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IMPLEMENTATION COMPLETION AND RESULTS REPORT

< TF-18577 >

ON A

GRANT

IN THE AMOUNT OF US\$9.15 MILLION

TO THE

Republic of India

FOR THE

Efficient & Sustainable City Bus Services
{September 27, 2021}

Transport Global Practice
South Asia Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective {May 30, 2021})

Currency Unit = Indian Rupee (INR)

INR 74.36 = US\$1

US\$0.013 = INR 1

FISCAL YEAR

April 1 – March 31

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ABBREVIATIONS AND ACRONYMS

AFCS	Automatic Fare Collection system
AVLS	Automatic Vehicle Location system
BAU	Business as Usual
BCLL	Bhopal City Links Limited
CBS	City Bus Services
CTU	Chandigarh Transport Undertaking
ESCBS	Efficient and Sustainable City Bus Services
ESMAP	Energy Sector Management Assistance Program
GEF	Global Environment Facility
GHG	Green House Gas
GPS	Global Positioning System
ITS	Intelligent Transport Systems
IPT	Intermediate Public Transport
JCTSL	Jaipur City Transport Services Limited
KMPL	Kilometer per Litre
MBMC	Mira Bhayander Municipal Corporation
MIS	Management Information System
MoEF&CC	Ministry of Environment, Forest and Climate Change
MoHUA	Ministry of Housing & Urban Affairs
MORTH	Ministry of Road Transport and Highways
NAPCC	National Action Plan for Climate Change
NUTP	National Urban Transport Policy
OSD	Officer on Special Duty
PC	Project Component
PDO	Project Development Objective
PPP	Public-Private Partnership
PIA	Project Implementing Agency
PIS	Passenger Information System
PIU	Project Implementing Unit
PMU	Project Management Unit
PMC	Project Management Consultant
RAS	Reimbursable Advisory Services
RSRTC	Rajasthan State Road Transport Corporation
STU	State Transport Undertaking
SUTP	Sustainable Urban Transport Project
TA	Technical Assistance
TOR	Terms of Reference

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DATA SHEET

BASIC INFORMATION

Product Information

Project ID	Project Name
P132418	Efficient & Sustainable City Bus Services
Country	Financing Instrument
India	Investment Project Financing
Original EA Category	Revised EA Category
Partial Assessment (B)	Partial Assessment (B)

Organizations

Borrower	Implementing Agency
Republic of India	Ministry of Housing and Urban Affairs (erstwhile Ministry of Urban Development)

Project Development Objective (PDO)

Original PDO

The project's Global Environment Objective (GEO) is to improve the efficiency and attractiveness of city bus transport and reduce greenhouse gas emissions in the demonstration cities.



FINANCING

	Original Amount (US\$)	Revised Amount (US\$)	Actual Disbursed (US\$)
World Bank Financing			
TF-18577	9,200,000	9,149,055	9,149,055
Total	9,200,000	9,149,055	9,149,055
Non-World Bank Financing			
Borrower/Recipient	103,800,000	73,850,000	73,850,000
Total	103,800,000	73,850,000	73,850,000
Total Project Cost	113,000,000	82,999,055	82,999,055

KEY DATES

Approval	Effectiveness	MTR Review	Original Closing	Actual Closing
09-Dec-2014	29-Aug-2016	28-Aug-2017	31-Dec-2018	30-Dec-2020

RESTRUCTURING AND/OR ADDITIONAL FINANCING

Date(s)	Amount Disbursed (US\$M)	Key Revisions
02-Nov-2018	1.15	Change in Results Framework Change in Disbursements Arrangements
28-Dec-2018	2.11	Change in Results Framework Change in Loan Closing Date(s) Change in Implementation Schedule
30-Sep-2019	2.80	Change in Components and Cost Reallocation between Disbursement Categories Change in Implementation Schedule
24-Dec-2019	4.13	Change in Loan Closing Date(s) Change in Implementation Schedule
28-Sep-2020	5.89	Change in Loan Closing Date(s) Reallocation between Disbursement Categories

KEY RATINGS

Outcome	Bank Performance	M&E Quality
Moderately Satisfactory	Moderately Satisfactory	Modest



RATINGS OF PROJECT PERFORMANCE IN ISRs

No.	Date ISR Archived	DO Rating	IP Rating	Actual Disbursements (US\$M)
01	30-Mar-2015	Satisfactory	Satisfactory	0
02	08-Oct-2015	Satisfactory	Satisfactory	0
03	08-Jun-2016	Moderately Unsatisfactory	Moderately Unsatisfactory	0
04	19-Oct-2016	Moderately Satisfactory	Moderately Unsatisfactory	0
05	30-Mar-2017	Moderately Satisfactory	Moderately Unsatisfactory	0
06	21-Jul-2017	Moderately Satisfactory	Moderately Unsatisfactory	0
07	15-Dec-2017	Moderately Satisfactory	Moderately Unsatisfactory	.29
08	12-Jun-2018	Moderately Satisfactory	Moderately Satisfactory	.89
09	10-Jan-2019	Moderately Satisfactory	Moderately Satisfactory	2.11
10	23-Apr-2019	Moderately Unsatisfactory	Moderately Unsatisfactory	2.14
11	16-Dec-2019	Moderately Unsatisfactory	Moderately Satisfactory	3.76
12	17-Jun-2020	Moderately Satisfactory	Moderately Satisfactory	5.86

SECTORS AND THEMES

Sectors

Major Sector/Sector (%)

Transportation 100

Urban Transport 97

Public Administration - Transportation 3

Themes

Major Theme/ Theme (Level 2)/ Theme (Level 3) (%)



Private Sector Development	2
Jobs	2
Job Creation	2
Human Development and Gender	5
Gender	5
Urban and Rural Development	69
Urban Development	67
Urban Infrastructure and Service Delivery	67
Rural Development	2
Rural Infrastructure and service delivery	2
Environment and Natural Resource Management	25
Climate change	25
Mitigation	25

ADM STAFF

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I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES

A. CONTEXT AT APPRAISAL

Country Context

1. **Indian cities were (and still are) urbanizing steadily and were straining their transportation systems.** With an additional 10 million urban dwellers per year, India's rapid economic growth was accompanied by an unprecedented urban and spatial transformation. Urban transport demand in Indian cities was met by a range of modes – public, private, and personal - and cities experienced a poor public transit share, severe congestion, deteriorating road safety, and increasing air pollution and GHG emissions.

2. **At the time of project preparation, clear evidence had emerged on the rapidly declining public transport mode share.** With reduced efficiency, availability, and accessibility of bus services, cities witnessed a drastic increase in private vehicle share. In cities with a formal bus system, the bus routes operated had not kept pace with the changes in travel demand. Further, awareness of the correlation between efficient urban transit and climate change mitigation, as well as an awareness of the country's climate commitment, was still at nascent level within city governance. To reverse this vicious cycle had become a national priority.

3. **Land for bus depots was difficult to locate in cities due to multiple factors, and many of the existing depots were operated with minimal or no equipment, resulting in poorly maintained fleets, higher fuel consumption¹ and fast depleting buses.** A National Bus Funding Scheme was launched in 2009² and a follow-up Scheme II in 2013-14 which led to many new cities launching bus services. These services were often launched without developing the requisite depot capacity and resulted in poorly maintained and rapidly depreciating fleets well before their productive life. Modern depot equipment was not in use even in well-established state transport undertakings. Very little progress was made in terms of deploying and successfully operationalizing intelligent transport systems (ITS) in city public transport systems. Building capacity among the newly created special purpose vehicles was another immediate priority. Inefficient, poorly planned, and operated buses impacted women disproportionately, as women compared to men, are more dependent on public transit.

4. **The “National Bus Funding Scheme 2009” (Phases I & II) of Government of India, was the Baseline Project³ based on which a larger GEF funded project was being envisaged.** Phase I included the procurement of 15,260 modern buses across the country for US\$1,020 million; however, implementation of supporting infrastructure, such as depots, workshops, and ITS/ MIS integration was delayed. Although Phase II attempted a reorientation towards depot infrastructure and ITS, its tight implementation timelines limited course correction opportunities. Multiple cities under the Scheme had constituted separate special purpose vehicles (SPVs) to operate buses, but these were not well resourced in terms of staff and finances. A growing need was felt to fund the incremental costs of activities aimed at enhancing energy efficiency, the quality of city bus services and overall sustainability.

5. **The GEF financed Efficient and Sustainable City Bus Services (ESCBS) Project was developed to improve the efficiency and attractiveness of City Bus Services in India.** The project was conceptualized around Tier 2 cities (population between 1-4 million), with Bhopal, Chandigarh, Jaipur, and Mira Bhayander chosen to demonstrate the

¹ Many studies and experiences have shown that through improved maintenance and driver training alone fuel savings of the order of 7-15 percent are possible - Best Operational and Maintenance Practices for City Bus Fleets to Maximize Fuel Economy, 2011 Guidance Note, ESMAP

² Second Economic Stimulus Package of the Government of India (announced on 2nd January 2009): The Government launched a scheme to provide a onetime assistance to States for the purchase of buses for their Urban transport systems and identified 61 mission cities in the first phase.

³ A GEF requirement



potential for GHG emission reductions from the baseline project. These cities were selected via a structured process of soliciting expressions of interest from all NURM (National Urban Renewal Mission) eligible cities by MoHUA (29 Expressions of Interest (EOIs), were received). At that time, the capacity development initiatives for urban transport undertaken by the Sustainable Urban Transport Project (SUTP⁴) were also progressing well at the national, state and city levels. Based on the SUTP experience, city demonstration projects with an emphasis on Tier 2 cities were combined with capacity building and TA interventions at the national level.

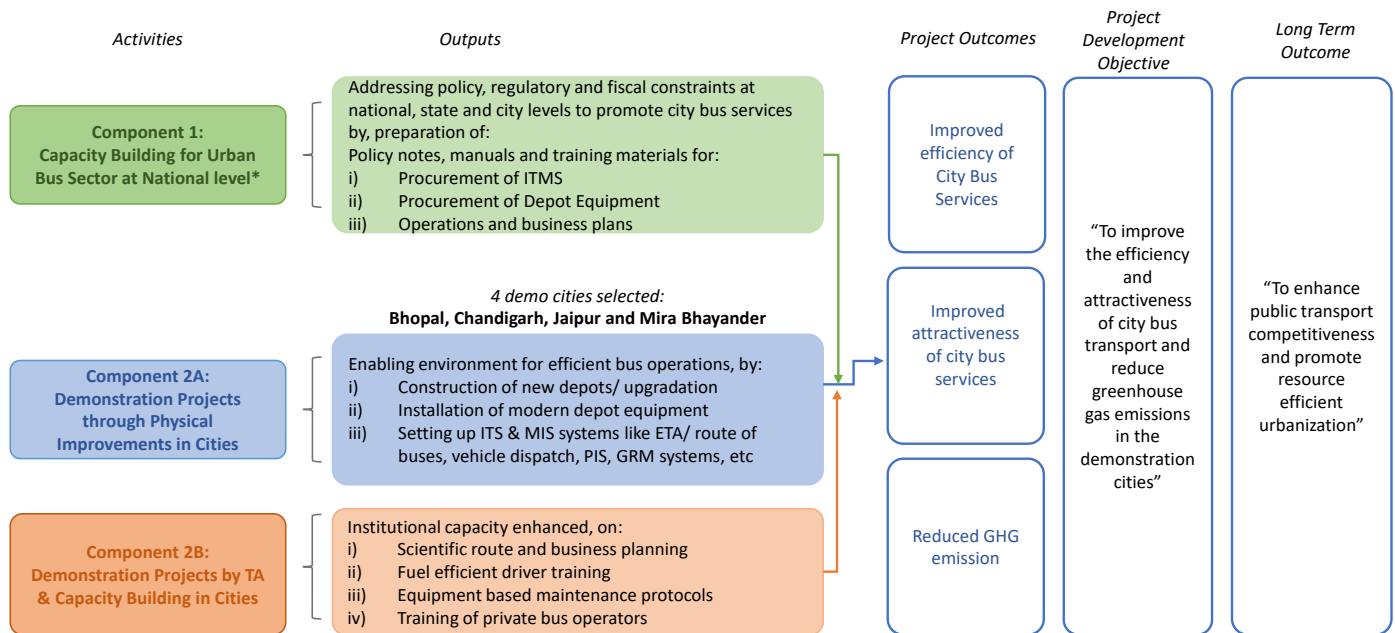
6. The project was aligned with the World Bank Group’s (WBG’s) India Country Partnership Framework for FY 18-22 and supported the first and second pillars of “resource efficient growth” and “enhancing competitiveness and enabling job creation” by promoting and implementing environmentally sustainable urban transport modes.

Theory of Change (Results Chain)

7. The retrofitted theory of change (ToC) of the project is illustrated in Figure 1 below.

Critical Challenges:

(i) lack of enabling institutional, regulatory and policy environment; (ii) limited capacity & expertise in urban bus transportation (across value chain – planning, design, operations etc..) at national, state and local levels; (iii) limited access to good practices and peer to peer learning that are customized to the Indian context; and (iv) absence of technology and maintenance infrastructure and equipment-based city bus operations and their role in improving user and environment friendly services.



Key Assumptions:

- Technology (scientific route planning, depot equipment, maintenance methods, ITS including MIS and PIS): can make PT efficient and attractive
- Institutional & regulatory structure (at both national and city level): needs investment in capacity building and thus improvements in the sector

Figure 1: Retrofitted Theory of Change

Project Development Objectives (PDOs)

8. The project development objective is to “improve the efficiency and attractiveness of city bus transport and reduce greenhouse gas emissions in the demonstration cities”.

9. The Global Environment Objective (GEO) was identical to the PDO.

⁴ <http://operationsportal.worldbank.org/secure/P100589/home>

Key Expected Outcomes and Outcome Indicators

10. At appraisal, the achievement of the PDO was to be measured through the three main indicators listed in Table 1 below.

Table 1: Indicators for Assessing the Achievement of Outcomes

Expected Outcome	Outcome Indicator
1. To reduce greenhouse Gas emissions in demonstration cities	PDO Level Results Indicator 1: GHG emissions in the demonstration cities are lower than their 'business-as-usual' or 'without-project' forecasts.
2. To improve efficiency of city bus transport by service improvements	PDO Level Results Indicator 2a: reduced breakdowns per km run of bus operations PDO Level Results Indicator 2b: increased fuel efficiency (km per liter)
3. To improve attractiveness of the city bus transport	PDO Level Results Indicator 3a (i) & (ii): Increased ridership (overall and women) PDO Level Results Indicator 3b (i) & (ii): user satisfaction (overall and women)

Main Beneficiaries

11. The primary project beneficiaries were the users of public transport in the demonstration cities. The project also focused on women as a special beneficiary group and promoted women's bus ridership through a focus on personal safety, trip schedules, depot layouts and the behavior of conductors and drivers.

Components

12. At approval the project comprised two main components as detailed below.

13. **Component 1: National Capacity Building for Urban Bus Sector (GEF US\$0.7 million, counterpart finance US\$2.6 million).** Reviewing policy, regulatory and fiscal constraints at national, state and city levels to promote efficient and high-quality bus services, including by developing policy notes and organizing workshops; and providing capacity building initiatives involving the development of knowledge materials, training activities, knowledge sharing and cross-learning events, aimed at developing the urban bus sector.

14. **Component 2: City Demonstration Projects – Physical Improvements (GEF US\$8.1 million, counterpart finance US\$99.95 million).**

(i) Supporting physical improvements targeted at modernizing the city bus services in selected cities in the Participating States, including by providing modern depots and bus maintenance equipment and intelligent transport systems and management information systems.

(ii) Providing capacity building and technical assistance in selected cities in the Participating States, including institutional strengthening, capacity building and training; service and business planning; marketing and branding; technical support for private sector participation; and vehicle and driver performance management.



B. SIGNIFICANT CHANGES DURING IMPLEMENTATION (IF APPLICABLE)

15. **The project was restructured five times based on implementation requirements (as listed in the Data Sheet).** Changes were initially made to accommodate the delay in grant effectiveness, and then to proactively accommodate the varying responses in the demonstration cities. The results framework was updated by refining the indicator methodology and End of Project (EoP) targets (as explained below), along with changes in disbursement categories and the grant closing date.

