond subsidy scheme etc.
- **Timelines for tendering and contracting**: One of the key constraints faced by cities in planning and procuring e-buses has been the short timelines allowed by DHI. This includes the time given to cities to respond with Expression of Interest (EoI) to qualify for the subsidy as well as time to complete the tendering and contracting process. As a result, cities didn't have adequate time to plan their deployment strategies and to have adequate consultations with the industry and DISCOMs. This led to multiple rounds of re-tendering, extensions and cancellations of tenders thereby leading to further delays. It is, therefore, recommended to have more lenient timelines in the next round to improve city preparedness
- **Focus on limited cities with capacity for implementation**: Concentrating e-bus subsidy in a few cities is likely to help in achieving economies of scale rather than spreading implementation into small parcels across many cities. This will ensure that cities with the necessary technical and financial capacity to create the upfront infrastructure and

ensure sustainability of operations are selected. Therefore, we suggest that DHI focuses on a limited set of States/ Cities for the phase II of e-bus subsidies. DHI may consider developing model cities with high e-bus implementation and let other cities learn from their experiences

- **Improving the operator ecosystem**: India only has a limited no. of private operators who can bid for FAME II supported tenders and implement a technology and financing intensive exercise such as e- buses. This is resulting in the OEMs with limited operational expertise leading many bids-which may not be the most sustainable operating model to scale up e-buses. It is suggested that DHI in partnership with the cities and states makes efforts to attract more operators through favourable terms
- **Create a pool of pre-qualified service providers**: The variations in eligibility criteria of service providers which led to inadvertently disqualify some of the bidders need to be avoided by creating a pan-India pool of empanelment of qualified service providers under the FAME II scheme

3.3 Exploring alternative models of procurement and incentives

State Transport Undertakings (STUs) are used to outright purchase mode of procurement and in-house operations for ICE buses. FAME II presented the challenge of transitioning to an outsourced form of operations along with the technology transition to e-buses. This led to some states with strong STUs not showing adequate enthusiasm in FAME II. The following measures may be taken up towards addressing their concerns

- **Allowing Capital Expenditure (CAPEX) based funding for State Transport Undertakings (STUs):** Many STUs prefer outright purchase of buses and charging infrastructure as purchasing buses would give them more flexibility in operations compared to GCC operations which involves regular negotiation with operators even for changes in service plans. At the same time, the poor financial health of some STUs is leading to service providers factoring in their revenue risks into the quoted costs thereby increasing the overall project cost. Hence, ***CAPEX model of procurement may also be considered under the next round of FAME II subsidy*** for e-buses. However, adequate technology-risk mitigation measures such as warranty on the vehicle and battery, adequate maintenance support from OEMs etc. need to be built into such contracts to ensure their long-term sustainability. In the current OPEX based model, the focus of cities have shifted more to GCC contracting which is a new aspect for them rather than focusing on technicalities of implementation of electric buses and their supporting infrastructure
- **Ensuring commitment from States and Cities for consistent Viability Gap Funding (VGF) to bus agencies**: Successful execution of a GCC contract over its lifecycle would require the authority to ensure timely payments to the operators. However, the poor financial health of Indian bus agencies coupled with the higher cost of e-buses results in their lack of financial capability to pay the operators in a timely manner. Therefore, DHI should insist that States and Cities commit to consistent Viability gap Funding (VGF) for e-buses to avail the CAPEX subsidy offered by Government of India (GoI). This will ensure sustainability of the project and de-risk the contract for operators and their financiers
- **Allowing private buses to avail FAME II funding**: Private bus operators providing premium services, given their higher rate of revenue returns, are likely to implement e-

buses even if they cost higher as compared to Government urban bus agencies. Therefore, allowing them to avail FAME II funding can potentially unlock a bigger e-bus market compared to the current Govt. only funding. Adequate measures to ensure public access to the infrastructure developed by these private operators may be built into the funding mechanism

- **Role of DISCOMs**: The electricity distribution companies (DISCOMs) are a key stakeholder for e-bus implementation as they to provide the necessary power infrastructure for charging and ensure high quality power supply during operations. However, they haven't been engaged adequately in the e-bus implementation efforts so far. It is recommended that some part of FAME II charging infrastructure funding is also allocated to create supporting power infrastructure for buses

