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GREEN RECOVERY CHALLENGE FUND

MARCH 2023

TRAINING AND CAPACITY BUILDING REPORT

Learnings from National and International visits

Supported by
Ahmedabad Municipal Corporation
and District Collectorate Mehsana

CRDF CEPT RESEARCH AND DEVELOPMENT FOUNDATION
CEPT UNIVERSITY
UNIVERSITY OF LEEDS
Brunel University London
GERMI GUJARAT ENERGY RESEARCH AND MANAGEMENT INSTITUTE

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ABOUT UK PACT
Project Partners

UK PACT (UK Partnering for Accelerated Climate Transitions) is a programme funded by the Secretary of State for Business, Energy and Industrial Strategy, Government of UK. This programme supports countries that strive to overcome barriers to clean growth and have high emissions reduction potential to accelerate their climate change mitigation efforts.

Under the UK PACT funding, CRDF-CEPT University, Gujarat Energy Research Management Institute (GERMI), University of Leeds and Brunel University, UK are supporting Ahmedabad Municipal Corporation and District Collectorate Mehsana on the project "Strategy and action plan for electrification of public transport and intermediate public transport".

PROJECT DESCRIPTION

Ahmedabad Municipal Corporation and District Collectorate Mehsana are the key stakeholders, and are taking ownership of the project. Hence, training and capacity building of city stakeholders was a critical component of the project. This report presents the key findings of two training programs through national and international study visits conducted for these officials under the UK PACT project.

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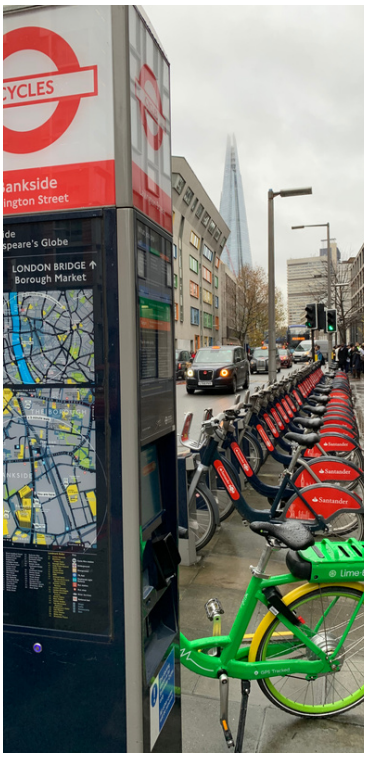
INTRODUCTION

The cities of Ahmedabad and Mehsana are in the process of implementing the project "Strategy and action plan for electrification of public transport and intermediate public transport" along with other sustainable transport strategies. To further support the cities in this endeavour, the project team organised training programs for the officials of Ahmedabad Municipal Corporation, District Collectorate Mehsana and other key stakeholders in the respective cities.

The objective of the training program was to create, enhance and develop capacity at the institutional level to carry out sustainable transport strategies including electrification strategies. To achieve this objective, selected delegates from both cities were taken on national and international study visits. The cities selected for the national study visits were Bengaluru and Bhubaneswar and London, United Kingdom for the international study visit. These cities were selected based on inputs from the case cities and the sustainable transport strategies/initiatives implemented.

The main questions that were addressed through these study visits were:
a) What are the various sustainable transport strategies adopted by applicability of the initiatives for the cities.
b) How can these sustainable transport strategies be adapted for Ahmedabad and Mehsana?



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INTRODUCTION

Agenda of national study visits

The national study visits were conducted across four days from 5th September to 9th September 2022 for nine delegates from Ahmedabad and Mehsana. The details of the selected delegates are given in Annexure 1.The first two days were spent in Bengaluru and the remaining two were spent in Bhubaneswar. The day-wise agenda of the national study visit is presented below:

Day 1- 5th September 2022

- Meeting with Bengaluru Metropolitan Transport Corporation (BMTC) on bus operations in Bengaluru
- Visit to Bangalore Metro Rail Corporation Limited's (BMRCL) Namma Metro
- Intelligent Transport Systems (ITS) technology and control room visit

Day 2- 6th September 2022

- Visit to Sun Mobility Private Limited
- Exploring multi-modal integration in and around metro stations (Shanthinagara TTMC & Majestic) in Bengaluru
- Visit to Majestic Multi Modal Hub (Traffic Transit Management Centres (TTMC))
- Intelligent Transport Systems (ITS) technology and control room visit