Revised PDOs and Outcome Targets

16. The PDO was not revised during project implementation.

Revised PDO Indicators

17. The methodology for measuring the PDO indicator on increase in overall ridership was revised from capturing the overall increase to increase as compared to Business As Usual (BAU). EoP targets for GHG emission reduction and fuel efficiency were revised downwards to reflect delayed project implementation. A new indicator was included on user satisfaction (overall and women riders) to capture the impact of the project on commuters.

Revised Components

18. There were no changes to the project components.

Other Changes

19. Changes made to the Grant Agreement under the five restructurings are listed in the Data Sheet and include changes to - the Results Framework (revised twice); the reallocation of the grant between disbursement categories (three times); the closing date (three times); the implementation schedule (three times); and component costs.

20. **The Grant closing date was extended for a total two years⁵, including to account for the COVID-19 pandemic**, which delayed on-ground implementation of ITS/ MIS and the impact evaluation. (*See footnote below*)

Rationale for Changes and Their Implication on the Original Theory of Change:

21. These changes were made to ensure the completion of the national level toolkits and the demonstration projects in the cities and to achieve the PDO. They did not have an impact on the original Theory of Change.

II. OUTCOME

A. RELEVANCE OF PDOs

Rating: Substantial

22. **The PDO was clear and well defined.** The PDO was realistic in choosing to focus on improving the efficiency and attractiveness of city bus transport and reducing greenhouse gas emissions in four mid-size *demonstration* cities. By working on service level improvements, the PDO contributes to meeting India's global commitment to GHG emission reduction. India's Intended Nationally Determined Contribution (INDC) issued in 2015⁶, aims to make sustained efforts in GHG emission reduction and mitigation in the transport sector, especially passenger transport

⁵ In December 2018 for 12 months, in December 2019 for nine months, and in September 2020 for three months.

⁶ <https://pib.gov.in/newsite/printrelease.aspx?relid=128403>; <https://www4.unfccc.int/sites/submissions/INDC/Submission%20Pages/submissions.aspx>



in urban areas. The national government (Niti Aayog⁷, MoHUA, MoRTH) is keen to promote efficient and green public bus transport and has announced a national scheme in 2021 at a cost of US\$2.3 billion. The Bank supported this priority through a Reimbursable Advisory Service study in 2019 and 2020 on Improving Bus Public Transport Services with a focus on urban areas. The ESMAP training results and the TA studies, undertaken as part of the project were disseminated to other Indian cities as well.

23. **The PDO is consistent with the WBG’s India CPF** for FY18–FY22 (report number 126667-IN). It contributes significantly to CPF Pillar 1 “promoting resource efficient growth”. Public transportation is treated under Pillar 1 as part of the Bank Group’s support to cities. Objective 1.2 “Improve livability and sustainability of cities” is to be achieved through support for investments in affordable and sustainable public transport services in cities to make them green, livable, and resilient. The PDO is also aligned to Objective 1.3 of promoting policies and programs for the increased adoption of cleaner technologies that help in controlling air pollution in cities.

24. The Relevance of the PDO is therefore rated **Substantial**.

B. ACHIEVEMENT OF PDOs (EFFICACY)

Rating: Substantial

Split rating

25. Neither the PDO nor the project scope was changed. The end targets of two PDO indicators were revised downwards, however project is being assessed against the original (higher) targets. As such, a split rating has not been adopted.

Assessment of Achievement of Each Objective/Outcome

PDO element 1: To reduce GHG in the four demonstration cities

PDO level results indicator 1: GHG emissions in the demonstration cities are lower than their ‘business-as-usual’ or ‘without-project’ forecasts.

26. **GHG emission savings estimates in the without new buses and with the procurement of new buses scenarios exceeded both the original and the revised (reduced) targets;** (Refer to Table 2). GHG emission was calculated as a combination of five activities⁸, and the highest savings came from increased bus availability and bus maintenance. The detailed methodology is outlined in **Annex 4**.

⁷ Strategy for New India by Niti Aayog

⁸ The projected GHG emission gains estimated (over 2020-30) from cities are a combination of 5 activities: (i) procuring buses (higher ridership), (ii) depot creation and equipment (increased fleet life and utilization due to better maintenance and lesser breakdown), (iii) better per vehicle fuel efficiency (combination of bus maintenance and driver training), (iv) better service operations (empirical data from the ITS/ MIS being processed to inform the service plans/ routes will result in increased bus kilometers and ridership) and (v) increased mode shift to city buses as compared to BAU due to improved service plan, more reliable service, passenger information, clean buses etc.

Table 2: Achievement of PDO Element 1 – Reduction in GHG Emissions

Indicator	Baseline (Mt CO2 equivalent)	Target (Mt CO2 equivalent)	Status (Mt CO2 equivalent from 2020-30)
Reduction in GHG emissions in project cities over a period of 10 years as a result of the adoption of modernization initiatives from the Business as Usual (BAU) scenario ⁹ .	1,094,430 (2014-2023) original	Reduction of 230,000 (original)	Achieved 238,600 (without new buses) 454,600 (with new buses) Project activities resulted in higher fleet utilization and optimization, thus higher service kms operated in the project scenario as compared to the BAU.
	1,069,063 (2014-2023) revised ¹⁰	Reduction of 170,000 (revised)	

27. **Under Component 1, six studies were undertaken.** Four of the six have been adopted and disseminated by the Government of India. The fifth study documented the largest training program undertaken on fuel efficiency and has been completed. The sixth study on the review of the regulatory and fiscal constraints is well advanced and MOHUA has agreed to complete it. Details of the TA activities, planned outputs, and potential benefits are shown in **Table 3** below.

Table 3: Outputs and Outcomes of TA Activities under Component 1

S.no.	Activities	Output	Benefits	Status
1	PC 1: Options and Recommendations for Regulatory, Institutional and Fiscal Constraints in Providing Efficient and Sustainable City Bus Services.	Recommendations on City Bus Services (CBS) policy, State Level Nodal Agency obligations, CBS Act, etc.	Study has the potential to bring about critical regulatory and legislative reforms for sustaining the city bus sector in India.	Study is 85% complete ¹¹
2	PC 2: Design and Testing of a Skill Development Program for Professionals Engaged in City Bus Operations.	Training toolkits developed for city bus managers (senior and middle level), drivers, conductors on eight different aspects of bus operations e.g., network planning, operations, outsourcing, etc.	Capacity development through hands-on experience, and knowledge exchanges. Annual calendar for future trainings prepared.	Completed and adopted by MOHUA
3	PC 3: Preparation of Guidance Document on Standardized Functional Specifications for ITS/ MIS in City Bus Operations	Guidance document for City Bus SPVs to specify requirements for ITS/ MIS based on needs of their organization and customers; to plan, design, procure, and successfully utilize such systems.	Any city grappling with decisions on specifications, business model, procurement terms, timelines, etc., would benefit from this manual.	Completed and adopted by MOHUA.
4	PC 4: Guidance Documents for City Bus Depot Design & Implementation	Guidance on depot design and implementation in urban settings. A two-day training session	Will enable STU/SPVs and designers to develop & implement efficient bus	Completed and adopted by MOHUA.

⁹ Revised indicator PDO1

¹⁰ Revised baseline based on buses eventually procured by cities.

¹¹ It is 85% complete and MOHUA has agreed to complete the study through its own funds.



		organized to disseminate and train officials on the use of the guidance document.	depots and maintenance capacity for current & new E-fleet.	
5	PC 5: Fuel Efficiency through targeted Driver Training and Bus Maintenance as non-consultancy service.	One of the largest country wide, depot level training programs on fuel efficiency approach and vehicle maintenance protocol.	An overall improvement of approximately 4% was estimated across 34 depots in 21 cities.	Completed.
6	PC 7: Service and Business Plan for Chandigarh and Mira Bhayander (MB).	Service and operational planning was initiated in Chandigarh and MB.	Support the Project cities with scientific route and business planning.	Completed and adopted by MOHUA.

28. The **intermediate output indicator targets** (refer to **Table 4**) for the corresponding activities have been mostly achieved.

Table 4: Progress of Intermediate Indicators under Component 1

Intermediate indicators	Baseline	Target	Status
Policy notes and recommendations developed for sustainable CBS and deliberations at the national and state levels initiated.	-	At least five workshops held at national and state levels.	Mostly Achieved: Although the activity is not yet completed, several deliberation workshops have been held since 2018: <ul style="list-style-type: none"> • Focus Group Discussion on the initial hypothesis held with key stakeholders at Delhi in July 2019. • 15 city/state level workshops held from 14th to 18th Dec 2020. • Two National level workshops held on 28 and 29 Dec 2020.
City bus operators trained in / exposed to best practices in low-carbon programs including improved fuel efficiency techniques.	-	33 across the project cities	Achieved: <ul style="list-style-type: none"> • 19 operators of 34 depots in 21 cities trained under ESMAP. • 10 city bus transport agencies (20 staff) trained under LUTP. • 6 transit agencies (21 officials) in participating states trained through a CEPT training program, which included exposure visits. • 15 transit agencies (41 officials) and 14 related organizations were trained in city bus training modules

29. **Under capacity building activities, over 3,000 participants were trained in domestic trainings, ESMAP workshops, LUTP-CEPT and workshop by CEPT, while ten persons participated in international study tours to and knowledge exchange with Seoul, Hongkong and China.** (See the detailed list in **Annex 8.**)

30. **ESMAP** conducted four rounds of training in 2017-18 in the depots of 21 cities in 12 states and trained over 1,450 drivers and crew. These training events contributed to bus fuel consumption per km being improved by 7.7 percent on average for targeted buses and 6.8 percent on average for targeted drivers. **Private sector operator training was a critical part of these trainings, as those operators did not focus on Kilometers per Liter (KMPL) in their driver programs.** These trainings also encouraged cities to take up such programs on their own, and institutions like **PCRA**¹² (one of the training institutions that implemented the fuel efficiency program) **is developing a system in line with the tool developed as part of the ESMAP Fuel Efficiency.**

¹² The Petroleum Conservation Research Association (PCRA) is a registered society set up under the aegis of Ministry of Petroleum & Natural Gas, Government of India.



31. **Depot development & Upgradation** (Component 2A). Three new model depots (in Ghodbunder in MBMC, and Bagraana and Todi in Jaipur) were constructed and are operational. The Ghodbunder depot with multi-level design, modern equipment, sustainable features (such as solar panels leading to a net zero electricity bill) and ETP is one of the contemporary depots in the country. (Refer to Annex 10 for project photos). Cities also upgraded three night-parking facilities and seven depots. (Refer to Annex 7 for details.) The intermediate output indicator targets for the corresponding activities have been mostly achieved, see Table 5 and the paragraphs below.

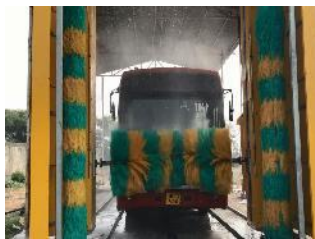
Table 5: Achievement of Intermediate Indicators under Component 2A

Intermediate indicators	Baseline	Target	Status
Modern depot equipment installed in all project cities.	Modern equipment not in place.	Modern equipment in all project cities.	Achieved Depot equipment was installed and is functioning in all four cities.
Increased use of ITS and MIS data and tools in operations planning and management.	Limited use of ITS/Manual systems for data reporting in place.	ITS systems being used in all project cities. MIS reports Developed.	Mostly Achieved ITS/MIS systems are live in Bhopal, Chandigarh and Mira Bhayander. Jaipur opted out of the project ITS/ MIS intervention, but is implementing it using funds from other the Government’s Smart Cities Program ¹³ .

32. **Depot equipment.** At appraisal, the four cities had limited basic depot maintenance equipment and lacked modern maintenance equipment. By project closing, 131¹⁴ equipments were bought, installed and commissioned. Staff were also given operational trainings. (Refer to **Figure 2**).



Air compressor installed at Depots



Automatic bus washing plant installed at three Depots in Bhopal



Recovery and relief van procured at Bhopal

Figure 2: Depot equipment installed under Component 2A

33. **Cities have also started to experience savings.** The automatic bus washing plants have reduced water consumption in Bhopal, Jaipur, and MBMC. In Chandigarh, depot equipment has increased the overall life of tires,

¹³ Expected to be complete by Sep 2021.

¹⁴ Equipment like - Nozzle Tester, Diesel Smoke Meter, Wheel Alignment Machine, Balancer Machine, Fully Automatic Tire Changer Hydraulic Type, Nitrogen Tire Inflator, Auto Electrical Test Bench, Head Light Beam Aligner, Pneumatic Impact Wrench & Socket, Automatic Bus Washing Plant, Heavy Duty Vacuum Cleaner, Lathe Machine, Paint Booth, Computerized Lube Oil Dispensing and Monitoring System, Heavy Duty Engine Lifting Crane (Hydraulic), Quick Oil Chamber Flush/Filter/Clean Machine, Post Mobile Column Lift 5.5 T X 4 For Buses, High Pressure Direct Drive Washer, Ride on Bus Parking Floor Sweeper Machine, Ride on Floor Scrubbing Machine, Ultra-Sonic Cleaning Machine

and thus reduced expenditure on tires as well as improved fuel efficiency. In Bhopal, improvements in braking efficiency and overall driving experience were noted.

34. **ITS/ MIS.** Chandigarh and Mira Bhayander have set up MIS systems with Business Intelligence, cloud-based services, vehicle tracking, passenger information systems, e-ticketing, and Customer-Facing Mobile Apps and Grievance Redress Mechanisms. Integration with the National Common Mobility Card (**NCMC**) is also underway. Bhopal has also developed, tested, and commissioned MIS systems under the project. In Chandigarh, the automation of the duty roster has led to the rebalancing of staff duties and reduction in overtime costs. In Bhopal, the automation of schedules has led to proper tracking of service schedules by private operators. Mira Bhayander reported a reduction in revenue leakage with the implementation of e-ticketing. The cities have also seen an average of 1000+ downloads of the user Mobile App and an increase in the number of queries from users on the online sale of passes/ recharge. (Refer to **Annex 1, Section A** and **Annex 7** for more city specific details).

35. **The intermediate indicator targets for the corresponding activities have been mostly achieved, as shown in Table 6 below.**

Table 6: Achievement of Intermediate Indicators under Component 2B

Intermediate indicators	Baseline	Target	Status
More efficient and user responsive bus service plans prepared and adopted in demonstration cities.	Service plans partially in place.	At least two cities have adopted improved bus service plans.	Achieved in one of two targetted city <ul style="list-style-type: none"> Service plans in place in Bhopal. Service plans in Chandigarh and MBMC are in the process for adoption.
Demo cities have institutional systems in place for monitoring and evaluation of bus fuel efficiency program.	Not in place; partially in Bhopal	At least two cities.	Achieved in one of the two targetted city. Partially in place in the other three. <ul style="list-style-type: none"> Chandigarh has a separate team for managing its fuel efficiency program. The program is partially in place at Jaipur and Bhopal, while Mira Bhayander is to commence fuel efficiency program.

36. **Based on the above discussion, PDO element 1 is considered mostly achieved.**

PDO element 2: to improve efficiency of city bus transport in project cities

PDO level results indicator 2a: reduced break-down incidents per km run of bus operations & 2b: increased fuel efficiency (km per liter)

37. As shown in **Table 7** below, the end targets of Indicator 2a were surpassed, while Indicator 2b surpassed the revised target and substantially achieved the original (higher) target.