3.4 Performance monitoring and evaluation

- **Performance reporting and data sharing protocols**: DHI has already created the necessary ecosystem for a National level performance evaluation framework for e-buses by mandating all STUs and cities receiving FAME II subsidy to create an online platform for performance monitoring. However, there is a lack of guidance to cities on the specific performance monitoring and evaluation methods to be adopted. UITP has prepared a framework for performance monitoring and evaluation for e-buses, building upon the current performance monitoring practices for ICE buses. This framework can help cities in improving their operational strategies and will support DHI with a guidance framework for tracking performance of buses deployed through FAME II subsidy. These performance indicators need to be included at the tendering stage and built into the contract, to ensure data sharing at a later stage. When adopted by cities and DHI, the framework will help monitor performance of deployed e-bus and use the learnings to inform upcoming round of procurement, financial incentives and business models. These indicators will also help the cities in learning and scaling up e bus operations.

3.5 Concluding remarks

The report provides a comprehensive review of the procurement of e-buses undertaken under the FAME-II scheme to establish the variance in costs and the procurement specifications that lead to such variance in costs. These findings were used to develop specific pragmatic recommendations towards improving the future rounds of procurement to reduce the cost of e-buses and accelerate their adoption in cities. We understand that electric mobility is a rapidly evolving technology and it's a continuous learning process to identify the best technology, procurement and financing strategies for a given context. However, certain issues like efficient planning, reliable contracting and performance monitoring are key to the success of any bus system and hence will need to be adopted by agencies covered under FAME II as well. We'd like to reiterate our commitment to scale up e-buses in India towards improving our energy efficiency and emissions performance and our keenness to continue the partnership with DHI, authorities and operators to ensure the success of FAME II scheme and rapid scale up of e-buses across India.