Day 3- 7th September 2022

- Bus operations and innovations, gender mainstreaming and initiatives taken by Capital Region Urban Transport (CRUT), Bhubaneswar
- IPT operations in Bhubaneswar

Day 4- 8th September 2022

- Site visit to E-Bus depot
- Discussion on Integration of IPT with bus services
- Operating model & discussion with beneficiaries and officials

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INTRODUCTION

Agenda of international study visit

The international study visit to London were conducted across four days from 13th March to 16th March 2023 for five delegates from Ahmedabad and Mehsana. The details of the selected delegates are given in Annexure 2. The study visit comprised of technical presentations from Transport for London (TfL), guided tours of transport infrastructure facilities and self tours to experience the city's transport facilities on their own. The day-wise agenda of the international study visit is presented below:

Day 1- 13th March 2023

- Overview of TfL's services and how TfL is set up and run
- Presentation on the London Congestion Charge and the Ultra-Low Emission Zone
- Briefing on challenges and opportunities of electric scooters and electric bike hire for London, and TfL's trials

Day 2- 14th March 2023

- A self tour using wide-ranging multi-modal transport in London (using bus, Elizabeth Line, tube, rail etc) with information on integration and customer experience.
- A session on multi-modal interchanges, their operation and customer experience
- A session on Healthy Streets and active travel as well as further information on TfL policy in this area
- Presentation on how TfL has integrated tickets and how the data is used.

Day 3- 15th March 2023

- Briefing looking at on-street and off-street infrastructure for car electrification including business models and market responses
- TfL's experience with the operation of bus infrastructure including electric buses
- Presentation on TfL's consideration of bus route rationalisation and lessons learnt

Day 4- 16th March 2023

- Briefing on urban regeneration from the perspective of Transportation
- Tour of Olympic Park

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NATIONAL STUDY VISITS

Sustainable mobility strategies adopted by Indian cities

Case city - Bengaluru

Day 1: It began with a visit to BMRCL's Namma Metro and experienced the metro ride.

The meeting with BMTC started with an introduction of the UK PACT project by Dr. Shalini Sinha, Center Head, Center of Excellence in Urban Transport, CRDF.

The opening session was followed by presentations on BMTC by Mr A.V. Surya Sen, IFS., Director (Information Technology), BMTC, Bengaluru. He touched upon the evolution of public bus transportation in the city and highlighted the city's aim to overcome every challenge emerging from PT electrification actions.

BMTC PT Operational Characteristics :

	2022 (Post-Covid)	2019 (Pre-Covid)
Fleet Size	6,690	6,690
Operational Km (in millions)	1.11	0.98 (In lakhs)
Passengers carried (in millions)	2.71 (In lakhs)	3.31 (In Lakhs)

Electric bus characteristics :

Electric Fleet

90 E-buses of 9mtr. (Non-A.C)

120 KW Fast chargers (3 each) in each depot

120 kms Operated kms in single charge

300 Additional E-buses by October 2022

The main focus of the discussions between the delegates and BMTC officials was on charging technology, trade-offs between range & battery size, opportunity charging, energy efficiency, the role of e-bus manufacturer & specifications, etc. The discussions also highlighted future strategies and initial thoughts on formulating institutional strategy.

Day 1 ended with a visit to Intelligent Transport Systems (ITS) technology and control room in the city.

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NATIONAL STUDY VISITS

Sustainable mobility strategies adopted by Indian cities

Case city - Bengaluru

Day 2 began with a visit to SUN Mobility which works on universal energy infrastructure and services which enables electric vehicles to be recharged conveniently in a faster and cheaper way. The delegates were given a tour of battery swapping stations and discussions took place with representatives of Sun mobility regarding their projects and level of electrification of IPT.

- Sun mobility is developing a retrofitting model costing Rs. 32000 which can convert a lead acid battery to lithium iron battery.
- They provide charging station services and battery swapping centers at National Capital Region (75), Delhi (54), Bengaluru (100), etc. At these facilities, unlimited swapping unlimited swapping can be done for a cost of Rs.15000.
- They are exploring retrofitting for converting CNG auto rickshaw to E-auto.

The representative elaborated on how other countries are investing in swapping-based electric batteries for IPT and PT. Some of the examples highlighted were:

- Gogoro, Taiwan - working on two wheeler electrification,
- Neo - China - working on four-wheeler segment
- Beijing and Shanghai, China - 100 swap stations have been implemented.
- Within India, Jaipur has developed a retrofit model for IPT with the help of Volta company.