Table 7: Achievement of PDO Element 2

Indicator	Baseline	Original Target	Revised Target	Status
Indicator 2a: Rate of Breakdowns to not exceed 5/10,000 kms (<i>unit: incident per km</i>).	Bhopal: 4.2 Chandigarh: 6.6 Jaipur: 7.38 Mira Bhayander: 7.5	Less than 5 breakdowns/10,000 kms	-	Significantly exceeded. Bhopal: 3.41 Chandigarh: 0.7 Jaipur: 2.9



				Mira Bhayander: 0.27 ¹⁵
Indicator 2b: Improvement in bus fuel efficiency in demo cities by at least 12% relative to business as usual.	Bhopal: 3.2 km/l Chandigarh: 3.4 km/l Jaipur: 2.76 km/l Mira Bhayander: 2.8 km/l	15%	12%	Substantially achieved Overall: 14% (Pre-Covid: 10% Post Project: 14% ¹⁶)

38. PDO element 2 was addressed by a combination of four activities under Components 1 and 2A. Improvements in breakdowns and fuel efficiency were planned as outcomes of: (i) setting up/ upgrading depots; (ii) installation of modern depot equipment¹⁷; (iii) driver training on driving skills, plus training the driver, crew, and maintenance staff on better bus maintenance protocols; and (iv) optimization and operational efficiency by ITS/MIS deployment. Details of the outputs achieved under these activities are discussed in PDO Element 1 above.

39. Constructing depots in cities provided secure parking places for buses, enabled regular maintenance, reduced wear and tear, reduced time for repairs, and improved mileage. They also gave private operators an additional sense of comfort and confidence in the city SPVs. For instance, MBMC was facing difficulties in getting a private operator on board and had to cancel the tender multiple times owing to limited or no response. Eventually, in July 2019, the presence of the depot (among other things), helped MBMC to obtain the services of a private operator. The same was also the case in Jaipur.

40. **Most of the equipment was installed in 2018-19; however, the COVID-19 pandemic prevented the cities from utilizing them to their full potential.** Demonstration benefits of the equipment were nevertheless visible, even during the pandemic. **The use of washing plants, nitrogen gas, and automatic lube changer enabled clean and sanitized buses to be deployed for operations faster, with reduced manual interventions.** With better maintenance equipment and processes, the breakdown rate improved (Refer to **Table 7**) in all four cities. Part of the improvement in Jaipur could also be attributed to the early scrapping of poor performing buses.

41. Fuel performance of depots in the four cities saw an improvement respectively of 10 percent and 14 percent pre-COVID (January - February 2020) and at Project closing (January - March 2021). With Chandigarh and Bhopal incorporating these protocols in their regular maintenance programs, further improvements are likely in the medium and long term.

42. **Based on the above discussion, PDO Element 2 is considered achieved.**

PDO element 3: to improve attractiveness of city bus transport in project cities

PDO Level Results Indicator 3a: Increased ridership (overall and women) and 3b: increased user satisfaction (overall and women)

43. Activities and outputs under Components 1, 2A & 2B discussed earlier in this section supported the achievement of this outcome by contributing to: (i) more service kilometers operated with improved efficiency and reliability; and (ii) improved information availability by setting up customer facing ITS, e.g., PIS, GPS, e-payment, and User App. **Table 8** below shows the status of end targets of **PDO Element 3** (Indicator 3a and Indicator 3b).

¹⁵ City wise BUA & Project: Bhopal – 4.01 & 4.47; Chandigarh – 3.61 & 3.80; Jaipur - 2.71 & 3.47; Mira-Bhayander – 2.62 & 2.77

¹⁶ Pre-COVID includes average data of Jan- Feb 2020, as thereafter for a few month operations was closed or almost nil. And Post Project data is average of Q1 2021 (Jan-March 2021).

¹⁷ like tyre pressure, wheel alignment, tyre changer, brake riveting machine, automatic lube oil change machines (long list shared earlier)



Table 8: PDO 3a (i) & (ii) and 3b (i) & (ii) Achievement

Indicator	Baseline	Original Target	Revised Target	Status										
Direct project beneficiaries (riders in number)	100%) 180,000,000 ¹⁸	235,000,000 ¹⁹ riders	10% increase of the BAU scenario	Over-Achieved Pre-COVID: 20% Post project: 16%										
Female beneficiaries (percentage)	Bhopal: 39%; Chandigarh: 28%; Jaipur: 39%; Mira Bhayander: 43%	Increase by 3%	Increase by 3%	Achieved in one city: Improvement visible in Chandigarh. Bhopal: 39% Chandigarh: 32% Jaipur: 37% Mira Bhayander: 34%										
User satisfaction overall riders	(baseline 2014) Bhopal: 3.36 (out of 5) Chandigarh: 3.59 Jaipur: 3.44 Mira-Bhayander: 2.62	Increase in user satisfaction in at least two cities	Increase in overall user satisfaction in at least two cities	Over-Achieved: Improved in Bhopal, Chandigarh, and Mira Bhayander <table border="1"> <thead> <tr> <th>City</th> <th>End Term</th> </tr> </thead> <tbody> <tr> <td>Bhopal:</td> <td>4.11</td> </tr> <tr> <td>Chandigarh:</td> <td>4.55</td> </tr> <tr> <td>Jaipur:</td> <td>2.71</td> </tr> <tr> <td>MB:</td> <td>3.30*</td> </tr> </tbody> </table>	City	End Term	Bhopal:	4.11	Chandigarh:	4.55	Jaipur:	2.71	MB:	3.30*
City	End Term													
Bhopal:	4.11													
Chandigarh:	4.55													
Jaipur:	2.71													
MB:	3.30*													
User satisfaction of women riders	(baseline 2014) Bhopal: 3.56 Chandigarh: 3.51 Jaipur: 3.07 Mira Bhayander: 2.42	Increased in user satisfaction of women in at least two cities	Increase in user satisfaction of women in at least two cities	Over-Achieved: Improved in Bhopal, Chandigarh, and Mira Bhayander <table border="1"> <thead> <tr> <th>City</th> <th>End Term</th> </tr> </thead> <tbody> <tr> <td>Bhopal:</td> <td>4.08</td> </tr> <tr> <td>Chandigarh:</td> <td>4.60</td> </tr> <tr> <td>Jaipur:</td> <td>2.64</td> </tr> <tr> <td>MB:</td> <td>3.25*</td> </tr> </tbody> </table>	City	End Term	Bhopal:	4.08	Chandigarh:	4.60	Jaipur:	2.64	MB:	3.25*
City	End Term													
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Chandigarh:	4.60													
Jaipur:	2.64													
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44. **Overall beneficiaries (riders).** Ridership, as compared to BAU, increased by 20% pre-COVID and fell slightly to 16% post-Project. The dip in post-project numbers in the demonstration cities can be attributed to reduced urban passenger movement due to change in working modalities during the pandemic (Refer to Table 8). The impacts of demand responsive service planning are evident in Bhopal, where after restructuring of the routes the Year on Year (YoY) average daily ridership went up from 269 per bus in second half of 2016 to 494 per bus in 2017.

45. **Share of female ridership,** based on the end term survey (in 2021) indicated a **mixed result in the project cities:** increase in Chandigarh and decrease in the other two cities (Refer to Table 8). It is difficult to interpret the results in the ongoing COVID context. The higher share in Chandigarh, and the almost unchanged share in Bhopal & Jaipur, may suggest that while men had other alternatives, women were more dependent on public transport. This indicates that a gender informed public transport benefits women riders, especially in the context of the COVID-19 pandemic.

46. **Improvement in the user satisfaction index, both overall and for women users, was visible in Bhopal, Chandigarh and MBMC** (Refer to Table 9). Seat reservations for women, cleaner buses with reduced crowding, safety features on-board (such as CCTV/ GPS tracking/ panic buttons) and the introduction of women conductors/

¹⁸ Source: Project Restructuring paper (Nov 2018)

¹⁹ Source: Project Restructuring paper (Nov 2018)



drivers were appreciated by female riders. To increase the trust of women riders in PT, Bhopal set up two more helplines for grievance reporting & grievance redress; promoted a QR code based anonymous driver rating and feedback system; and operated free bus services for women on “women’s day”. Chandigarh installed PIS at all operational bus stops, modified routes, followed the social distancing norms stringently, ensured regular bus cleaning and maintenance. Jaipur’s user perception may have suffered due to reduced bus services during the COVID-19 pandemic.

47. **Based on the above, the PDO element 3 is considered achieved.**

Justification of Overall Efficacy Rating

48. **Given the extent of achievement of the three PDO elements described above, Efficacy of the Project is rated Substantial.**

C. EFFICIENCY

Rating: Modest

Assessment of Efficiency and Rating

49. At appraisal, an economic analysis was not carried out, instead an Incremental Cost analysis for estimating project impact in terms of the reduction in GHG emissions (as is the norm for GEF Projects) was undertaken. Further, the project supported mostly low cost (high impact) maintenance modernization and technology interventions, along with extensive strategy and capacity building on CBS. It was not considered feasible to carry out a traditional cost-benefit analysis for these activities.

50. **Cost effectiveness of the GEF Grant for emission reduction.** The GEF grant of US\$9.15 million resulted in reducing direct CO2 emissions by 454,600 metric tons. **The GEF contribution per ton of CO2 is US\$20, compared to the US\$40²⁰ estimated at project appraisal.** The unit cost of CO2 reduction against the project cost of US\$85²¹ million at US\$182 per ton was also significantly lower than the estimated unit cost of US\$493 per ton (based on the estimated project cost of US\$113 million at appraisal). This is a conservative estimate, because the ICR only calculated direct emission benefits from the four pilot cities and did not calculate emission reductions due to the contribution of the Project to accruing fuel savings from the trainings on maintenance protocols and driving and scale up of depot modernization on inter-city operations.

51. **The project was able to use almost all the US\$9.15 million GEF grant** through its design and rigorous implementation follow-up. However, only 76 percent of the counter-part share estimated at appraisal was utilized at completion, as the share of the State Governments and GoI in the form of sanctioned buses under Phase II materialized only partly, because of the tight timelines for bus procurement by the cities/states. PIUs like MBMC spent a much higher amount than projected on depot development from their own budget. Despite the above, the leverage of the GEF grant remained at a high of eight.

52. One TA study was not completed by the end of the project; however, MOHUA has committed to complete it using GoI funds. The difference in project cost at completion (US\$85 million) and at appraisal (US\$113 million) also includes exchange rate gains due to the depreciation of the Indian rupee from Rs. 60.00²² to the U.S. dollar at appraisal to Rs.

²⁰ Direct GHG emission savings of 229,109 MT for a GEF funding of US\$ 9.2 mn were estimated at appraisal

²¹ Project cost actual (US\$ 83 mn) = counter-part funding of US\$ 73.85 mn + private sector contribution US\$ 1.8 mn + GEF grant of US\$ 9.15 mn

²² Source: Project Appraisal Document



73.74²³ to the US dollar at completion, which resulted in grant savings of US\$1.4 million that were tracked and re-utilized timely. A comparison of estimated and completed component costs is shown in **Annex 3**.

53. **Design Efficiency.** The project design was flexible and incentivized the better performing cities (e.g., Chandigarh and MBMC) by providing them an increased allocation of the GEF grant. It also focused on low cost – high impact service delivery related investments, which resulted in the GHG emission reduction target being exceeded at completion.

54. **Implementation Efficiency.** Initial delays of 20 months affected the overall implementation timeline, while the impact of the COVID-19 pandemic on project implementation was felt from March 2020 for a period of about six months, when national and local lockdowns and precautions were in place. While implementation benefits from equipment and ITS systems are still being realized, all key activities were satisfactorily completed. Knowledge sharing activities were carried out virtually and were widely appreciated. Overall, project implementation proved to be far more complex and time intensive than initially envisaged. In view of these factors, the two-year extension of the grant closing date is considered reasonable.

55. Based on the above discussion, **efficiency is rated Modest**.

D. JUSTIFICATION OF OVERALL OUTCOME RATING

Rating: Moderately Satisfactory

56. Based on the above assessments of Relevance of the PDO, Efficacy, and Efficiency as **Substantial, Substantial, and Modest** respectively, **overall Outcome is rated Moderately Satisfactory**.

E. OTHER OUTCOMES AND IMPACTS (IF ANY)

Gender

57. Project interventions in the four demonstration cities were based on the concerns expressed by bus commuters in 12 cities, especially women. The Project's contribution to improving bus operations on the selected corridors, as well as the availability of bus information and trip planning due to the ITS interventions, will mean an increase in women's use of buses in the pilot cities. To make CBS safe, separate seats, complaint handling systems and CCTV cameras have been deployed in Chandigarh. Bhopal has additional QR code-based feedback systems²⁴. Separate toilets for women employees (a major gap identified) were included as part of the depot upgrades. Cities procuring new buses will enhance service coverage, which will have a further impact.

58. The project has also benefited from the collection of gender disaggregated data as part of the user satisfaction survey. This survey highlighted that during the COVID-19 pandemic, a higher percentage of male commuters had shifted to a personal mode of transport, while women were still highly dependent on public transport. The surveys indicated that women in Chandigarh were very satisfied with the bus services, and particularly appreciated the vigilant conductors, panic button, GPS tracking, CCTV cameras, priority seats for women and the helpline, and cleanliness of the buses.

Institutional Strengthening

59. The project contributed to strengthening institutional and technical capacity at the national and local levels through the PIUs/ PMO, e.g., by encouraging MBMC to hire a private operator and develop an internal team of depot managers and operations managers, as well as engaging with Chandigarh for separate monitoring and tracking of

²³ [https://www.exchange-rates.org/Rate/US\\$/INR/12-31-2020](https://www.exchange-rates.org/Rate/US$/INR/12-31-2020)

²⁴ The QR code pasted in buses can be scanned by users to give feedback about the driver and conductors.



inter-city and intra-city bus operations. The creation of new fully equipped depots and ITS/ MIS systems are expected to go a long way in strengthening the capacity of the weak SPV/ STUs in the four cities. Some evidence is already emerging, with Bhopal planning its new fleet induction along with the development of the requisite depot capacity.

60. Capacity building under Components 1 and 2 included: (i) capacity building and training for more than 3,000 officials & staff across the country, many of whom have proceeded to develop environmentally friendly initiatives; (ii) 'on-the-job-learning', along with class-room training, of drivers, conductors and crew on fuel efficient driving, as well as bus maintenance techniques²⁵; and (iii) the preparation of Guidance Manuals that provide high-quality tools for cities and institutions to develop sustainable frameworks, as well as implementation support.

Poverty Reduction and Shared Prosperity

61. The project's contribution to improving access to, and the quality of, public transport services are expected to be inclusive, equitable and pro-poor, as the poor (and school and college students) are the primary users of bus transport and have limited or no alternatives to public transport. The passenger information system, including the Mobile App released in Bhopal, Chandigarh, and Mira Bhayander may also result in greater equity and inclusion among bus users.

III. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME

A. KEY FACTORS DURING PREPARATION

62. **Realistic objectives based on background analysis.** The project benefited from the background analysis undertaken in 12 cities to better understand the concerns of male and female bus users and non-users. Lessons from these studies, along with previous pilot testing, were carefully examined. The rationale for Bank intervention was strong, as discussed in Section 1.A. Several rounds of consultation with key stakeholders were completed and the project was designed to enhance the impact of government policies and programs. With a view to simplifying the project design and keeping in mind the learnings from the SUTP program, new depot construction was on publicly owned sites to avoid land acquisition issues, and fund allocations were specified by component rather than by city to provide incentives to cities and to reduce the need for restructuring.

63. **Classroom and on-the-job learning were included in the project design to build institutional capacity.** The project design included the provision of technical support (in the form of the PMU) to Government agencies for data collection, organizing capacity building sessions, procurement, and review support. This dedicated team would also hedge the risk of project continuity and loss of institutional memory, especially with the frequent transition of Government officials in the cities, States, and at the national level. PMC support was provided at the city level for ITS/MIS design, implementation, and operationalization. The design envisaged 'learning by doing' for blue collar staff (bus maintenance and fuel-efficient ways of driving, along with depot equipment procurement), and practitioner-oriented training sessions, technical assistance, and exposure visits for officials to demonstration projects.

64. **The project duration did not include contingencies for unanticipated issues.** The analysis of implementation capacity carried out during project appraisal indicated that the four-year project duration would be adequate, despite the design involving technical assistance at the national level and demonstration projects in four cities. Nevertheless, it would have been appropriate to allow time for contingencies by selecting a five-year implementation period.