Annexure 1: Procurement specifications of FAME II e-bus tenders

Table 1, Page 1/2

City	Mumbai	Bangalore	Ahmedabad	Surat	Rajkot	Goa (Intercity)	Navi Mumbai	Nagpur	Patna	Bhopal (B)/Indore(I)	Jabalpur(J)/ Ujjain(U)	Gwalior
Buses tendered (by length)	200(9m) 140(12m)	300 (12 m)	300 (9m)	150 (9m)	50 (9m)	50 (12m)	30 (9m) 70 (12m)	40 (9m)	15 (9m) 10 (12m)	**B**=100 (9m&12m) **I**=100 (9m&12m)	**J**=50 (9m&12m) **U**=50 (9m&12m)	40 (9m)
Contracted Rate per km (INR)	9m- 74.0 12m- 83.0	NA	54.9	55.26	53.91	78.87	9m- 52.2 12m- 69.9	NA	79.83	**B**= 64.8 **I**= 63.9	**J**= 67.23 **U**= 68.4	69.96
Contract Duration (Yrs.)	10	10	10	10	10	10	12	10	7	10	10	10
Assured km/ month	9m: 4,200 km 12m: 4,750 km	6,560 km	5,850 km	5,850 km	5,850 km	6,700 km	9m: 5,700 km 12m: 6,600 km	5,700 km	6,000 km	6,100 km	6,100 km	6,100 km
Time given for bid submission	14 days	9 days	9 Days	28 Days	25 Days	9 days	36 days	42 days	6 days	28/ 30 days	19 days	16 days
Floor height	400/650/900 mm	400 mm	900±10 mm	900 ± 10 mm	900 ± 10 mm	900 mm	9m: 400-900mm 12m: 400mm	650-900mm	not mentioned	900 mm	900 mm	900 mm
Bus length	9m, 12m	12m	9m	9m	9m	12m	9m, 12m	9m	9m, 12m	9m, 12m	9m, 12m	9m
Air-Conditioning?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Passenger capacity (D= Driver)	9m: Seating 24+W+D 12m: Seating 35+W+D	Total= 42 Seating= 29+D+W	Total= 42 Seating= (24-27)+D+W	Total= 42 Seating= (24-27)+D+W	Total= 42 Seating= (24-27)+D+W	Not mentioned	9m: Seating 25+D 12m: Seating 30+D	Total= 40 Seating= 25+D+W	Seating = 40+ D	9m: Total 42, Seating= 31+D 12m: Total 60, Seating= 35+W+D	9m: Total 42, Seating= 31+D 12m: Total 60, Seating= 35+W+D	9m: Total 42, Seating= 27+D+W
Time for charging (Overnight/specific hours mentioned?)	Overnight	Overnight/ Charging time < 4 hours.	Overnight	Overnight	Overnight	Not mentioned	Overnight	Overnight	Overnight	Overnight	Overnight	Overnight
Vehicle utilisation in single charge (km)	120 km	225 km	220 km	220 km	220 km	225 km	240 km	160-200 km	150 km	9m: 240 km 12m: 225 km	9m: 240 km 12m: 225 km	200 km
Battery capacity	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned
Energy consumption up to which STU will pay, if any?	Not mentioned	≤ 1.4 kWh/km.	Not mentioned	1 kwh/km	1 kwh/km	Not mentioned	Not mentioned	Not mentioned	9m: 0.8-0.95 kwh/km 12m: 1.4-1.5 kwh/km	Not mentioned	Not mentioned	Not mentioned
Opportunity charging (Time allowed)	30 minutes	Not mentioned	75 minutes	75 minutes	75 minutes	Not mentioned	Not mentioned	Not mentioned	75 minutes	30 minutes	30 minutes	30 minutes
Number of depots	5	3	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned	1	Not mentioned	Not mentioned	1
Rate Quote with electricity or w/o?	With electricity	W/O electricity	With electricity	with electricity	with electricity	With electricity	With electricity	With electricity	With electricity	With electricity	With electricity	With electricity
Minimum payment	Total payment = Ta x R + 0.50 x (Tm – Ta) x R Where Tm denotes Revised monthly assured kilometres Tm = T (Assured Km.) - D (Deductible) Ta denotes actual kilometres run in a month and R is Rates applicable	(Payment made for bus km operated up to Annual Assured km)	(Payment made for bus km operated)+(Annual Assured Payment Amount for Unutilised Km= (0.50 x (Tm – Ta) x Applicable Kilometre Charge)) Tm: Annual Assured Bus Kilometres X No. Of buses operated. Ta: Actual Bus Kilometres	(Payment made for bus km operated)+(Annual Assured Payment Amount for Unutilised Km= (0.50 x (Tm – Ta) x Applicable Kilometre Charge)) Tm: Annual Assured Bus Kilometres X No. Of buses operated. Ta: Actual Bus Kilometres	(Payment made for bus km operated)+(Annual Assured Payment Amount for Unutilised Km= (0.50 x (Tm – Ta) x Applicable Kilometre Charge)) Tm: Annual Assured Bus Kilometres X No. Of buses operated. Ta: Actual Bus Kilometres	Not mentioned	(Payment made for bus km operated)+(Annual Assured Payment Amount for Unutilised Km)	(Payment made for bus km operated)+(Annual Assured Payment Amount for Unutilised Km= (0.75 x (Tm – Ta) x Applicable Kilometre Charge)) Tm: Annual Assured Bus Kilometres X No. Of buses operated. Ta: Actual Bus Kilometres	(Payment made for bus km operated)+(Annual Assured Payment Amount for Unutilised Km)	(Payment made for bus km operated)+(Annual Assured Payment Amount for Unutilised Km= (0.75 x (Tm – Ta) x Applicable Kilometre Charge) Tm: Annual Assured Bus Kilometres X No. Of buses operated. Ta: Actual Bus Kilometres	(Payment made for bus km operated)+(Annual Assured Payment Amount for Unutilised Km= (0.75 x (Tm – Ta) x Applicable Kilometre Charge) Tm: Annual Assured Bus Kilometres X No. Of buses operated. Ta: Actual Bus Kilometres	(Payment made for bus km operated)+(Annual Assured Payment Amount for Unutilised Km= (0.40 x (Tm – Ta) x Applicable Kilometre Charge) Tm: Annual Assured Bus Kilometres X No. Of buses operated. Ta: Actual Bus Kilometres