After the meeting, delegates visited ITS technology and control room, Yeshwantpura depot number 8, Shanthinagara and Majestic multi-modal hub (TTMC).

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NATIONAL STUDY VISITS

Sustainable mobility strategies adopted by Indian cities

Case city - Bhubaneswar

On Day 3, the delegates visited CRUT office, Bhubaneswar as part of an official visit under the UK PACT project. The were welcomed by CRUT's General Manager (P&A), Dipti Mahapatro.

- The opening session was followed by presentations and videos illustrating various initiatives of CRUT, with emphasis on operations of its EV fleet and gender-inclusive strategies.

- The CRUT presentations were followed by discussions on operations of 265 buses particularly CRUT's 10 E-buses and IPT electrification. Funding and financials were also discussed.

- The discussions was followed by a presentation on auto-rickshaw operations. CRUT's E-auto project and gender inclusive strategies in IPT sector was then discussed along with implementation challenges faced by CRUT. Planning and implementation points were identified which could be adopted in Mehsana.

On Day 4, delegates visited Patrapada Mo Bus Depot (E-bus) and interacted with depot managers and employees, including lady conductors. They also rode on Mo E-Ride to get an understanding of route coverage. Gross-cost contract (GCC) based model employed to provide last-mile connectivity with E-auto was presented. It has a unique operating GCC for E-Auto in India. The President of the Mehsana District Autorickshaw Association engaged in discussions with CRUT officials and said this could also be implemented in Mehsana. The integration of Intermediate Public Transport (IPT) with bus services was discussed during the meeting. Passengers benefit from improved connectivity, better journey planning, and reduced waiting times, making public transportation a more appealing option.

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LEARNINGS FROM NATIONAL STUDY VISITS

Takeaway for Ahmedabad and Mehsana

- Bus priority measures are a way to help buses move on congested roads. BMTC had implemented bus priority lanes in the city on a pilot basis (pre-Covid). This has now been dismantled due to metro construction work happening on major corridors.

- The applications and benefits of employing the GCC model for e-buses and e-autos by BMTC and CRUT could be explored by other cities.

- The importance of providing last-mile connectivity services was highlighted through BMTC's metro feeder services and CRUT's Mo E-Ride and Mo Bus services which help in increasing PT ridership. BMTC and BMRCL also have a tie-up to develop foot-over bridges, offering ridership benefits to both the PT systems.

- Strong branding of CRUT's PT and IPT system using social media and newspapers is a key takeaway.

- CRUT upholds gender inclusions as an important element in its operations. CRUT employs gender-inclusive policies in its recruitment processes and has recruited transgenders and women as drivers and conductors. Seats reserved for women have been demarcated in pink color to highlight and separate them from the rest of the seats.

- TTMC is an integration initiative by the state government that can be replicated for better infrastructure. They generate 10% of revenue by giving out infrastructure on lease, which is allocated towards public transport.

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LEARNINGS FROM NATIONAL STUDY VISITS

Takeaway for Ahmedabad and Mehsana

- A single agency for managing all PT operations in the city is beneficial for planning, implementing and operating PT in a city. CRUT is the primary agency providing PT services within Bhubaneswar, Cuttack and Puri.

- A well-established institutional framework plays an important role in the smooth and successful running of PT establishments. BMTC has an institutional setup comprising of Chairman, Vice-Chairman, and Board of Directors responsible for its governance.

- Cities can explore various funding schemes and financial sources for PT, such as smart city schemes, FAME and Nirbhaya. FAME was only available for GCC model. BMTC is sourcing funds from Ministry of Heavy Industries (Rs.52.42 lakh per bus), Government of Karnataka (Rs. 33.33 lakh per bus) and Bengaluru Smart City Ltd. hall be providing financial assistance of Rs.50 crores for operation of 90 e-buses (an incentive of Rs.50 lakh per bus for bidder and Rs.5.00 crores shall be spent by BMTC on installing charging infrastructure).

- Electrification of buses is a priority for BMTC and CRUT. BMTC is operating e-buses on a GCC rate of Rs.51.67 per km with electricity and has negotiated for an uninterrupted power supply with DISCOM. Additionally, BMTC has identified seven charging points in the city for opportunity charging.

- Operating various tailor made services helps caters to varied needs of the passengers. BMTC operates Vajra service, Vayu-vajra, Bangalore Rounds, charted & dedicated services, and metro feeder services along with various types of commuter passes.