²⁵ ESMAP fuel efficiency trainings across the 34 depots (12 States) were undertaken as part of the Project



B. KEY FACTORS DURING IMPLEMENTATION

65. The grant closing date was extended by twenty-four months to allow sufficient time for the completion of key activities, including the construction of depots, installation of depot equipment, and the setting up of ITS/ MIS systems. The project had a sluggish start which continued till the mid-term review (MTR) and picked up speed only during the last three years of implementation.

66. **The procurement of sanctioned buses under the Baseline Project (to be procured under GoI funding) did not fully materialize.** Phase I buses (788) had already been procured at the time of Project appraisal²⁶. However, only 360 of the sanctioned 886 Phase II buses were procured, owing to the very short timelines provided by GoI to the cities/ provinces for the completion of procurement, leading to the need to revise the results targets. However, between 2018-20 (i.e., before the project closed) 1,140 buses were procured for fleet replenishment and expansion under other subsequent government schemes (e.g., AMRUT and FAME II).

Factors Subject to the Control of the Government and/or Implementing Entities

67. **Lack of coordination, commitment, and familiarity with Bank project requirements.** A delay of almost twenty months in the grant being declared effective²⁷ had a cascading effect on project implementation. At the city level, depot construction was delayed, which resulted in overall delays in the setting up of equipment as well as ITS/ MIS implementation. This was further exacerbated by the limited understanding of working with the World Bank's fiduciary and safeguard requirements, as well as the frequent changes of officials.

68. **Uneven performance of the demonstration cities.** Delays in filling posts in the PIAs or assigning staff on a part-time basis or on additional charge, as well as frequent staff turnover and/or lack of local experts to support the PIA, impacted city level performance. From a star performer in 2012, Jaipur barely met its targets by 2016-18; at MTR, Mira Bhayander was proposed for removal from the project, but ultimately was one of the better performers. Chandigarh Transport Undertaking (CTU), a late entrant, diligently implemented fuel trainings, ITS/ MIS and used its own funds (over and above the GEF grants) for depot equipment and upgrades of remaining depot facilities.

69. **By MTR some impact of the project was visible.** At MTR (in September 2017) the project was two years behind schedule, depots and equipment were not ready, some cities still scrapped buses before their full life, and almost every city had been through two to three rounds of depot and/or ITS procurement. Project restructuring was undertaken in 2018 to address these issues. At the same time, solutions were also found during regular Bank implementation support missions, with the PMU supporting the cities to plan and deliver better, and by escalating issues to senior officials at State/ Ministry/ DEA levels as and when required. For instance, the PMU supported MBMC in its efforts to turn the situation around and eventually the city implemented one of the best depots.

Factors Outside the Control of Government and/or Implementing Entities

70. **Lack of a mature market and market players.** The lack of mature domestic players for depot maintenance equipment resulted in no or weak bid responses/ erroneous bids/ shortage of products and delivery mix-ups. Consultants, vendors, cities, and the PMU lacked familiarity with equipment specifications, depot planning and design, and land suitability analysis. These problems were compounded by the lack of standardization of equipment and ITS/ MIS systems, delays in delivery and commissioning, and in imparting training to staff on equipment usage.

²⁶ BCCL was operating 675 buses total - 225 buses from Phase 1 with no new procurement plans; Chandigarh had 431 buses (of which 100 were from Phase 1) and had plans to augment that by 400 more from Phase II; Jaipur had 400 from Phase 1 and planned 286 buses more from Phase II; and MBMC had 63 buses on road (50 buses from Phase 1) and planned 100 additional from Phase II.

²⁷ initial delay of almost 20 months in effectiveness due to incomplete mobilization of PMU at the national level, an outcome of the changes in officials in MoHUA and their changing priorities with new programs being announced.



71. **Benefits for transit agencies or operators, especially during the COVID-19 pandemic.** The use of depot equipment for bus cleaning and maintenance during the pandemic allowed the STU/ SPVs to deploy clean buses faster and with limited manual involvement. The use of equipment also enabled the operators to manage staff shortages (due to the migration of labor/ health aspects/ social distancing norms) without impacting operations during the COVID-19 pandemic²⁸. The commuter facing App enabled with e-payment options²⁹ reduced the potential exposure of handling cash. Commuters also benefited from advance information on ETA/ ETD/ routes/ fares via the mobile App, resulting in ease of access and increased confidence in the PT system.

IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME

A. QUALITY OF MONITORING AND EVALUATION (M&E)

Rating: Modest

M&E Design

72. At appraisal, the project included appropriate PDO indicators and intermediate indicators (see Section IB and Section II) to assess the achievement of project objectives and project outputs, and the two restructurings early in the project (2017-18) fine-tuned them. A few indicators were revised to link them to BAU instead of the start of Project, because without a major boost to CBS, the share of PT would continue to fall in cities. **The user surveys proposed as part of M&E were updated by considering the COVID-19 pandemic and its impacts.** Post-March 2020, the user satisfaction surveys were redesigned to capture the impacts of the COVID-19 pandemic on urban transport in the project cities. Additional questions were included to understand the changes in travel patterns, reduced economic activity, and/ or user confidence in public transit.

73. The baseline estimation of the overall user indicator was, however, unclear until April 2019. In addition, the inclusion of intermediate indicators on “depot level staff training on fuel efficiency”, “buses maintained using modern equipment per depot” and “rate of equipment usage per depot/ city” may have been useful to demonstrate the correlation to incident reduction and fuel efficiency.

74. The Project established a three-tier monitoring structure (monitoring committees), and the Quarterly Progress Report (QPR) formats were designed in consultation with the city officials and PMU/ PIAs. Budgets for M&E were included for the entire duration of the project.

M&E Implementation

75. **The M&E was implemented as designed after initial hiccups.** Baselines were established (in one case late), and progress towards the PDO and key intermediate indicators were regularly tracked. The initial issues in data quality (especially for break-down rates and fuel efficiency) due to the limited capacities at the city level however continued till the end. Regular follow-ups and reviews by the PMU and the Bank team ensured data consistency. The cities were able to make the necessary adjustments and submit the quarterly progress reports (QPRs) timely. The impact of the COVID-19 pandemic however delayed data collection and surveys in 2020.

²⁸ COVID-19 pandemic lockdown for the first wave lasted from March – June 2020 but in many cities, buses were deployed for alternate use like transportation of groceries/ medical staff/ make-shift COVID testing centers. Post lockdown, re-opening was slow, and most transit agencies ramped up the operations gradually. With multiple waves of the pandemic - restrictions, threat and availability of manpower varied over time and geographies.

²⁹ City is working towards moving to card and wallet-based payment mechanism as well as integration with National Common Mobility Card. However, during COVID-19 progress was hampered due to restrictions in imports/ domestic logistics and overall availability of cards.



76. The Bank carried out regular implementation support missions and reported on them in Aide Memoires as well as the Implementation Status and Results Reports (ISRs). These became a useful source of information on the performance of bus operations in the demonstration cities.

M&E Utilization

77. The M&E process was used to review progress, develop mitigation measures, and agree with the cities on improvement strategies, as well as for informed decision making for overall project management. Each city, based on the maturity of its operations, was able to utilize the M&E as feasible. For instance, by December 2019, based on the M&E data, Chandigarh realized the benefits accruing from the usage of depot equipment and obtained additional support from the Project, as well as Government funds for the purchase of equipment for other depots. These findings were further shared with other cities as part of the Bank's effort to create a demonstration effect. The use of the M&E system to track the technical performance of ITS/ MIS in cities proved valuable. The implementation of ITS substantially improved the PIUs' access to data, and therefore the opportunity to use it for more effective operations.

Justification of Overall Rating of Quality of M&E

78. **Based on the above, the overall rating of the Quality of M&E is Modest.**

B. ENVIRONMENTAL, SOCIAL, AND FIDUCIARY COMPLIANCE

Environmental Safeguards

79. **At appraisal, OP/BP 4.01 (Environmental Assessment), OP/BP 4.04 (Natural Habitat) and OP/BP 4.11 (Physical Cultural Resources) were triggered. The project was assigned Category 'B' because potential impacts were assessed to be manageable and mostly concentrated within the depot sites.** These impacts included drainage, water pollution due to discharge from vehicle repairs/ washing, health and safety during construction, and traffic safety related issues during the operation of the depots. In line with the Environmental and Social Management Framework (ESMF) prepared for the project, environmental assessment was undertaken along with the preparation of engineering designs for the depots. The resultant Environmental Management Plans (EMPs) were integrated with the design elements to minimize environmental footprints from depot operations. Adequate budgetary provisions were included where separate measures were to be implemented. The three new depots (two in Jaipur and one at Mira Bhayander) obtained the required licenses from the respective State Pollution Control Boards for the purchase of raw materials like sand and stone from existing approved sources.

80. **Measures such as internal storm water drains, oil, and grease traps, and ETP/ STP³⁰ were integrated in the depot designs to reduce the environmental footprint of the new facilities. In addition, measures with long term positive environmental benefits, e.g., solar photovoltaic panels, rainwater harvesting systems and sanitation systems, were included in the designs.** The operation of the ETPs will enable the reuse of treated wastewater for gardening or bus washing, and to recharge ground water; the use of solar PV panels will reduce dependence on fossil-based energy. These measures will contribute to environmental benefits³¹ by minimizing the project's carbon footprint. However, the effectiveness of these facilities will depend on the implementation of the yet to be developed standard operating procedures, work for which is underway.

³⁰ Effluent Treatment Plant (ETP)/ Sludge Treatment Plant (STP)

³¹ The cities have reported benefit during the presentation, but rational for calculation was not clear and was requested to share with bank. Real figures will be included if and once data is available from cities and PMC review



81. **Implementation of the EMPs was affected by the frequent transfer of key officials.** The key challenges during EMP implementation were securing access to work sites and the safety of workers during construction. In the case of the Raipur Kalan Depot in Chandigarh, the finalization of the EIA report and its disclosure took time due to delays in the administrative and technical approval of the design.

82. **Compliance with the Bank's environmental safeguards is considered Satisfactory.**

Social Safeguards

83. OP/BP 4.12 (Involuntary Resettlement) was triggered, as the probability of displacement of squatters or encroachers on or around the boundary of depots was identified. Construction at the Ghodbunder Depot involved the relocation of 163 slum dwellers to another temporary site, and an addendum to the ESMP was prepared. MBMC secured intermediate transit camps and these slum dwellers were temporarily located at the Transit Camp of the Basic Services for Urban Poor (BSUP) scheme. Based on the guidance provided by the Bank, MBMC took steps to improve the facilities available in the transit camp site, as well as the working conditions for workers in the construction site. The final relocation to affordable housing under the Pradhan Mantri Awas Yojna (PMAY) scheme is expected by October 2021 and will be monitored by the Bank. City agencies, with guidance from the World Bank team, incorporated several measures for rehabilitation, keeping in mind gender aspects. At project closure, most gender related recommendations had been implemented. Grievance redress mechanisms were set up by the cities for the resolution of any complaints received. The Bank will follow-up with the project cities to ensure that all remaining social safeguards actions are completed in a satisfactory manner.

84. **There were delays in the preparation of the social safeguard instruments, particularly in Jaipur and MB, due to frequent changes in staff and the lack of capacity in the implementing agencies.** The Bank provided guidance for the preparation of these instruments as well as in capacity building in implementation of the ESMF and the ESMPs. In view of the above, project closed with Moderately Satisfactory rating on Involuntary Resettlement.

85. Overall, the project closed with a **Moderately Satisfactory rating** on Environmental & Social safeguard management.

Procurement

86. **The Bank's Procurement Guidelines 2011 applied to activities funded by the GEF grant and not to the procurement of buses and depot construction, which were funded entirely by counterpart funds.** Procurement was carried out for US\$16.7 million (1.7 times the GEF Grant) through 70 procurement processes³². It is confirmed that there is no non-compliance in procurement process with respect to Bank procurement Guidelines during project implementation.

87. **Lack of trained staff in the city units, lack of familiarity with e-procurement or approved NIC systems, and the frequent transfer of senior officials** affected project procurement. Procurement was extremely slow, especially in Mira Bhayander and Jaipur. For many post-review procurement activities, the required data had not been updated in STEP.

88. Procurement was rated moderately satisfactory in the ISRs and the project **closed with a Moderately Satisfactory rating for Procurement.**

Financial Management (FM)

³² As per STEP data total 70 procurement processes undertaken, of which 33 were for consultancy services, 25 for goods and equipment, and two were for non-consultancy activities.



89. **FM capacity varied significantly in the PIAs.** BCLL and JCTSL, the dedicated companies established for the operation and management of city bus services under the Jawaharlal Nehru National Urban Renewal Mission (NURM), had low institutional capacity for FM. There were repeated observations by the external auditors on poor documentation of fixed assets, weak internal controls, etc. Submission of audit reports and Interim Unaudited Financial Reports (IUFRs) of the PIAs by the PMU was typically on time, with audit observations on monetary values; however, these were not significant and were mostly reconciled.

90. **FM processes for ensuring the smooth flow of funds and proper expenditure controls at the State PIAs were either not well established or were discontinued during project implementation.** The project required the creation of dedicated project bank accounts in PIAs, however discussions during implementation supervision missions with BCLL and JCTSL revealed that these bank accounts were not being used for project expenditures. The external auditors also had observations on similar lines in the project audit reports across financial years.

91. **The FM arrangements for the project at the central level piggy backed on the institutional set-up of SUTP, which closed on March 31, 2018.** The two projects shared a common PMU in MoHUA, which helped to leverage learnings on fiduciary systems and processes required under Bank projects. However, this was not the case in the state PIAs. It appears that from an FM perspective, the ESCBS project did not receive appropriate attention from the PMU until SUTP closed.

92. **The project closed with a Moderately Satisfactory rating for Financial Management.**

C. BANK PERFORMANCE

Quality at Entry

93. The Project's strategic relevance, country context, and environmental and social development issues were clearly identified. Risk mitigation measures were incorporated in the project design, and the Bank ensured that adequate implementation arrangements and flexibility were built in the project design that involved multiple states and cities. It also ensured the participation of beneficiaries, including women, at various stages in the project. **However, given earlier experience, the delays in meeting readiness criteria could have been better anticipated and the design could have been adjusted accordingly.**

94. The task team worked closely with Bank and external experts to pilot customized solutions for both depot design and maintenance equipment. It also engaged in a dialogue with the operations team of various other depots as well as independent experts, including through stakeholder consultations with industry partners on the outputs of Components 2A and 2B, which were being piloted under the project. **Market interest for the supply of depot equipment could have been explored further; this could have saved time and effort during project implementation.**

Quality of Supervision

95. **The Bank team supervised the project closely, even during the COVID-19 pandemic.** During the six years of project implementation, 12 missions were undertaken and were supplemented by interim missions and technical visits. The findings of the missions and agreements reached were conveyed to Government and the project agencies through aide memoires and management letters, and twelve ISRs were filed. During the COVID-19 pandemic³³, eight virtual meetings (including the ICR mission) were held with the PIAs and the PMU.

³³ March 2020 during nation-wide lockdown to Dec 2020



96. **Though the team worked proactively with the Government, the involvement of four cities / States and GoI resulted in the aggregate performance taking a while to become visible.** From 2014, implementation ratings in the ISRs fluctuated between Moderately Unsatisfactory to Satisfactory, based on candid assessments of project status. The Bank's ratings of FM & safeguards performance highlighted issues and were duly resolved through appropriate follow-up. The Bank provided guidance on re-tendering and re-packaging to address procurement delays and issues. As detailed earlier, the team worked with the Government to restructure the project (including amendments to the timelines, results indicators/ EoP targets) to respond to the conditions on the ground. The MTR, Steering Committee meetings and multiple other discussions were used judiciously to flag issues and take timely decisions. Savings were identified and Government proposals for their utilization were carefully assessed and finalized. However, the critical study on regulatory, institutional, and fiscal recommendations for CBS could not be completed before the closing date, and MOHUA has committed to completing it.

97. **The Bank extended technical support to the various studies and the development of manuals under Components 1 and 2 by mobilizing experts** to ensure that international good practice was incorporated in the manuals and guidance documents that were developed and subsequently adopted at the national level. The lessons learned during the implementation of the three new depots were documented in the depot manuals. The Bank provided guidance to the PMU in customizing the specifications of depot equipment for city bus operations in India.