City	Mumbai	Bangalore	Ahmedabad	Surat	Rajkot	Goa (Intercity)	Navi Mumbai	Nagpur	Patna	Bhopal (B)/Indore(I)	Jabalpur(J)/ Ujjain(U)	Gwalior
			Operated by all Buses	Operated by all Buses	Operated by all Buses			Operated by all Buses		Operated by all Buses	Operated by all Buses	Operated by all Buses
Deduction for under-utilised km	Same as minimum payment.	Fleet utilization= 95%: Same as minimum payment otherwise payment will restricted to actual fleet available	Fleet utilization= 94%: Same as minimum payment otherwise payment will restricted to actual fleet available	Fleet utilization= 94%: Same as minimum payment otherwise payment will restricted to actual fleet available	Fleet utilization= 94%: Same as minimum payment otherwise payment will restricted to actual fleet available	Not mentioned	Not mentioned	Fleet utilization= 95%: Same as minimum payment otherwise payment will restricted to actual fleet available	Not mentioned	Fleet utilization= 96%: Same as minimum payment otherwise payment will restricted to actual fleet available	Fleet utilization= 96%: Same as minimum payment otherwise payment will restricted to actual fleet available	Fleet utilization= 96%: Same as minimum payment otherwise payment will restricted to actual fleet available
Escalation mechanism for payment	Electricity: Monthly, Labour: 2nd year, Material: 3rd year	First 2 years= Nil, 3rd year onwards= 1% of basic quoted rate	Revised every 12 months	Revised every 6 months	Revised every 6 months	Not mentioned	Revised every 6 months	Revised every 6 months	Revised every 6 months	3rd year onwards: 2% of basic quote rate	3rd year onwards: 2% of basic quote rate	3rd year onwards: 2% of basic quote rate
Maximum penalty to operator	Not mentioned	0.25 % of performance security/day subjected to maximum amount equal to bid security.	0.25 % of performance security/day subjected to maximum amount equal to bid security.	0.25 % of performance security/day subjected to maximum amount equal to bid security.	0.25 % of performance security/day subjected to maximum amount equal to bid security.	Not mentioned	0.1 % of performance security/day subjected to maximum amount equal to bid security.	0.25 % of performance security/day subjected to maximum amount equal to bid security.	0.25 % of performance security/day subjected to maximum amount equal to bid security.	Not mentioned	Not mentioned	Not mentioned
Payment cycle(15/ 30/ 45/ 60) days	30 days	30 days	15 days	15 days	15 days	Not mentioned	15 days	15 days	15 days	15 days	15 days	15 days
Annual escalation of electricity charges (Yes/No)	Yes	No	Yes	Yes	Yes	Not mentioned	Yes	Yes	Yes	Yes	Yes	Yes
Payment of electricity (Authority/Operator)	Operator	Authority	Operator	Authority	Authority	Not mentioned	Authority	Authority	Authority	Operator	Operator	Operator
Performance Bank Guarantee (PBG) Amount	50,000/bus	50,000/bus	3% of total project cost.	3% of total project cost.	3% of total project cost.	1,00,000/bus	50,000/bus	3% of total project cost.	3% of total project cost.	5% of total project cost.	5% of total project cost.	3% of total project cost.
PBG Duration (same for entire duration or changes over time?)	Full contract period plus 365 days (Same)	Full contract(Same for entire duration)	Full contract period plus 120 days(same)	Full contract period plus 60 days(same)	Full contract period plus 60 days(same)	Full contract period plus 180 days (10% reduction annually)	Full contract period plus 90days (8.33% reduction per annum)	Full contract period plus 180 days (Same)	Full contract period plus 120 days (10% reduction annually)	Full contract period plus 180 days(Same)	Full contract period plus 180 days(Same)	Full contract period plus 180 days(Same)
Bid security deposit	0.50 crore	4.5 crore	2 Crore	1.5 Crore	0.65 Crore	0.10 crore	0.50 Crore	0.30 crore	0.15 crore-9m bus 0.10 crore-12 m bus	0.50 Crore	0.25 Crore	.25 Crore
O&M: Depots specified?	Yes	Yes	No	No	No	No	No	No	Yes	No	No	Yes
Routes Specified?	Yes	Yes	No	No	No	No	No	No	Yes	Yes	Yes	Yes