- Both CRUT and BMTC consider passenger satisfaction to be of importance. CRUT employs continuous staff training under Bus Pathshala initiative. BMTC is active in resolving passengers' complaints through different sources such as phone calls, WhatsApp messages, Twitter, and mobile applications. CRUT is also active on social media and uses it to share information on new routes, resolve complaints, etc.

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INTERNATIONAL STUDY VISIT

Sustainable mobility strategies adopted by Transport for London

The international study visit to London provided an opportunity for city officials to learn about the strategies and challenges of operating from one of the world's largest transportation networks. On Day 1, TfL representatives gave an introduction to the organization, overview of TfL's services with respect to PT operations, road network operations and customer experience. They explained in detail various PT modes plying in London (such as buses, underground, heavy rail, etc.) and how they manage the road network on a daily basis using control centre, asset operations, monitoring network performance and roadworks planning and permits. The initiatives aimed at reducing air pollution, mainly the Congestion and Emission Charging zones and Travel Demand Management (TDM) were detailed out. The importance of creating a good PT experience and customer experience through world class multi-modal integration was also highlighted. Experiences of TfL's journey with electric scooters and electric bike hire for London was also detailed along with challenges faced and future opportunities. The delegates also met with team members Mr. Chun Sing Lai, Prof. Ronghui Liu from project partners - Brunel University London and University of Leeds.

Day 2 began with a self tour of the city where the delegates explored and experienced London as a tourist using various PT modes, way finding, healthy street (NMT) infrastructure, seamless interchanges. The technical presentations on Day 2 focused on The Mayor's Transport Strategy, healthy streets, multi-modal interchanges (design principles, best practices), integrated fares and data applications, TfL's current projects and interactive discussions. The self tour experience of the delegates was also discussed and the key points such was wayfinding, travel times, PT waiting time, availability of travel information, etc. were touched on.

From left: Mr. Vishal Khanama, Mr. Khelan Modi, Dr. Shalini Sinha, Mr. Chun Sing Lai, Prof. Ronghui Liu, Mr. Arjav Shah, Mr. Devang P. Desai, Mr. R.L.Pandey

Day 3, focused on London's Electric Vehicle Infrastructure Strategy (EVIS) project (including challenges, modelling techniques, lessons learned, etc.), zero emission bus infrastructure, restructuring of central London bus network, etc.

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INTERNATIONAL STUDY VISIT

Sustainable mobility strategies adopted by Transport for London

On Day 4, TfL presented their urban and transport planning policies, urban regeneration from the perspective of transportation, strategic models and current work areas. This was followed by an interactive discussion and a guided visit to Olympic park facility in the city.

The Mayor's Transport Strategy (MTS) sets out the overarching goals for London's transport network

The Three Pillars of the MTS Themes

Healthy Streets and healthy people (NMT Infrastructure – active mobility)

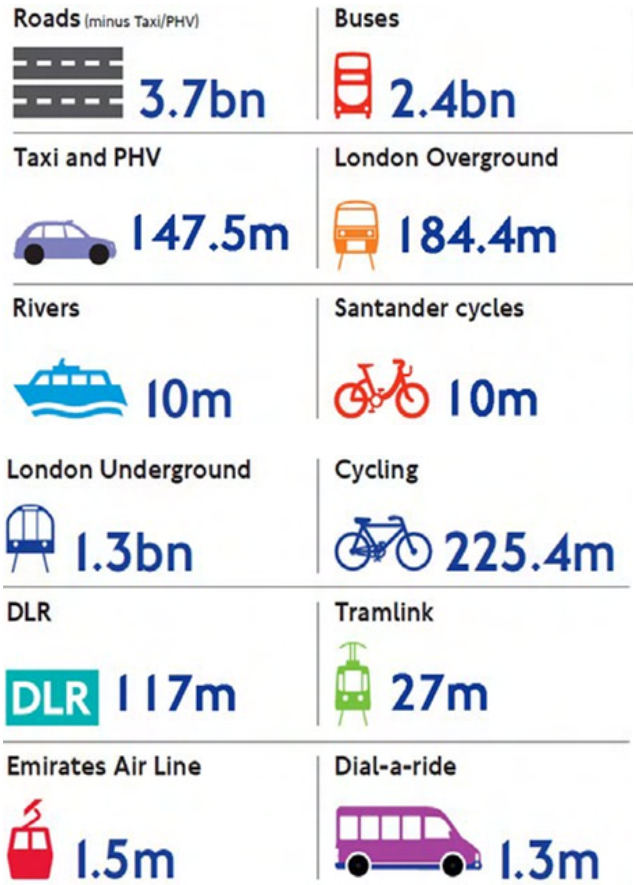
A good public transport experience (Service quality)