Justification of Overall Rating of Bank Performance

Rating: Moderately Satisfactory

98. The project had weaknesses at entry: M&E design had shortcomings; there were delays in meeting readiness and effectiveness criteria, market analysis on the supply of depot equipment was not adequate; and the overall project implementation period was too short. These shortcomings were effectively addressed during project implementation through strong Bank implementation support. On balance, overall bank performance is rated **Moderately Satisfactory**.

D. RISK TO DEVELOPMENT OUTCOME

99. The PDO continues to be highly relevant to national priorities as well as the priorities of the demonstration cities, and Indian cities more broadly. The guidance documents and manuals have been circulated to state agencies and shared on the MOHUA website for wider dissemination. However, champions would be needed at the national and city levels to keep the momentum going, and this could be affected by frequent changes in officials and the lack of a permanent operations team in the cities. Continued and regular refresher on-job trainings of the kind provided under the project would also be important. Long term sustainability of the sector would require a more enabling regulatory environment to be in place to ensure priority to city public transport.

100. Trained staff are necessary to operate the more sophisticated depot equipment, and proper contracting arrangements (including handing over equipment to the selected private operators) are essential to ensure their proper usage and adequate maintenance. There is a risk that adequate funding may not be provided by the cities for the proper maintenance and upkeep of the equipment, as well as to address the increasing need for new fleets. Similarly, while ITS/ MIS are in use in two cities, with limited funding there remains a risk of their sustainability. The COVID-19 pandemic is further likely to stall progress in the short to medium term.



V. LESSONS AND RECOMMENDATIONS

101. **The level of performance varies across cities and is more dependent on the institutional setup, dedicated leadership and capacity as compared to available funding.**
102. **Engaging with the State Governments, along with the national and city governments, should be considered in future projects.** As part of the project, a strong need was felt for the creation of a nodal State Technical Unit to bring the desired attention and focus to the subject and to support city level SPVs in planning, design, financing, and management of CBS. The Bank should also consider using the PforR instrument when dealing with multiple cities under same operation to implement similar interventions as a part of existing or new Government programs.
103. **Centralized procurement, standardized templates and formats can help fast-track procurement and ease the process for medium-sized cities with weak procurement capacity.** Under ESCBS, the cities with limited ability and capacity each went through a steep learning curve for the procurement of equipment and ITS/ MIS. Having a centralized or standardized procurement process, with recommendations on system design/ specifications and a list of empaneled vendors, should be considered in future projects and programs of this nature. It would also eliminate the individual negotiations that the cities may have to navigate (on AMC, spares, trainings, etc.,) in future, and will help standardize and bring about economies of scale.
104. **Lack of continuity of officials and teams can affect project outcomes and consistent capacity building efforts are critical for successful implementation.** The Project lost valuable time due to the frequent transfer of officials and the consequent efforts needed to restart the dialogue with the Bank. Even the key positions in the operations teams (e.g., traffic manager) were either absent/ vacant or were affected by high attrition at both city and State levels. The lack of adequate qualified staff with continuity is in large part due to the policy and regulatory environment in Indian cities not yet assigning adequate priority to urban bus transport. The Bank has already made good progress in furthering the policy dialogue and must continue to do so for the long-term sustainability of the sector.
105. **A two-pronged approach to developing capabilities and the enabling environment helps to leverage private sector support.** ESMAP showed greater emission reduction by involving private operators in the trainings. Efforts on capacity building for the private sector (such as consultants, vendors, and service providers) in bus operations, maintenance, ITS/MIS, designing/ planning would be critical and help in scaling up impact. At the same time, the creation of an enabling environment by putting in place appropriate risk sharing mechanisms, dispute resolution mechanisms, timely payments, and a collaborative approach with private operators can help support much needed market development to achieve the necessary scale up in availability of bus services in the country.
106. **Dissemination.** The project did not explicitly include the dissemination of the results in the four demonstration cities. While dissemination was envisaged under the training and TA activities, it may be a good idea for similar demonstration projects to include the dissemination of results as part of project activities.



ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS

A. RESULTS INDICATORS

A.1 PDO Indicators

Objective/Outcome: Reduce GHG in Demo cities by improving efficiency and attractiveness of city bus transport.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Reduction in GHG emissions in project cities over a period of 10 years as a result of adoption of modernisation initiatives from the Business as Usual (BAU) scenario	Metric ton	1,094,430.00 09-Jul-2014	230000.00 31-Dec-2018	170,000.00 02-Nov-2018	238,600.00 31-Mar-2021

Comments (achievements against targets):

Scenario 1: GHG emission savings without the bus procurement is estimated to be 238,600 Mt (2020-30). Scenario 2: GHG emission savings after factoring in new fleet (700 ICE buses and 300 e-buses) that all the four cities have procured or are planning to procure in next 6 months is 454,600 MT.

Objective has been achieved and substantially surpassed (the higher original targets as well) in both scenarios.

GHG emission savings have resulted from higher service km being operated as a result of project activities that helped achieve higher fleet utilization, optimization and low fuel consumption in the project scenario as compared to the BAU. While the BAU scenario assumes a constant decline in fuel efficiency of project city fleets, improvement through utilization of depot equipment procured under the project has been realized. The majority of the



equipment was procured in 2019 with cities commencing utilization in early 2020 pre-pandemic with continued utilization on resumption of services post pandemic. The realized benefits can be observed through 2020 and post-project with a 14% improvement in fuel efficiency at the project level

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Rate of breakdowns to not exceed 5/10,000 kms	Text	Bhopal:4.2; Chandigarh:6.6; Jaipur:7.38; Mira Bhayandar:7.5 09-Jul-2014	Less than 5 breakdowns/10,000 kms 31-Dec-2018	Less than 5 breakdowns/10,000 kms 30-Dec-2020	Bhopal: 3.41; Chandigarh: 0.7; Jaipur: 2.9; Mira Bhayandar: 0.27 31-Mar-2021

Comments (achievements against targets):

Reported breakdown rates in all cities lower than the target. Objective has been substantially achieved

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Improvement in bus fuel efficiency in demo cities by at least 12% relative to business as usual (Annual Average in overall fleet - Bhopal: 3.2;	Text	Bhopal - 3.2km/l; Chandigarh - 3.4km/l; Jaipur - 2.76km/l; Mira-Bhayander - 2.8km/l	15%	12%	Overall - 14%; Pre COVID - 10%; Post project: 14%



Chandigarh:3.4; Jaipur:2.76; Mira Bhayandar:2.8)		09-Jul-2014	31-Dec-2018	30-Dec-2020	31-Mar-2021
<p>Comments (achievements against targets): City: BAU (km/ litre) & Project (km/ litre)</p> <p>Bhopal – 4.01 & 4.47; Chandigarh – 3.61 & 3.80; Jaipur - 2.71 & 3.47; Mira-Bhayander – 2.62 & 2.77</p> <p>All cities have shown improvement in kmpl relative to the BAU scenario with some cities surpassing the target of 12%. At the overall project level, an improvement of 10% has been reported at Pre-COVID (Jan - Feb 2020) and of 14% post project (Q1 FY 2021). Thus, indicator has been achieved.</p> <p>The ridership estimates in the BAU scenario have been based on the ridership per bus km observed in the project scenario and service kms assumed to be operated without project intervention. Service interruptions due to Covid have led to reduced services and in turn ridership in 2020, and a BAU scenario based on the city's readiness (infrastructure available without project interventions) to operate buses rendered inoperable due to extended lockdowns has been developed.</p>					

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Direct project beneficiaries	Text	100%	235,000,000	10% increase relative to business as usual	Pre-COVID: 20% Post project: 16%
		31-Aug-2016	31-Dec-2018	28-Dec-2018	31-Mar-2021
Female beneficiaries (Ridership)	Text	Bhopal: 39%; Chandigarh: 28%; Jaipur: 39%; Mira	Increase by 3%		Overall Post Project (2021): 36% Mid Term survey (2017): 40%; City wise Bhopal: 40%



		Bhayandar: 43%			Chandigarh: 32% Jaipur: 37% Mira Bhayander: 34%
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Comments (achievements against targets):

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Improvement in women's user satisfaction on a scale of 0-5, as compared to their current calculated index	Text	Bhopal:3.56; Chandigarh: 3.51; Jaipur:3.07; Mira Bhayandar:2.42 09-Jul-2014	atleast two cities 31-Dec-2018	 30-Dec-2020	Improved in Bhopal and Chandigarh 31-Mar-2021

Comments (achievements against targets):

City	Mid Term	End Term
Bhopal:	3.93	4.08
Chandigarh:	3.59	4.60
Jaipur:	3.56	2.64
MB:	3.21*	3.25*

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
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Improvement in Overall user satisfaction compared to their current calculated index	Text	Bhopal - 3.36; Chandigarh - 3.59; Jaipur - 3.44; Mira-Bhayander - 2.62	In at least two cities			Improved in Bhopal and Chandigarh; Bhopal: 4.11; Chandigarh: 4.55; Jaipur: 2.71; Mira Bhayander: 3.30
		09-Jul-2014	31-Dec-2018	30-Dec-2020	31-Mar-2021	

Comments (achievements against targets):

City	Mid Term	End Term
Bhopal:	3.68	4.11
Chandigarh:	3.63	4.55
Jaipur:	3.22	2.71
MB:	3.64[1]	3.30*

[1] MBMC numbers have been highly impacted by limited or no operations. There was no operator in MBMC in 2017 (Mid-term) and services were run departmentally as the procurement of an operator was getting protracted since 2014. Eventually the operator engaged since Aug 2019 was terminated on Dec 2020 due to payment related issues in COVID times and a new operator was engaged on 3rd Feb 2021.

A.2 Intermediate Results Indicators

Component: National Capacity Building for Urban Bus Sector

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised	Actual Achieved at
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				Target	Completion
Policy notes and recommendations developed for sustainable city bus transportation and deliberations at national and state level initiated.	Text	-	At least five workshops held at national and state level		<ul style="list-style-type: none"> Focus Group Discussion on initial hypothesis with key stakeholders held at Delhi in July 2019 15 city/state level workshops were held from 14th to 18th Dec 2020 Two National level workshops held on 28 and 29 Dec 2020
		09-Jul-2014	31-Dec-2018	30-Dec-2020	31-Mar-2021

Comments (achievements against targets):

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
City bus operators trained in / exposed to best practices in low-carbon programs including improved fuel efficiency techniques	Number	0.00	33.00		19.00
		01-Jan-2014	31-Dec-2018	30-Dec-2020	31-Mar-2021

Comments (achievements against targets):

- 19 operators across 34 depots trained with support from ESMAP,



- 20 staff from 12 city bus transport agencies trained under LUTP, and
- 21 officials from 8 agencies trained in participating states through a CEPT training program including exposure visits

Component: City Demonstration Projects - Physical Improvements

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Modern depot equipment installed in all project cities	Text	Modern equipment not in place 09-Jul-2014	All project cities 31-Dec-2018	 30-Dec-2020	Depot Equipments were installed and are functioning in depots in the four cities. 31-Mar-2021

Comments (achievements against targets):

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Increased use of ITS and MIS data and tools in operations planning and management	Text	Limited use of ITS/Manual systems for data reporting in place	ITS systems being used in all project cities; MIS reports developed		ITS/MIS systems are live in Bhopal, Chandigarh and Mira Bhayander. Jaipur is implementing the ITS systems using its internal funds.



		09-Jul-2014	31-Dec-2018	30-Dec-2020	31-Mar-2021
Comments (achievements against targets):					

Component: City Demonstration Projects - Technical Assistance & Capacity Building

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
More efficient and user responsive bus service plans prepared and adopted in demo cities	Text	Service plans partially in place 09-Jul-2014	At least 2 cities 31-Dec-2018	 30-Dec-2020	<ul style="list-style-type: none"> Service plans in place in Bhopal. Service plans developed in 2 cities (Chandigarh and MBMC) and under process for adoption. 31-Mar-2021
Comments (achievements against targets):					

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Demo cities have institutional systems in place for monitoring and evaluation of bus fuel	Text	Not in place; partially in Bhopal	At least 2 cities		Partially in place in Jaipur and Bhopal. In Chandigarh separate team had been put in



efficiency program		09-Jul-2014	31-Dec-2018	30-Dec-2020	place for managing the fuel efficiency program. Mira Bhayander to commence fuel efficiency program 31-Mar-2021
Comments (achievements against targets):					



B. KEY OUTPUTS BY COMPONENT

Objective/Outcome 1: Reduce GHG in Demo cities by improving efficiency and attractiveness of city bus transport	
Outcome Indicators	<ul style="list-style-type: none"> a. Reduction in GHG emissions in project cities over a period of 10 years as a result of adoption of modernisation initiatives from the Business as Usual (BAU) scenario [baseline: 1,094,430 Metric Ton (MT); target: 170,000 MT] b. Rate of breakdowns to not exceed 5/10,000 kms [baseline: Bhopal: 4.2; Chandigarh: 6.6; Jaipur: 7.38; Mira Bhayander: 7.5; target: less than 5/10,000 km] c. Improvement in bus fuel efficiency in demo cities by at least 12% relative to business as usual [baseline: Bhopal: 3.2; Chandigarh: 3.4; Jaipur: 2.76; Mira Bhayander: 2.8; target: 12% relative to BAU] d. Direct project beneficiaries [baseline: 100%; target: 10% increase in ridership relative to BAU at project end] e. Female beneficiaries (Ridership) [baseline: Bhopal: 39%; Chandigarh: 28%; Jaipur: 39%; Mira Bhayander: 43%; target: 3%] f. Improvement in women's user satisfaction on a scale of 0-5, as compared to their current calculated index [baseline: Bhopal: 3.56; Chandigarh: 3.51; Jaipur: 3.07; Mira Bhayander: 2.42; target: In at least 2 cities] g. Improvement in Overall user satisfaction compared to their current calculated index [baseline: Bhopal: 3.36; Chandigarh: 3.59; Jaipur: 3.44; Mira Bhayander: 2.62; target: In at least 2 cities]
Intermediate Results Indicators	<p>Component 1 - National Capacity Building for Urban Bus Sector</p> <ul style="list-style-type: none"> 1. Policy notes and recommendations developed for sustainable city bus transportation and deliberations at national and state level initiated. [baseline: under review; target: at least 5 workshops for discussion and deliberation held at national and state level]



	<p>2. City bus operators trained in / exposed to best practices in low-carbon programs including improved fuel efficiency techniques [baseline: 0; target: 33]</p> <p>Component 2A - City Demonstration Projects – Physical Improvements</p> <p>3. Modern depot equipment installed in all project cities [baseline: Modern equipment not in place; target: Equipment installed and functioning in all cities]</p> <p>4. Increased use of ITS and MIS data and tools in operations planning and management [baseline: Limited use of ITS/Manual systems for data reporting in place; target: ITS systems functional in all project cities]</p> <p>Component 2B - City Demonstration Projects - Technical Assistance & Capacity Building</p> <p>5. More efficient and user responsive bus service plans prepared and adopted in demo cities [baseline: Service plans partially in place; target: in at least two cities]</p> <p>6. Demo cities have institutional systems in place for monitoring and evaluation of bus fuel efficiency program [baseline: Not in place; partially in Bhopal; target: in at least 2 cities]</p>
<p>Key Outputs by Component (linked to the achievement of the Objective/Outcome 1)</p>	<p>Component 1 - National Capacity Building for Urban Bus Sector</p> <p>1. Policy notes, manuals and guidance documents for the following developed and endorsed by the MOHUA:</p> <ul style="list-style-type: none"> a. PC1 - TA on legislative, institutional and fiscal constraints to city bus services (DOA³⁴ 4 Jan 2018 to DIMTS, India) b. PC2 - Design and Development of Training Programme for City Transport Professionals (DOA: 1 Oct 2018 to Deloitte and CIRT consortium) c. PC3 - Developing a Manual on FRS & RFP for ITS and MIS for Urban Bus Systems (DOA: 3 Oct 2018 to DIMTS, India) d. PC4 - Develop a Manual on Planning, Design and Implementation of Depots for City Bus Operations (DOA: 27 April 2018 to DIMTS, India) e. PC5 - Conducting ESMAP for driver and maintenance staff training for fuel economy in select NURM cities (DOA: 1 Oct 2018 to Zone 1 – 21 depots by PCRA and Zone 2 – 16 depot by Centum)

³⁴ Date of Award



- f. PC7 - Preparing Service and Business Plan for City Bus Operations for Chandigarh and Mira Bhayander (DOA: 30 Oct 2019 to CEPT, Ahmedabad)
2. Capacity Building:
- a. Development of Manuals and Training Toolkits;
 - b. Conduct of Trainings and Knowledge Events for City Bus Services Sector;
 - c. Staff exchange program between established STUs and newly instituted SPVs;
 - d. Organizing LUTP
- Component 2A - City Demonstration Projects – Physical Improvements**
3. Depot related:
- a. **Bhopal:**
 - i. 3 new depots being planned in the city for future bus procurements
 - ii. Depot modernization by installing solar panels, toilets for women staff, etc,
 - iii. 32 equipment of 15 types³⁵ installed at Depot 1, 2 and 3 (Bairagarh Depot, ISBT Depot and Jawahar Chowk Depot)
 - b. **Chandigarh:**
 - i. New Depot under approval and will be constructed at Raipur Kalan location (with GRIHA rating standards and own funds)
 - ii. Depot modernization by installing solar panels, toilets for women staff, etc and
 - iii. 13 different types of depot equipment installed (2018-19) at Depot 2
 - c. **Jaipur:**
 - i. New Depot constructed at Bagrana and Todi
 - ii. Depot modernization by installing solar panels, toilets for women staff, etc,
 - iii. 63 total depot equipment procured - in first phase 13 type of 32 equipments and in second phase 13 types of 31 equipments have been procured & installed at Bagrana, Todi, Sanganer and Vidhyadhar nagar Depots.

