## EXPERTS:

Lawrence Berkeley National Laboratory

icct THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION

UITP ADVANCING PUBLIC TRANSPORT

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## COMPANIES PARTICIPATED:

Bangalore Metropolitan Transport Corporation; Karnataka Transport Corporation Ltd. Govt. of Goa Undertaking; Delhi Transport Corporation; Association of State Road Transport Undertakings; Karnataka State Road Transport Corporation; MSRTC; Uttar Pradesh State Road Transport Corporation; दिल्ली मेट्रो रेल कॉर्पोरेशन लिमिटेड Delhi Metro Rail Corporation Limited; METRO; SHAKTI SUSTAINABLE ENERGY FOUNDATION; ITDP; SURBANA JURONG; MYTRAH; STEP CENTER FOR STUDY OF SCIENCE, TECHNOLOGY & POLICY; SUN MOBILITY; CSE; KONDODY AUTOCRAFT Driving ahead with innovation.; ALSTOM; EICHER; WORLD RESOURCES INSTITUTE | WRI ROSS CENTER FOR SUSTAINABLE CITIES

## SPECIAL THANKS TO

SHAKTI SUSTAINABLE ENERGY FOUNDATION

**International Association of Public Transport (UITP) is a passionate champion of sustainable urban mobility and has over 1,400 members in 96 countries throughout the world and represents the interests of key players in this sector. Its membership includes transport authorities, operators, both private and public, in all modes of collective passenger transport, and the industry. UITP India Regional Office was established in 2007, and working for the advocacy of public transport in India.**

The report was prepared by UITP India Office Team.

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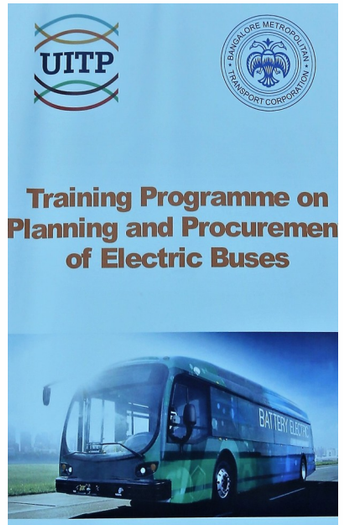
UITP INDIA

UITP ADVANCING PUBLIC TRANSPORT

# UITP TRAINING PROGRAMME ON ELECTRIC BUSES

## BANGALORE, KARNATAKA | 11-12 FEBRUARY 2019





# TAKEAWAYS AND RECOMMENDATIONS REPORT

**ORGANISED BY**

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## INTRODUCTION

Indian Cities are faced with numerous challenges during the course of planning and procurement of these electric buses. Towards addressing some of these challenges, International Association of Urban Transport (UITP), supported by Association of State Road Transport Undertaking (ASRTU) and Shakti Sustainable Energy Foundation (SSEF) organized a training program on 'Planning and Procurement of Electric Buses' in Bangalore between **February 11 and 12, 2019**.

The training programme brought together more than **60 participants** representing **30 organisations** comprising of State Transport Undertakings, Special Purpose Vehicles (SPVs) managing city buses, manufacturers, think-tanks and consultants. Indian and International experts with extensive experience in electric bus sector delivered lectures on a wide range of planning and procurement issues.

The training program was **inaugurated by Sri. D C Thammanna, Minister of Transport, Government of Karnataka** and Inaugural address by Sri N A Haris, Chairman, BMTC. Dr. N V Prasad (Managing Director, BMTC) gave welcome note. Capt. Ratnaparkhi,(Executive Director, ASRTU) and Ms. Rupa Nandy, (Head of UITP India) gave introductory remarks on the event.

There were **7 technical sessions** and **2 workshops** chaired under the panel of **Mr. Jen Fongers** (Fongers Folio B. V., Netherlands), **Dr.Ray Minjares** (ICCT), **Dr. Nikit Abhyankar** (LBNL) **and Mr. C K Goyal** (DIMTS) to cover the following topics on

Different configurations of electric buses (Buses, Charging infrastructure, Battery, Battery management system)

a) Components of charging infrastructure and its guidelines for installation

b) Types of procurement of electric buses and tender structure

c) Techno economic analysis of electric buses

d) The challenges and opportunities faced during implementation of electric buses in Delhi

## KEY TAKEAWAYS

UITP would like to compile some of the key takeaways from the programme future actions



- **Gross Cost Contract** model is the preferred model for the implementation of electric buses since this is an emerging technology in India which requires time to learn and develop protocols and strategies for the successful implementation.

- In FAME I scheme, the selection of cities for the scheme was based primarily based on population of city .The **level of pollution** in the city and the **previous efforts** taken by the city towards the implementation of electric buses have also to be explored while city selection.

- The configuration of the vehicle i.e. standard size (12m) or midi (9m), air conditioning, battery and range requirements etc. were the parameters considered for setting bidding criteria of electric buses .Along with these parameters, the **efficiency of the battery** is also an important criteria to be considered.

- Certain amount of subsidy may be allocated for **research, development and innovations** in electric bus technology during FAME II scheme to enhance the customised manufacturing of electric buses and its components to Indian conditions.

- **Various Public Sector** Undertakings (PSU) can play an active role in providing infrastructure for electric bus deployment. For example NTPC limited (India) is currently supporting Bhopal Smart City to provide charging infrastructure.

- The **Government of India (GoI )** may provide **capital subsidy** for fixed assets like buses, charging infrastructure etc. while the **State Governments** can provide **reciprocal subsidies** through lower tariff on electricity to reduce operating cost of the electric buses. Also In addition to the upfront capital subsidy, making low interest financing available to cities is likely to scale up electric bus deployment sooner

- The **charging infrastructure** should ideally be developed as **an interoperable system** across bus manufacturers. However, the cost of switching between charging infra technologies may not be very high.

- **Scaling up of purchase** of electric bus will eventually reduce the cost of the electric buses .For example by providing more subsidies for purchase, popularised the electric bus market in China which scaled the volume of electric buses in China, which **reduced the cost** simultaneously.

- **Minor investment** will be sufficient to manage the grid impact on power distribution systems due to extra power load required for the operation of electric buses.

- The depot charging and opportunity charging are two operating strategies of charging electric buses. For city buses, **opportunity charging** has been identified as a suitable operational strategy.

- The development of a robust charging infrastructure network is widely considered a key requirement for a large-scale transition to electric mobility. Government of India has issued **guideline and specifications** for charging infrastructure to ensure the optimal distribution and supply of the power for the electric buses in December 2018.

- Significant variations was found among the bidding criteria's across the cities during the phase I of FAME scheme, hence Formation of a **central nodal agency** for determining the operational parameters and other specifications and thus to harmonise the bidding criteria's across the cities will help to reduce uncertainties in the bidding process.

## WAY FORWARD

A National level working group on 'Electric buses for India' was launched on the sidelines of the UITP training program on 'Planning and procurement of electric buses. The working group includes key Government officials promoting electric mobility throughout India, representatives of State Road Transport Undertakings (SRTUs), professionals from academia and think-tanks promoting electric mobility.The working group will act as a knowledge sharing platform for various city bus agencies including but not limited to energy performance of implemented electric buses, exchanging notes on tendering structures and their bids and meet periodically to advance other opportunities As a first step, the group agreed to exchange information with each other on the performance of the electric buses inducted through the FAME I scheme. The next working group meeting will be focused on specific opportunities like tendering operations ,planning, charging infrastructure etc. which will help accelerate e-bus deployments across India.