New homes and jobs (new development/ re-development of land use as TOD)

Strategies Under MTS

- To encourage more people to use public transport, walking and cycling
- Vision Zero for road danger by 2041
- Fewer private car trips by 2041
- 20 minutes of active travel per day for everyone by 2041
- Zero emission transport network by 2050
- Increase bus speeds by 5-15% by 2041

Mode wise TfL journeys per Year (Pre-pandemic)



LEARNINGS FROM INTERNATIONAL STUDY VISIT

Takeways for Ahmedabad and Mehsana

- London is an excellent case study for the successful formation of an Integrated Transport Authority. TfL (Transport for London) have restructured their operations from two bodies (London Underground and Surface Transport) to a single body strengthening institutional integration.
- Mayor's Transport Strategy for London lays down direction and guidance for the city's transport facilities and initiatives.
- The contracting for operating public buses in London is carried out with clearly defined responsibilities for the contractor which includes training of staff, traffic management, etc.
- TfL is prioritising healthy streets promoting walking and cycling as sustainable and active lifestyle choices. TfL is investing in a range of initiatives such as safer junctions, safe cycle routes, pedestrian crossings, bus priority measures, lower speed limits, low traffic neighborhoods, school streets, etc.
- Working with boroughs on a local level delivering local schemes is part of TfL's effective working strategy. For example, to increase residential charging, Local EV Infrastructure (LEVI) fund provides money to boroughs as part of electrification strategy.
- The TDM data is analysed and insights (internal and external) are used to work out how customers are travelling, how demand can be spread on TfL network and to forecast trends aiding project planning.

- Stakeholder engagement, though challenging, is a significant process. It is necessary to consult and ensure the buy-in of stakeholders - operators, boroughs, energy providers, transport operators, consortium retailers, logistics partners, etc.
- Customer experience is paramount and multi-modal integration plays a key role in this. Live travel information is provided to citizens through its own services and third-party organizations.
- TfL is committed to reducing carbon emissions and promoting greener modes of transport. London Congestion Charge and Ultra Low Emission zone are commendable strategies that can be adopted by cities across the world.
- Electrification strategies are being implemented by TfL for both PT modes as well as private modes. Electric Vehicle Rapid Charging Hub is being developed to invest in the deployment and operation of rapid charging hubs on TfL's property estate for commercial benefit. On-street and off-street infrastructure for car electrification is being taken up based on business models and market responses.
- Multi-modal interchanges must be developed based on design principles to ensure seamless transfers and to improve PT journey experiences.

Ten Principles of Healthy Streets

- Pedestrians from all walks of Life
- People choose to walk, cycle and use public transport
- Clean Air
- People feel safe
- Not to noisy
- Easy to cross
- Places to stop and Rest
- Shade ad shelter
- People feel relaxed
- Things to see and do

FEEDBACK

National and International visit

> It was an enlightening experience to learn about the cost-saving and eco-friendly benefits of electric buses. I learned during my national visit that operating an electric bus costs only Rs. 5 per unit and can travel non-stop for 150-160 km. Such operations ensures significant amount of savings that can be used for purchase of electric buses along with its subsidy.

MR. PRAHLADBHAI PATEL
CHAIRMAN, TRANSPORT AND GARAGE, MEHSANA NAGARPALIKA, MEHSANA

> Engagement of citizens and the government is crucial in planning an efficient public transportation system, as they are the key stakeholders. We as a State government transport department closely connected with all the public transport service providers.

MR. NILESH V PARMAR
ASSISTANT REGIONAL TRANSPORT OFFICER (ARTO), AHMEDABAD

> I have learned a commitment to collaboration and continuous improvement, which can ultimately benefit citizens and communities.

MR. JIGAR K PATEL
ASSISTANT REGIONAL TRANSPORT OFFICER (ARTO), MEHSANA

> The national visit has showcased the possibility of retrofitting CNG vehicles to electric. I am eagerly waiting for availability of such technology in our city which will be helpful for all the auto drivers to shift from CNG auto to electric auto.