³⁵ Nozzle Tester, Diesel Smoke Meter, Wheel Alignment Machine, Balancer Machine, Fully Automatic Tire Changer Hydraulic Type, Nitrogen Tire Inflator, Auto Electrical Test Bench, Head Light Beam Aligner, Pneumatic Impact Wrench & Socket, Automatic Bus Washing Plant, Heavy Duty Vacuum Cleaner, Silent Generators, Lathe Machine, Paint Booth, Computerized Lube Oil Dispensing and Monitoring System, Heavy Duty Engine Lifting Crane (Hydraulic), Quick Oil Chamber Flush/Filter/Clean Machine, Air Compressor, Post Mobile Column Lift 5.5 T X 4 For Buses, High Pressure Direct Drive Washer, Portable Oil Dispensing System, Greasing System, Ride on Bus Parking Floor Sweeper Machine, Ride on Floor Scrubbing Machine, Ultra-Sonic Cleaning Machine



d. **Mira Bhayander:**

- i. New Depot constructed at Ghodbunder location, and 23 depot equipment installed at the Depot (from 2019-2020)
- ii. Night parking locations (3 in number) developed,
- iii. Depot modernization by installing solar panels, toilets for women staff, etc

4. MIS/ ITS

a. **Bhopal:**

- i. Modern management systems (MIS) including following features - MIS for Fleet Management System (Existing AVLS System), MIS for Ticketing Management System & Concessional Management System (Existing FCS System), MIS inter-face for Network, Route, Bus & Crew Management including optimization of timetable, Bus and Crew; Bus Maintenance Management System including workshop, maintenance, store, inventory and procurement; Fuel Management System; Depot and Driver Performance management; Contract/Concessionaire Contract Management; Tyre Management System;
- ii. Mobile Application for monitoring operations ;
- iii. Mobile App for bus users named “Chalo App”

b. **Chandigarh:**

- i. Management systems (MIS), web portal
- ii. Mobile App for bus users named “TryCityBuS”,
- iii. Mobile App for managers
- iv. Modern fare collection systems (ETM/ AFC/ smart card),
- v. Intelligent Transport systems (ITS – GPS/ AVLS, Station PIS, OBITS, in Bus CCTV),
- vi. GRSM with web and App interface
- vii. S&R solution
- viii. TMS/ DMS solution
- ix. BI & MIS solution
- x. Command and Control Centre

c. **Mira Bhayander:**

- i. Modern management systems (MIS) with Fleet Management System (FMS) inter-face with MIS; Fare Collection System (AFCS); Vehicle Scheduling & Crew Allocation (VSCA), AVLS, PIS, DMS, VMS, CCMS



- ii. ITS including procurement, Installation, Testing and Commissioning of Vehicle Tracking Device (VTD) as per the specification AIS-140 for Buses,
- iii. Integration of existing OBU (pre-installed KPIT GPS units as a part of OBITS) and OBU in New Buses with the proposed Fleet Monitoring System;
- iv. Fare Collection System including On board ETM Devices, Smart Card Issuance system;
- v. PIS, CCTV Cameras and required hardware, network equipment for Bus Stations, Bus Parking Locations, Bus Depot and CCC;
- vi. Setting up of Cloud based hosting for ITS Solution and Central Control Center at Ghodbunder Depot;
- vii. Providing 24*7 network availability between ITS components in Buses, at Bus stations, Bus Parking Locations, Bus Depot, Cloud DC and CCC; Development, Testing and Commissioning of Web based software application;
- viii. Operations and Maintenance of ITS solution for 5 years post successful GO-LIVE of the system (including 3 years of post-implementation comprehensive warranty)
- ix. Mobile App for bus users called “Majhi Bus”,

Component 2B - City Demonstration Projects - Technical Assistance & Capacity Building

- 5. Total 3,051 participants were trained during various workshops and capacity building activities under the Program, including:
 - a. ~1600 participants trained in domestic training programs undertaken from 2017-2020
 - b. 36 Participants were trained under LUTP - CEPT and international study tour belonging to 17 cities in 15 different states
 - c. 21 additional officials (19 from 4 project cities and 2 from Jabalpur City Bus service) were trained during the workshops organized by CEPT.
 - d. 10 participants trained during international study tours
- 6. Fuel efficiency program (introduced at Bhopal, Chandigarh, Jaipur and Mira Bhayander
 - a. ESMAP fuel efficiency program in 34 depots (with 34 operators) of 21 cities across 12 states supported training of 1437 drivers, crew and maintenance staff



ANNEX 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION

A. TASK TEAM MEMBERS

Name	Role
Preparation	
Nupur Gupta	Task Team Leader(s)
Jurminla Jurminla	Procurement Specialist(s)
Neha Dhoundiyal Gupta	Financial Management Specialist
Gaurav D. Joshi	Social Specialist
Sangeeta Kumari	Social Specialist
Supervision/ICR	
Nupur Gupta	Task Team Leader(s)
Satyanarayan Panda	Procurement Specialist(s)
Neha Gupta	Financial Management Specialist
Radha Narayan	Procurement Team
Payal Malik Madan	Procurement Team
Gaurav D. Joshi	Environmental Specialist
Deepali Uppal	Team Member
Pamela Patrick	Procurement Team
Raman V. Krishnan	Team Member
Harjot Kaur	Social Specialist
Jaishree Jindel	Team Member



B. STAFF TIME AND COST

Stage of Project Cycle	Staff Time and Cost	
	No. of staff weeks	US\$ (including travel and consultant costs)
Preparation		
FY13	22.567	135,855.38
FY14	52.237	316,340.82
FY15	52.556	285,456.90
FY16	11.400	67,178.51
FY17	5.990	28,740.79
FY18	11.260	41,693.71
FY19	4.095	17,499.63
Total	160.11	892,765.74
Supervision/ICR		
FY15	0	3,156.08
FY16	19.629	233,542.80
FY17	26.353	248,252.54
FY18	16.892	216,118.61
FY19	9.880	110,115.64
FY20	5.570	109,894.85
Total	78.32	921,080.52



ANNEX 3. PROJECT COST BY COMPONENT

Components	Amount at Approval (US\$M)	Actual at Project Closing (US\$M)	Percentage of Approval (US\$M)
Component 1: National Capacity Building for Urban Bus Sector	0.7	2.37	338%
Component 2A: City Demonstration Projects: Physical Improvements	6.0	5.72	95%
Component 2B: City Demonstration Projects : Technical Assistance and Capacity Building	2.1	0.93	44%
Project Management Cost	0.4	0.20	50%
Total	9.20	9.15	99.5%

Table 9: Project Cost by Agency and Funding Source at Project Approval and Closing (In INR Cr)

Agency	Cost Break up (INR Crore) - PAD					Payment Break up (INR Crore) - Actual					
	Gol/NURM	State	PIU	GEF	Total	Gol/NURM	State	PIU	GEF	Private	Total
MOUHA	23.20	-	-	6.05	29.25	6.28	-	-	18.08		24.36
Bhopal city link limited	29.13	11.50	17.30	11.20	69.13	31.36	15.42	23.79	11.11	11.70	93.38
Chandigarh Transport Undertaking	120.20	92.93	4.00	11.20	228.33	59.33	-	66.75	16.07		142.15
Jaipur City transport Service limited	133.46	65.00	67.65	11.20	277.31	91.80	39.74	49.48	6.56		187.58
MBMC	37.80	9.70	10.53	11.20	69.23	22.09	6.40	48.91	13.51		90.91
Total	343.79	179.13	99.48	50.85	673.25	210.86	61.56	188.93	65.33	11.70	538.38

Table 10: Project Cost by Component and Funding Source at Project Approval (US\$ million)

Costs by Component		Approval Stage					Project Closing					
S.No.	Activity	GOI*	State+	PIU@	GEF	Total	GOI*	State+	PIU@	GEF	Private	Total
Component 1 - National Capacity Building and Technical Assistance												
1	Policy Notes, Training Programs & Knowledge Transfer	2.8	0	0	0.7	3.50	-	-	-	2.37		2.37
Sub-Total (Component 1)		2.8	0	0	0.7	3.50	-	-	-	2.37		2.37
Component 2A - Demo projects												
1	Modern Buses	49.82	27.26	15.55	0.00	92.64	31.39	9.04	20.67	-	1.80	61.10
	a) Scheme I	21.02	6.97	10.58	0.00	38.57	21.64	6.39	10.78	-		38.81
	b) Scheme II	28.80	20.29	4.98	0.00	54.07	9.74	2.65	9.89	-	1.80	22.28
2	Depot Modernization	2.46	1.26	1.47	2.02	7.21	1.66	0.92	7.11	2.30		12.00
	a) Construction of new Depots	2.46	1.26	1.47	0.00	5.19	1.66	0.92	7.11	-		9.70
	b) Depot Equipment	0.00	0.00	0.00	2.02	2.02	-	-	-	2.30		2.30
3	ITS Upgradation (MIS/PIS/AVLS/AFCS)	0.67	0.67	0.00	3.98	5.32	-	-	1.39	3.42		4.81
	a) MIS	0.00	0.00	0.00	2.94	2.94	-	-	1.39	3.42		4.81
	b) PIS/AVLS/AFCS	0.67	0.67	0.00	1.05	2.39	-	-	-	-		0.00
Sub-Total (Component 2A)		52.95	29.19	17.02	6.00	105.17	33.05	9.96	29.17	5.72	1.80	77.90
Component 2B - Capacity Building at City/PIA level												
1	Project Preparation Costs	0.46	0.13	0.19	0.00	0.78	0.20	-	0.55	-		0.76
2	TA for ITS/ MIS implementation, service & business planning, marketing, fuel efficiency etc.	0.00	0.00	0.00	1.74	1.74	-	-	0.02	0.70		0.72
3	Capacity building and incremental operating costs	0.00	0.00	0.00	0.36	0.36	-	-	-	0.23		0.23
Sub-Total (Component 2B)		0.46	0.13	0.19	2.10	2.88	0.20	-	0.57	0.93		1.71
PMU Project Management Cost		1.40	0.00	0.00	0.40	1.80	0.90	-	-	0.20		1.11
Total Financing		57.61	29.33	17.21	9.20	113.4	34.15	9.96	29.74	9.2	1.80	84.89

Note:

* refers to funding from all GOI sources including from MoHUA and NURM

+ denotes from all sources from the state budget or sources (for instance RTIDF in Rajasthan) or Union Territory budget

@ indicates funding from the respective city implementation agency



ANNEX 4. EFFICIENCY ANALYSIS

Introduction

1. This annex estimates the GHG benefits associated with urban transport initiatives undertaken in the four ESCBS demonstration cities. The data used in the analysis has predominantly been taken from the monitoring reports during project implementation. Some of the project components have only recently been completed, and estimates have been made in their case based on the results of similar projects. This annex concentrates on carbon dioxide, as it is the dominant contributor to global warming. Carbon dioxide emissions at 2.75 kgs/lit of petrol and 2.94 kgs/lit of diesel are assumed to be fixed independent of the mode.

Methodology

2. Emissions in all cities were evaluated using a common methodology where an equal volume of passenger travel, measured in passenger kilometers in a Business-as-Usual (BAU) scenario and project scenario, is converted to emissions depending on the mode used and the difference in emissions evaluated.

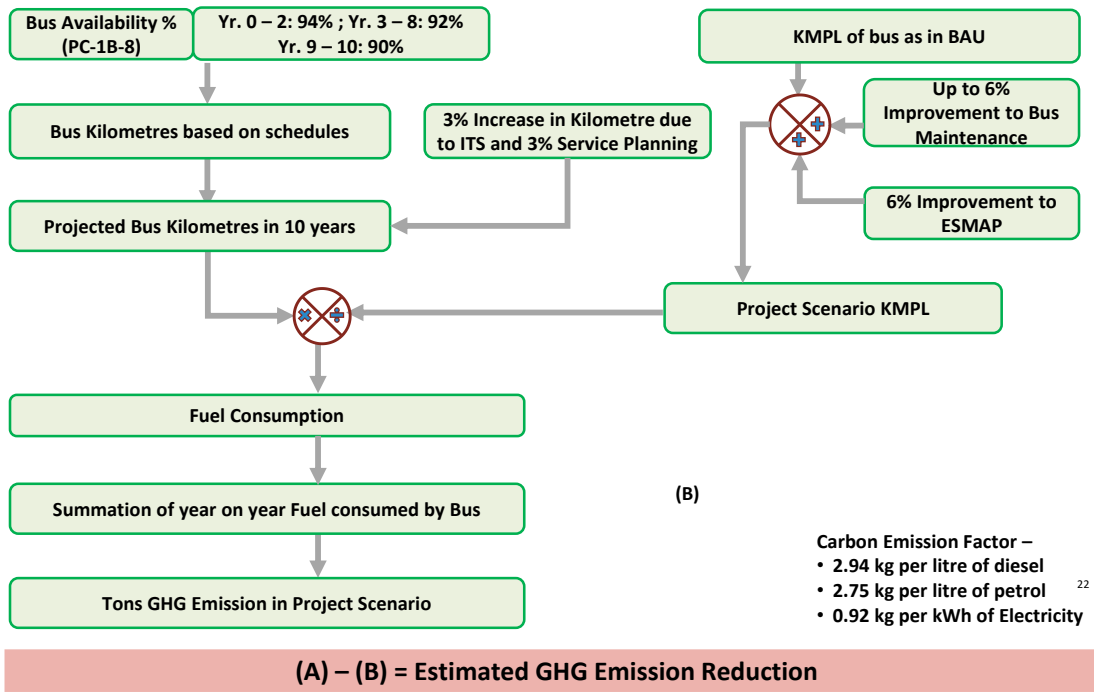


Figure 3: Methodology for emission estimation in Project scenario

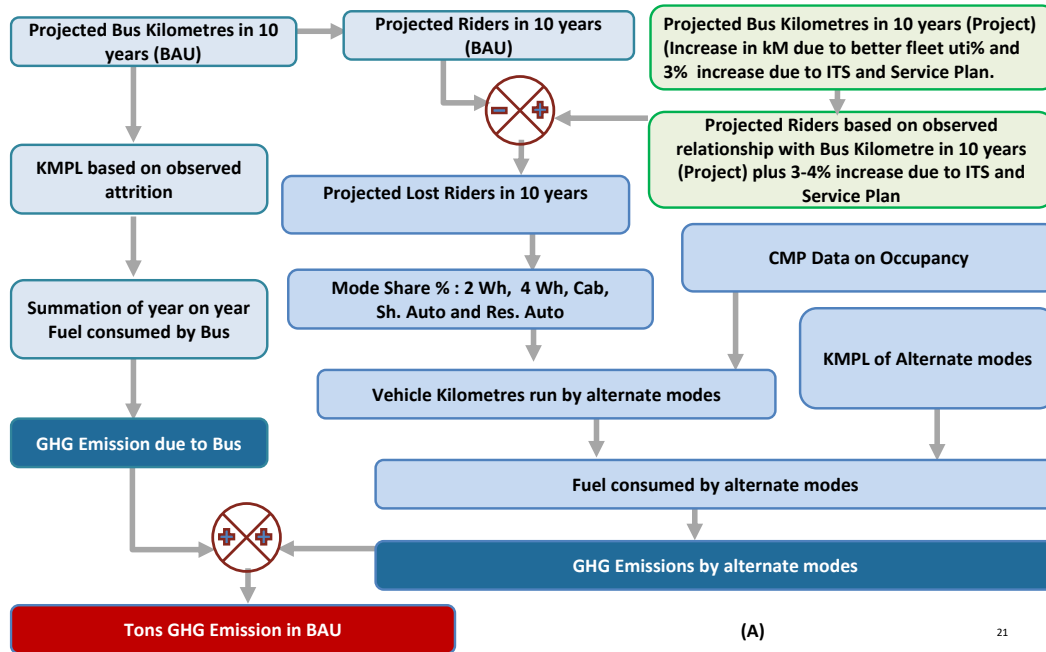


Figure 4: Methodology for emission estimation in BAU scenario

3. Passenger trip characteristics and the mode for the travel volume were analyzed separately for the four project cities using data from the M&E surveys (which included questions such as secondary mode of travel) and existing secondary sources such as the Comprehensive Mobility Plans/ Comprehensive Traffic and Transportation Plans. The average trip lengths, occupancies and mode share for the cities used for the analysis is presented in the table below.