Table 2, Page 1/2

City	Bhubaneshwar	Jaipur	RSRTC (Rajasthan Intercity)	Dehradun	UKSRTC (Uttarakhand Intercity)	Uttar Pradesh+ (P1/P2/P3/P4)	Kolkata New Town	DTC (Delhi)	DMRC North cluster (Delhi)	DMRC East Cluster (Delhi)	Tamilnadu: (8 Cities Intercity)*
Buses tendered	50 (9m)	100 (9m)	50 (12m)	08 (9m) 22 (12m)	15 (9m) 35 (12m)	600 (9m) (4 packages)	100(9m) 50(12m)	300 (12m)	50 (9m)	50 (9m)	525 (9m & 12m)*
Contracted rate per km (INR)	60.22	66.5	53.7	66.78	62.1	62.55	86	NA	64.5	64.5	NA
Contract Duration (Yrs.)	10	10	10	10	10	10	10	12	10	10	16 years
Assured km/ month	6,600 km	6,000 km	18,000 km	5,400 km	6,000 km	5,250 km	5,000 km	5,000 km	4,785 km	4,785 km	Vellore=3,125km/Salem, Tiruchirappalli, Madurai= 3,750km/ Coimbatore, Erode, Tiruppur= 4,100km/ Thanjavur= 3,400km
Time given for bid submission	25 days	10 days	18 Days	13 Days	11 Days	38 days	9m: 11 days 12m: 21 days	23 days	34 days	20 days	27 days
Floor height	900 mm	900 mm	1100-1200 mm	400/650 mm	9m: 650mm 12m: 400mm	400-900 mm	Not mentioned	400 mm	Not mentioned	Not mentioned	600-900 mm
Bus length	12m	9m	12m	9m, 12m	9m, 12m	9m	9m, 12m	12m	9m	9m	9m, 12m
Air-Conditioning?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not mentioned	Not mentioned	Yes
Passenger capacity (D= Driver)	Total= 42 Seating= 31+D	Seating = (30-34)+ D	Seating= 43+D+Co.D	9m: Seating 26-30 12m: Seating 40	9m: Total 35, Seating= 37+D 12m: Total 50, Seating= 35+W+D	Not mentioned	9m: Seating 30+D 12m: Seating 40+D	Seating= 35	9m: Seating 23-34	9m: Seating 23-34	9m: Total 52, Seating= 32+D 12m: Total 70, Seating= 40+D
Time for charging (Overnight/specific hours mentioned?)	Overnight	Overnight	Overnight	Overnight	Overnight	Not mentioned	Overnight	Overnight	Not mentioned	Not mentioned	Overnight
Vehicle utilisation in single charge(km)	260 km	250 km	300 km	9m: 200 km 12m: 200-250 km	9m: 160 km 12m: 200 km	180 km	150 km	140 km	Not mentioned	Not mentioned	Not mentioned
Battery capacity	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned	320-370 kWh
Energy consumption up to which STU will pay, if any?	≤ 1.2 kWh/km.	1.75 kWh/km	Not mentioned	Not mentioned	Not mentioned	Not mentioned	9m: 0.8-0.95 kwh/km 12m: 1.4-1.5 kwh/km	Not mentioned	Not mentioned	Not mentioned	Not mentioned
Opportunity charging (Time allowed)	30 minutes	90 minutes	Not mentioned	Not mentioned	Not mentioned	45-60 minutes	Not mentioned	60 minutes	Not mentioned	Not mentioned	120 minutes
Number of depots	Not mentioned	4	9	1	Not mentioned	1/city	5- 9m 3- 12m	3	1	1	4
Rate Quote with electricity or w/o?	With electricity	With electricity	With electricity	with electricity	with electricity	With electricity	With electricity	With electricity	Not mentioned	Not mentioned	With electricity
Minimum payment	(Payment made for bus km operated)+(Annual Assured Payment Amount for Unutilised Km= (0.35 x (Tm – Ta) x Applicable Kilometre Charge) Tm: Annual Assured Bus Kilometres X No. Of buses operated.	(Payment made for bus km operated)+(Annual Assured Payment Amount for Unutilised Km)	(Payment made for bus km operated)+(Annual Assured Payment Amount for Unutilised Km)	(Payment made for bus km operated)+(Annual Assured Payment Amount for Unutilised Km= (Tm – Ta) x Applicable Kilometre Charge) Tm: Annual Assured Bus Kilometres X No. Of buses operated. Ta:	(Payment made for bus km operated)+(Annual Assured Payment Amount for Unutilised Km)	(Payment made for bus km operated)+(Annual Assured Payment Amount for Unutilised Km= (0.75 x (Tm – Ta) x Applicable Kilometre Charge) Tm: Annual Assured Bus Kilometres X No. Of buses operated.	(Payment made for bus km operated)+(Annual Assured Payment Amount for Unutilised Km)	(Payment made for bus km operated)+(Annual Assured Payment Amount for Unutilised Km)	Not mentioned	Not mentioned	(Payment made for bus km operated)+(Annual Assured Payment Amount for Unutilised Km)