MR. BHARAT SINGH SOLANKI,
PRESIDENT, AUTO RICKSHAW ASSOCIATION, MEHSANA

> To ensure sustainable development, prioritization of transit development and its integration with urban development is essential. The international visit has showcased that effective teamwork can create wonders with proper planning, clear objectives, strong communication, clarity on individual roles/responsibilities, and efficient management.

MR. DEVANG DESAI
CHIEF EXECUTIVE AUTHORITY, AUDA, AHMEDABAD

> Training program as such provides exposure, shows real life examples and helps us to understand possible strategies that can be implemented in my city with institutional integration at a detailed level

MR. SHAH ARJAV JAGDISHKUMAR
DY. COMMISSIONER, AMC, TRANSPORT MANAGER, AMTS
EXECUTIVE DIRECTOR, AJL, AHMEDABAD

> My takeaway is to implement integration of bus services, that is, AMTS & BRTS with fare integration and proper route planning.

MR. VISHAL KHANAMA
DEPUTY MUNICIPAL COMMISSIONER & GENERAL MANAGER (AJL), AHMEDABAD

> PT Integration is a must and opportunity areas has to be identified and developed.

MR. VALLABHBHAI PATEL
TRANSPORT COMMITTEE CHAIRMAN, AHMEDABAD MUNICIPAL CORPORATION

> "Proper planning of Multimodal interchanges is necessary and one can learn from London's examples through their planning and design guidelines"

MR. RL PANDEY
DEPUTY TRANSPORT MANAGER (GENERAL), AMTS, AHMEDABAD

CONCLUSION

The study visits facilitated the delegates to experience a first hand basis on various sustainable transport strategies implemented by Bengaluru, Bhubaneswar and London. The aim of the study visits was to help draw lessons from case cities and to facilitate discussions between the delegates and officials/experts from the case cities regarding their experience (opportunities and challenges) on implementing various transport strategies including electrification of PT and IPT.

The training was well received by the delegates and have taken away lessons for application in their respective cities. The study visits also helped in cross-learning and dissemination of the various initiatives taken up under the "Strategy and action plan for electrification of public transport and intermediate public transport" in Ahmedabad and Mehsana.

Annexure 1

LIST OF PARTICIPANTS FOR NATIONAL VISITS

High-level officials from transport and urban development organisations and representatives of IPT associations from Ahmedabad and Mehsana attended national study visits.

Mr. Vishal Khanama
Deputy Municipal Commissioner & General Manager (AJL), Ahmedabad

Mr. RL Pandey
Deputy Transport Manager (General), AMTS, Ahmedabad

Mr. Nilesh V Parmar
Assistant Regional Transport Officer (ARTO), Ahmedabad

Mr. Jigar K Patel
Assistant Regional Transport Officer (ARTO), Mehsana

Mr. Prahladbhai Patel
Chairman, Transport and Garage, Mehsana Nagarpalika, Mehsana

Mr. Bharat Singh Solanki
President, Auto Rickshaw Association, Mehsana

Annexure 2

LIST OF PARTICIPANTS FOR INTERNATIONAL VISIT

High level officials from transport and urban development organisations from Ahmedabad attended the international study visit.

Mr. Devang Desai
Chief Executive Authority, AUDA, Ahmedabad

Mr. Shah Arjav Jagdishkumar
Dy. Commissioner, AMC
Transport Manager, AMTS
Executive Director, AJL, Ahmedabad

Mr. Vishal Khanama
Deputy Municipal Commissioner & General Manager (AJL), Ahmedabad

Mr. Vallabhbhai Patel
Transport Committee Chairman, Ahmedabad Municipal Corporation, Ahmedabad

Mr. RL Pandey
Deputy Transport Manager (General), AMTS, Ahmedabad

Annexure 3

PROJECT TEAM

The team from the University of Leeds and Brunel University had attended the international study visit. The project members from Center of Excellence in Urban Transport, CRDF, CEPT University had been in both the international and national study visit..

Dr. Ronghui Liu
Professor, Institute for Transport Studies, University of Leeds, UK

Chun Sing Lai
Lecturer, MSc Electric Vehicle Systems at Brunel University London

Dr. Shalini Sinha
Centre Head, Centre of Excellence in Urban Transport (CRDF), Ahmedabad

Mr. Khelan Modi
Project Manager, Centre of Excellence in Urban Transport (CRDF), Ahmedabad

Ms. Pooja Paghadar
Senior Transport Planner, Centre of Excellence in Urban Transport (CRDF), Ahmedabad

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