Table 11: Travel Parameters assumed for project cities

Mode	Bhopal	Chandigarh	Jaipur	Mira Bhayander
Average Trip Length				
(kms)	7.52	6.95	5.14	11.1
Mode Share (%)				
Two-Wheeler	35	10	29	52
Car	15	4	10	7
Taxi	5	19	18	11
Three-Wheeler (shared)	40	63	36	26
Three-Wheeler (reserved)	5	4	-	4
Minibus	-	-	7	-
Occupancy				
Two-Wheeler	1.6	1.33	1.6	1.6
Car	2.6	2.07	1.8	2.7
Taxi	2	2	1.8	2.7
Three-Wheeler (shared)	3	3.9	2.6	2.2
Three-Wheeler (reserved)	2	2	-	1.5
Minibus	-	-	15	-



4. In practice, emissions by mode would vary slightly among projects, depending on the local geography and traffic conditions which can affect fuel consumption. However, location-specific fuel consumption data are only partially available and instead a standard set of fuel consumptions, based on Indian conditions, has been adopted.

Table 12: Fuel Consumption for modes adopted in the analysis

Mode	Fuel type	Fuel consumption (kmpl)
Motorcycle	Petrol	50
Three-wheeler (shared)	Diesel	28.6
Three-wheeler (reserved)	Diesel	18.6
Taxi	Petrol/ Diesel	12.5
Car	Petrol/ Diesel	12.5

5. Project interventions (such as service planning through ITS/ MIS or a service optimization exercise) lead to an increase in system service kms. Based on the experience in ITS/ MIS implementation in Mysuru under the SUTP project, a three percent increase in system service kms has been assumed for the project. The cities of Mira Bhayander and Chandigarh implemented ITS/ MIS in 2020, while Bhopal had implemented ITS/MIS in 2019. Bhopal had also undertaken a service planning exercise in 2016 and a three percent decrease in service kms has been accounted for in the BAU scenario for the city.

6. Systemwide ITS/ MIS implementation also provides the transit authorities better monitoring capabilities to improve service quality, while providing passengers better access to service information thereby improving the attractiveness of bus transit. The project scenario uses an improvement of two percent in the load factor due to service planning and a two percent improvement due to ITS/MIS implementation.

7. The project scenario also projects the improved fuel efficiency of buses in the project cities through a combination of activities, including depot modernization and KMPL focused maintenance and driver trainings under ESMAP. A pilot ESMAP training was undertaken by all project cities in the baseline year 2014. Only Depot 2 in Chandigarh and the Sanganer Depot in Jaipur were part of the pilot program. In 2017, Bhopal, Chandigarh and Jaipur had undertaken three rounds of training under the program and an average reported improvement of four percent has been provisioned in the project scenario through 2017-2018. The table below presents the impact of EMSAP on the fuel efficiencies of the cities.

Table 13: Impact of ESMAP training in project cities

	2014 KMPL Improvement	2016 KMPL Improvement
Bhopal	2.31%	4%
Chandigarh	2.99%	4%
Jaipur	1.79%	4%
Mira Bhayander	1.91%	-

8. As a result of the multiple rounds of training under ESMAP, the project cities have developed the institutional capacity to continue the program. As a result, an improvement of six percent (reported under the national implementation of ESMAP across 35 city bus depots in India) as compared to the BAU scenario has been assumed for new buses procured after 2020 in the project scenario for all cities. An initial impact of three percent each in the first



two years of depot modernization, and a sustained improvement of six percent as compared to the BAU scenario has been assumed in all the project cities.

9. The decline in fuel efficiency of buses due to age and maintenance practices has been considered in both scenarios. In the BAU scenario, the kmpl of buses in the cities of Bhopal, Jaipur and Mira Bhayander, which at the time of project inception had poor infrastructure and maintenance practices, is assumed to decline at two percent annually. In the case of Chandigarh, which already had adequate infrastructure, a decline of one percent annually has been assumed. In the project scenario, a decline of 0.5 percent in all cities, attributable to the improvement in infrastructure and maintenance practices, has been assumed.

10. Fleet utilization in the BAU scenario is based on the trend of utilization observed in the project cities prior to the implementation of the project. In each city the performance of the varied fleet type or depot, where fleet level data is not available, has been considered to determine the trend for utilization during the projection period.

11. The project scenario assumes that the physical and operational improvements and increase in institutional capacities of the cities will ensure a high fleet utilization. The fleet utilization for all newly inducted fleet will follow a fleet utilization of 94 percent in the first two years, 92 percent over the next four years, and 90 percent over the last four years.

12. The project interventions and fleet utilization assumed in each of the cities is presented below.

Bhopal

13. City bus operations are managed by BCLL and operated by private operators. As part of the project, the private operators were provided driver and maintenance training under ESMAP in 2014 and 2017. The impact of the program is accounted for in the BAU scenario. BCLL had undertaken a service planning exercise in 2016 and accordingly an impact on service kilometers and load factor have been accounted for in the BAU scenario. BCLL has implemented a system wide ITS /MIS in 2019 under the project and accordingly a one-time impact on service kilometers and load factor in 2020 has been accounted for.

14. Fleet utilization in the BAU scenario is based on the observed trends of existing bus fleets have assumed. Refer to the table below for utilization for the different fleet types in the city.

Table 14: Fleet Utilization for Bhopal fleet types in BAU scenario

Fleet Type	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Semi Low Floor 900 mm	90%	82%	75%	67%	60%	52%	44%	44%	44%	44%
AC Low Floor 400mm	90%	80%	70%	60%	50%	40%	30%	20%		
Non-AC Midi buses	90%	82%	75%	67%	60%	52%	44%	44%	44%	44%

Chandigarh

15. City bus operations are managed and operated by CTU. Under ESMAP, a pilot was conducted in Depot 2 in 2014. In 2017, another round of training was conducted by the Bank, which was further expanded to all depots internally by the agency. In both cases the impact of the trainings has been accounted for a period of two years in the BAU scenario. Depot Modernization has been undertaken in Depots 2 and 3 in 2019 and 2020. A three percent improvement in kmpl in the mentioned years has been assumed in the project scenario.

16. After multiple iterations, CTU has implemented a systemwide ITS/ MIS in 2021. The ITS/ MIS will increase the



attractiveness of the service and the optimization will result in a one-time increase in the load factor and service kilometers of four percent and three percent respectively in 2021 under the project scenarios.

17. Fleet utilization in the BAU scenario is based on the observed trends of existing bus fleets in different depots. The following table presents the utilization for the different depots.

Table 15: Fleet Utilization of Depots in Chandigarh in BAU scenario

Depot	Fleet Type	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12
Depot-4	100 TATA Standard Buses	95%	95%	95%	95%	95%	95%	98%	94%	93%	93%	92%	92%
Depot-2	170 SML Midi Buses	88%	84%	84%	88%	86%	84%	81%	74%	67%	60%	-	-
Depot-3	Tata Midi non- AC and Corona HVAC	88%	88%	90%	90%	86%	82%	78%	74%	70%	66%	-	-
	Leyland Mini AC and Standard Buses	90%	87%	83%	80%	77%	73%	70%	67%	63%	60%	-	-

Jaipur

18. City bus operations are managed by JCTSL. Under ESMAP, a pilot was conducted in Sanganer Depot in 2014. In 2017, another round of training was conducted by the Bank for private operators in Todi and Vidhyadhar nagar Depot. In both cases, the impact of the trainings has been accounted for in the BAU scenario for two years.

19. Depot Modernization has been undertaken in the **Todi, Sanganer and Bagraana Depots. The newly constructed Bagraana depot is scheduled to be operational in 2021, and 100 buses operating from Sanganer Depot are planned to be shifted to the newly constructed depot. In the BAU scenario, the replacement buses have been assumed to be operated under JCTSL from the Sanganer Depot. The impact of modernization has been assumed to improve kmpl through 2018 and 2019 in the project scenario.** Jaipur has not implemented ITS/MIS under the project and no benefits have been assumed in the project scenario from ITS/MIS.

20. Fleet utilization in the BAU scenario is based on the observed trends of the existing bus fleets by mode of operations, i.e., private or JCTSL operated. The following table presents the utilization by mode of operation in Jaipur.

Table 16: Fleet Utilization of Depots in Jaipur in BAU scenario

Operator	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
JCTSL	90%	88%	86%	84%	78%	63%	55%	50%	45%	45%
Private Operator	95%	88%	81%	84%	81%	78%	75%	72%	69%	66%

Mira Bhayander

21. MBMC manages the city bus operations. Under ESMAP, a pilot was conducted with the private operator in 2014. Unlike other project cities, Mira Bhayander did not undertake a second round of ESMAP trainings. The newly constructed depot with modern equipment installed became operational in August 2019 under a newly appointed



private operator. The impact of depot modernization has been attributed in the project scenario in 2020 and 2021.

22. ITS/MIS implementation was completed in 2020 and a three percent improvement in service kilometers, and a four percent improvement in the passenger load factor due to optimization of ITS/MIS has been assumed in 2021. Fleet utilization in the BAU scenario is based on the observed trends of existing fleet under MBMC and is presented below.

Table 17: Fleet Utilization of Depots in MBMC in BAU scenario

Operator	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
MBMC	70%	66%	65%	54%	55%	30%	20%	15%	15%	15%

Impact of COVID-19

23. Due to the COVID-19 pandemic, all bus operations were suspended in the project cities in late March 2020. During the nation-wide lockdown, buses were vital in providing essential services in the cities. In most project cities, limited operations for the public resumed in July 2020, with various restrictions (e.g., occupancies/ routes/ timings) as per directives issued by the Central and respective State Governments. Since the resumption of services, cities have planned steadily increasing services, responding to the growing demand. By March 2021, ridership in all cities had recovered significantly in comparison to pre-pandemic level despite the lack / limited demand from educational institutions and offices. Jaipur, Bhopal, and Chandigarh had reached 68 percent, 65 percent, and 75 percent of pre-pandemic level ridership, while Mira Bhayander had reached 80 percent of daily commuters reported in the same quarter last year. The uptake of public transport in the project cities have been positive and the expected project ridership levels are expected to be achieved by the end of the year. The impact of the pandemic is therefore assumed to be limited to 2021, the first year of the projection period.

24. The pandemic has delayed the procurement plans for additional and replacement fleet in cities, but all cities except Mira Bhayander are at various stages of tendering for buses. A delayed procurement schedule based on communication from the city agencies has been accounted for in the BAU and project scenario.

Summary

25. The project has over-achieved the target savings of 170,000 tons. A major increase in savings has been achieved in Bhopal due to the city’s recent plan to induct 700 new buses in the fleet, compared to the 225 buses envisaged during appraisal. In contrast, the cities of Chandigarh, Jaipur and Mira Bhayander are procuring smaller fleets, as compared to the projected fleet.



ANNEX 5. BORROWER, CO-FINANCIER AND OTHER PARTNER/STAKEHOLDER COMMENTS

“On perusal of the contents of the draft ICR as prepared by the World Bank, it is submitted that the report, correctly and wholly, summarises all aspects of the project and its implementation. The draft ICR has brought out all aspect of PDO, project implementation and benefits achieved and lessons learnt etc”



Appendix to ANNEX 5. SUMMARY OF BORROWER COMPLETION REPORT

Rationale for the Project

- 1. India's economic growth accompanied by urban transformation, has led to increase in the relative proportion of cities populations, with 53 cities36 having over one million, urgency to accommodate 10 million urban dwellers annually, and the increasing dependence on personal transport impeding sustainable growth. The World Bank-GEF aided and UNDP and Union/State Governments supported Sustainable Urban Transport Project (SUTP) had earlier successfully demonstrated (2010-18) how to achieve growth with sustainability. Pilot cities, Mysuru (ITS, PBS), Hubli-Dharwad (BRTS), Indore (ITS), Pimpri-Chinchwad (BRTS) and Naya-Raipur (NMT, BRT, TOD) have become examples that are being emulated.
2. As city-bus transport is expected to remain the mainstay of urban mass transit in India, the ESCBS project was taken up as a corollary to SUTP with accent on improving the efficiency of city-bus services, to make them more attractive and the preferred mode of transport, and with the principal objectives as under.
- Adoption of modernization initiatives in bus operation and maintenance
- Lower GHG emissions from increased ridership by bus and safer travel
- Improved bus fuel efficiency
- Reduction in breakdowns per 10,000 km
- Higher level of user satisfaction, particularly in women users.

Project Achievements

- 3. National Level Interventions (3051 officials were trained in related fields)

Table 18: National Level Intervention

Table with 2 columns: National Level Interventions and Status. Rows include: Developing options and recommendations for resolving Regulatory, Institutional and Fiscal Constraints; Preparation of a Manual and Guidance Documents on Standardized Functional Specifications for ITS/ MIS, model RFP and business strategies; Preparation of a Manual and Guidance Documents on designing of efficient city bus depots, with various options and implementation methods; Design and Testing of Skill Development Program for City Bus Professionals; Service and Business Plans for Chandigarh and Mira Bhayander cities; Fuel Efficiency Programme through targeted Driver Training and Bus Maintenance protocols as non-consultancy service in 31 depots across the country.

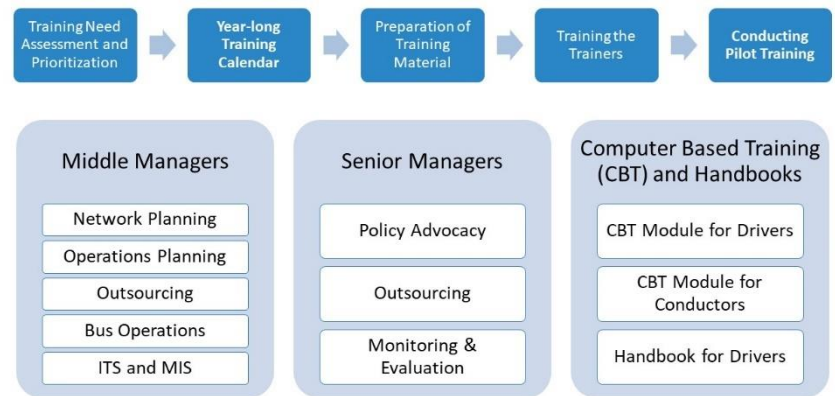
36 http://mohua.gov.in/cms/number-of-cities--towns-by-city-size-class.php



4. In addition to the training of 3051 officials of various government organizations connected with urban transport, drawn from all states and UTs, eight sets of training modules were created for priority areas identified through analysis of training needs (PC-2). The planned year-long training program needs to be pursued by the MoHUA under capacity building in urban transport scheme.