City	Bhubaneshwar	Jaipur	RSRTC (Rajasthan Intercity)	Dehradun	UKSRTC (Uttarakhand Intercity)	Uttar Pradesh+ (P1/P2/P3/P4)	Kolkata New Town	DTC (Delhi)	DMRC North cluster (Delhi)	DMRC East Cluster (Delhi)	Tamilnadu: (8 Cities Intercity)*
	Ta: Actual Bus Kilometres Operated by all Buses			Actual Bus Kilometres Operated by all Buses		Ta: Actual Bus Kilometres Operated by all Buses					
Deduction for under-utilised km	Fleet utilization= 100%: Same as minimum payment otherwise payment will restricted to actual fleet available	Not mentioned	Not mentioned	Fleet utilization= 94%: Same as minimum payment otherwise payment will restricted to actual fleet available	Not mentioned	Same as minimum payment	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned
Escalation mechanism for payment	Revised every 6 months	Revised every 6 months	Revised every 6 months	Revised every 6 months	Revised every 6 months	Revised every 6 months	Revised every 6 months	Revised every 12 months	Not mentioned	Not mentioned	Revised every 6 months
Maximum penalty to operator	Not mentioned	0.25 % of performance security/day subjected to maximum amount equal to bid security.	0.10 % of performance security/day subjected to maximum amount equal to bid security.	0.25 % of performance security/day subjected to maximum amount equal to bid security.	0.10 % of performance security/day subjected to maximum amount equal to bid security.	at the rate of 0.05% of the Performance Security/ day subjected to maximum of 3% of the performance security	0.25 % of performance security/day subjected to maximum amount equal to bid security.	0.25 % of performance security/day subjected to maximum amount equal to bid security.	Not mentioned	Not mentioned	0.25 % of performance security/day subjected to maximum amount equal to bid security.
Payment cycle(15/ 30/ 45/ 60) days	15 days	15 days	30 days	15 days	15 days	15 days	15 days	15 days	Not mentioned	Not mentioned	15 days
Escalation of Electricity charges (Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not mentioned	Not mentioned	Yes
Payment of electricity (Authority/Operator)	Operator	Operator	Authority	Operator	Authority	Operator	Authority	Operator			Operator
Payment of electricity (Authority/Operator)	5% of total project cost.	8.75 Crore	5% of total project cost.	5% of total project cost.	2,00,000/bus	3% of operational cost/year	3% of total project cost.	3% of operational cost/ year	Not mentioned	Not mentioned	3% of total project cost.
Performance Bank Guarantee (PBG) Amount	Full contract period plus 180 days (Same)	Full contract period plus 120 days (same)	Full contract period plus 180 days (Same)	Full contract period (same)	Full contract period plus 180 days(same)	Full contract period + 120 days (increases after 3th, 5th, 7th & 9th year as PS is linked to operational cost)	Full contract period (10% reduction annually)	Full contract period (increases as PS is linked to operational cost)	Not mentioned	Not mentioned	Full contract period (Same)
Bid security deposit	0.25 Crore	3.5 Crore	1.5 Crore	0.67 Crore	0.50 Crore	0.25 crore	1 Crore- 9m 0.50 Crore- 12m	6 Crore	0.50 crore	0.50 Crore	0.05 Crore
O&M: Depots specified?	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Routes Specified?	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes

Abbreviations:

NA: Not Available

PS: Performance security

O&M: Operation & Maintenance

+Uttar Pradesh

- P1-Package 1 = Agra+Aligarh =100+25= 125 (9m) buses
- P2-Package 2 = Bareilly+Gaziabad+Meerut+Moradabad = 25+50+50+25= 150 (9m) buses
- P3-Package 3= Lucknow+Varanasi= 100+50= 150 (9m) buses
- P4-Package 4 = Jhansi+Kanpur+Prayagraj= 25+100+50= 175 (9m) buses

* Coimbatore, Tiruchirappalli, Madurai= 100 buses each; Vellore, Salem, Erode, Tiruppur= 50 buses each; Thanjavur= 25 buses


Pure Electric
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