5. In areas where knowledge is not available for the sector professionals with context-relevant content, Guidance Documents and Manuals were created (after in-depth analysis of needs in the Indian context and of best practices overseas and within the country) for ITS and MIS and for city-bus depot designs. Preparation of Business Plans and Service Plans were initially assigned to cities. However, as cities expressed lack of capacity, the exercise was carried out from PMU for two cities viz, Chandigarh and Mira- Bhayander, through CEPT university (PC-7).

National Level (PC 2) Salient Features



6. The city bus fuel efficiency improvement program under the ESMAP umbrella elicited not just the interest of all participating depots but also yielded very substantial results: saving about 7500 tons of CO2 emissions and Rs 16.14 crore in the span of one year. Expenditure on the program was only Rs. 3.08 crore. At the end of implementation, the supervisory and maintenance staff and crew were convinced of its utility. The main reason for the success of this data driven exercise was that the services of the “partner institutes” for guiding the 34 bus depots across the country had been procured by the MoHUA; the depots had only to volunteer. This program must be institutionalized for all future bus funding schemes of the governments.

7. **PC-1, the pivotal study to develop options and recommendations for resolving regulatory, fiscal, and institutional constraints, progressed to 85% of its content during the project’s duration. The balance will be pursued by the MoHUA, till completion.**

8. The ESCBS project followed some of the best examples of ITS deployed for efficient management of city-bus transport. Chandigarh & Mira Bhayander included GPS devices on buses to track each bus in operation, a 24x7 Central Control Station to monitor services and provide real-time information on arrival/departure times on mobile phones, PIS and on Internet. This helped save waiting time at stops. Fare Collection System consisting of Electronic Ticketing Machines with Smartcard capability compatible with NCMC, and a Transit Management System to improved planning and scheduling of bus operations and crew management were included.

9. At Bhopal, the city management required that existing AVLS & AFCS data being generated through the pre-deployed ITS solutions be integrated with the new comprehensive MIS system for Schedule Planning, Fleet Management and Maintenance, Operations Control, Revenue Management & Analytics Reports for Service Planning.

Lessons learnt and way forward

10. The gap between the number of buses available in cities as of date and the number required is huge. This has been assessed to be the tune of 1,42,500 (if both organized and unorganized services are included, the total gap is estimated



to be 122,500 buses) in the study constituting PC 1. While the government plan to assist the states/UTs and cities to bridge this shortfall, concurrent assistance will be needed for setting up associated infrastructure, recruitment, training and positioning of personnel at different levels and transitioning to the new culture of O&M of city-buses using modern methods for efficiency and sustainability. Important learnings or lessons gained from the ESCBS project, that can be availed of to enhance the impact of future schemes are summarized below.

Overall ESCBS Project

11. Mobilization of organizational prerequisites in the PMU and in the PIAs took longer than as was foreseen when the project was on board on December 9, 2014. The project became effective from August 29th, 2016 and PMU GR 2 (PMC – combined for SUTP & ESCBS) was positioned when ESCBS had entered its 3rd year. Procedures available in the Ministry entailed approval of every individual sub-component and activity at the highest level though this same could be dealt at NPD/ OSD UT/JS level. This experience can be utilized to hone protocols for quicker processing.
12. Transfers of key officials (including CEOs) were frequent and positions for professionals dedicated to urban transport were not created. Conveyance of fund from the State to the city required disproportionate follow-up effort from the PMU. Consequently, release of fund (from the GEF Grant) was time-consuming. Chandigarh, where urban transport is departmentally managed, was an exception in this regard; Jaipur city's performance was impacted the most by such shortcomings. It may also be mentioned that at one point in time it was seriously considered to drop Mira-Bhayander as a project city for these reasons. After discussions in the TPRM at Lucknow on 7th December 2017, the positioning of a dedicated official with the right background, prospects looked up. The depot was completed, social and environment clearances arranged, operator was engaged, and the impact of depot modernization was best in MBMC yielding a tangible saving of Rs 1.30 per Bus-km including that from solar power generation.
13. A disconnect between the management of SPVs in the cities and the private operators who delivered the service on contract, came in the way of timely and full realization of project interventions. The non-availability of knowledgeable and trained supervisors and of a well-oiled mechanism for procurement of goods/services for day-to-day needs that managing depots call for, remained a severe constraint.
14. Implementation of ITS require an agreement of all key stakeholders to come on board the Project Development Plan before the design phase of an ITS/MIS project. This was not met, mainly in the haste to complete a project in time whose start had been delayed. Except for CTU, a lack of involvement on the part of the management of the SPVs during the project design phase was mainly due to their perception that the entire responsibility was that of the PMCs.
15. Over-ambitious ITS specifications and resultant higher bid prices led to more delay caused by the need to revise specifications. Another important learning from ITS procurements was that far more importance was needed to be given to an examination of the offered solution than to “credentials and past performance”. In Jaipur, ITS implementation suffered as the city could not decide whether to do it from GEF grant or Smart City Project. Eventually, the procurement itself was abandoned after issue of a work order. In Bhopal, the city's insistence on retaining the existing solution providers, who were not able to share the protocols for integration, led to delays and a sub-optimal solution.

Safeguards: Social and Environmental

16. Ensuring environmental and social safeguards during planning, construction and operation of bus depots were issues that required convincing to be done by the PMU and World Bank for the cities to agree on.



Procurements and contract management

17. Procurements and contract management were areas of most lessons, particularly in respect of ownership of project and of agreed actions. Significant amongst the lessons were:

- Insufficient weightage to advice from WB and experts on bids and orders.
- Going forward, more weight needs to be given to offered solutions/products than to the past performance of bidders. Re-tendering of procurements for CTU and BCLL ITS projects are lessons in this regard.
- Timely release of due payments to vendors and operators did not happen.
- Revisiting and revising considered decisions when incumbents of key posts changed hobbled implementation.

Capacity Building

18. The lack of capacity for delivery of efficient, attractive, and sustainable bus services in India's cities is as evident as are the repeated efforts on the part of the governments to address the issue. However, returns from the efforts were slow to come about and inadequate. One anomaly was that efforts were directed mainly to strengthening the capacity of government officials. Delivery of bus services has largely to do with the capacity of individuals at the front end and the private sector also. The lesson points to a need to shift in the direction to build capacity where it will fetch quicker returns.

19. All supervisory and maintenance staff and bus crew eventually get convinced of ESMAP program's utility. The main reason for the success of this data driven exercise was that the services of the "partner institutes" for guiding the 34 bus depots across the country had been procured by the MoHUA; the depots had only to volunteer. This program must be institutionalized as part of all future bus funding schemes of the governments.

Managing Institutional, Financial and Regulatory challenges.

20. At the outset, it may be mentioned that the related study PC-1 has taken a long time to reach its concluding stage. Nevertheless, given its foundational importance and the complexity of the task, it should be pursued to its logical conclusion and finalization of recommendations. What has so far emerged from the study and needs to be prioritized is summarized as under.

- Nodal department to have dedicated full-time officers/experts possessing required skills & resources (funds, depots, infrastructure), depending on the scale of city bus operations.
- City Bus Service be made mandatory function of designated entities with prescribed Levels of Services.
- Contracts for CBS to be aligned with documents issued by MoHUA.
- Boards of SPVs must represent all participating cities and have arm's length relationship with Municipalities and be accountable for meeting physical and financial performance targets.
- GST on buses be reduced from 28% to 12% at par with that on metro rail coaches.
- Periodic fare revision to be ensured. For any waivers, operator/SPV be compensated.
- In addition, a draft City Bus Service Policy, and a Draft Act for mandating urban bus services were prepared and submitted for consideration.

National Level Programs

21. Programs and training and, business and service planning, as identified as part of subcomponents PC-2, PC-3, PC-4, and PC-5 and PC-7, need to be popularized, carried out and monitored at wider State/National levels. The initiative for these must be pushed by the governments for a cultural shift in the processes followed for city-bus transport delivery for every major scheme of the governments aimed at promoting Public Transport. PC-1 is a study to determine options and recommendations for resolving Regulatory, Institutional and Fiscal Constraints in Providing Efficient and



Sustainable City Bus Services in Indian cities.

Use of Modern Maintenance Methods

22. In Chandigarh where the bus services were operated departmentally, city officials got involved as stakeholders early and the results were noticeable. However, in other cities, operators showed little or no enthusiasm in training their staff to use the specialized equipment viz., Fuel Pump Calibration, Injector testing/repair equipment, computerized lubricant dispensers etc., and MIS based tools. The cities were also not amenable to change contract conditions for leasing depots (and equipment) to operators. Their usage remained sub-optimal as a result. As buses of the future (including EVs) will employ more advanced technologies, supervision of maintenance (departmental or by operator) must be mandated to be by qualified and competent personnel.
23. For effective data based performance review, trend analysis and forecasting resource requirements, it is essential that supervisors put in charge of operation and maintenance of bus services are specifically assigned to the job, have a background either by qualification or training, and put up reports for review by the SPV's CEO. A system of quarterly progress reports (QPRs) was set up for the ESCBS review. The reports were invariably delayed, had often to be chased for submission and returned for rectification of errors. This was due to an absence of dedicated personnel at to man the positions. Future schemes must ensure that the resources required are in place in good time.
24. **As for installation of solar panels, only MBMC took the initiative with conviction. Ghodbunder depot had net zero energy drawn from the grid in 2020.**

Disseminating crystallized learning on urban transport

25. The World Bank and UNDP aided SUTP and the ESCBS projects have resulted in a treasure of recommendations, manuals, guidance notes, tool-kits, training modules, and policies on urban transport; practical knowledge gathered through execution of projects, are documented as reports and literature. These constitute a cache that must be easy to draw upon to improve and strengthen city bus service as the backbone of urban India's mass transit. Though all documentation is hosted on the web-portals, the retrieval of these by interested individuals or institutions so that keywords show up topic-related options is not immediate. To facilitate such access and to help information percolate, a vibrant Knowledge Management Portal needs to be made an integral constituent of the sharing process. It is also important that this repository does not slip away from conscious institutional memory and resources do not need to be invested for its *reinvention*.



ANNEX 6. SUPPORTING DOCUMENTS

Key Documents developed under the Project

1. The documents listed below were developed under the project and have been hosted on the official website of MOHUA. They can be accessed from - <http://mohua.gov.in/cms/escbs.php>
 - i. PC 1 – Review of Regulatory, Institutional and Fiscal Policies for Efficient and Sustainable City Bus Services
 - ii. PC2 - Design of Training Program for City Transport Professionals
 - iii. PC3 - Manual & RFP on developing functional specifications for ITS and MIS for Urban Bus Systems
 - iv. PC4 - Manual on Planning, Design & implementation of city bus depots
 - v. PC5 - Training report on ESMAP training for drivers and conductors on fuel efficient driving and maintenance techniques
 - vi. PC 7 - Service Plan and Business Plan for city bus operations for two cities – Chandigarh and Mira Bhayander

Project Documents

- i. Project Appraisal Document
- ii. Grant Agreement
- iii. World Bank Group's India Country Partnership Framework for FY18–FY22 (report number 126667-IN)
- iv. Project Aide Memories
- v. ISRs and AMs
- vi. Client's ICR reports



ANNEX 7. CITY LEVEL DETAILS

1. Bhopal

- a) Bhopal had sufficient depot space to meet the needs of its then bus fleet, hence the city planned to upgrade three depots with thirty-two modern fleet management equipment.
- b) In Bhopal improvements in braking efficiency and overall driving experience were noted.
- c) **Increase in women commuters from appraisal to project close was observed in the survey. Some of the key reasons could be that the city: introduced more buses; planned bus routes better; enabled seat reservations, panic button and GPS tracking; and deployed strict COVID-19 protocols.**
- d) Bhopal set up five broad themes as part of its MIS systems: Fleet management³⁷, Revenue Tracking³⁸, Staff Management³⁹, Depot & supporting infrastructure management⁴⁰, and Customer Management. A System Integrator (SI) was procured in 2018 or later.
- e) The MIS/ ITS M&E data on the poor quality of operations from the newly installed MIS system have started the process for correcting the issues with the operators.
- f) Issues during implementation like coordination and commitment of the PIUs, and the decision of the Bhopal Municipal Corporation to offer deeply discounted passes to passengers without reimbursing BCLL and in turn private operators, disrupted a well-functioning system.

2. Chandigarh

- a) Chandigarh upgraded Depot 2 and 3, under the Project and installed 13 equipment.
- b) Breakdown incidence rate – The STU quickly understood the gains from lower breakdown rates, higher fuel efficiency and clean buses. The city was therefore diligent in using the equipment and had started installing equipment in other depots at its own cost by Project end. It also intends to formalize the ESMAP driver training and maintenance protocols.
- c) The usage of the tyre retreading plant, nitrogen tyre inflator, and wheel alignment machine have helped increase the overall life of the tyres, resulting in lower spend on tyre repair. This helped bring in savings on the procurement of both tyres and fuel.
- d) Chandigarh also demonstrated that fuel Injection Pump Test Bench, when used correctly, can improve fuel efficiency.
- e) The Chandigarh MIS system has five broad themes, as seen in Bhopal and MBMC: Fleet management, Revenue Tracking, Staff Management, Depot & supporting infrastructure management, and Customer Management. Chandigarh also included Business Intelligence as well as cloud-based tracking and other services, e-ticketing, and integration with NCMC in the scope of System Integrator (SI) & PMC vendors.
- f) The root cause analysis performed for ETA/ ETD of buses in Chandigarh helped strengthen the position of

³⁷ Modern management systems (MIS) with Fleet Management System (FMS), AVLS, VMS, etc

³⁸ Fare Collection System (AFCS), e-ticketing and pass re-charge integrated with online payment options

³⁹ Vehicle Scheduling & Crew Allocation (VSCA)

⁴⁰ DMS, CCMS systems along with Intelligent Transport systems (ITS – GPS/ AVLS, Station PIS, OBITS, in Bus CCTV)



the PIA to direct the vendor to implement remedial measures, which led to better technical stability.

- g) Customer-Facing Mobile App “TryCityBuS” and Grievance Redressal Mechanisms were developed.
- h) The City was also expected to add additional space for its combined fleet of city and inter-city operations. Hence, it used the opportunity to develop a first GRIHA (Green Rating for Integrated Habitat Assessment) rate over and above the recommendations of the depot design manual published by MOHUA and has now applied for construction approval.
- i) The Chandigarh Transport Undertaking (CTU), with the help of the Staff management feature of ITS/MIS, was able to automate the duty roaster and identify under-deployed staff and was able to **reduce the overtime and extra drivers costs to the tune of US\$0.6 million⁴¹ monthly**. Staff punctuality has also improved. The AVLS brought down the over-speeding incidents of buses. **ETM machines deployed on all buses reduced cash deposit time from the previous three to four days to deposits of cash after every shift**. Similarly, e-ticketing resulted in improved convenience and reduced revenue leakage.
- j) The survey showed an increase in women commuters from appraisal to project close. This could be due to the city introducing more buses, better bus route planning, seat reservations, panic button and GPS tracking, and the deployment of strict COVID-19 protocols.

3. Jaipur

- a) The city faced implementation issues such as coordination and commitment of the PIUs. The State Government did not allow the handover of buses and operations to the newly appointed operator, as a solution had not been found for the existing JCTSL drivers. The city could not finally implement the planned ITS-MIS system under the Project on account of initial delays in clarity of scope of the ITS being implemented by the Jaipur Smart City and later owing to frequent changes in key officials.
- b) At the start of the Project, city was operating 400 buses out of two depots with half the capacity. Two new depots (Bagrana & Todi) were built under the project. Bagrana depot is a pioneer design of a two-level bus depot for 130 buses along with iconic features like ETP, rainwater harvesting and separate toilets for women staff. Todi depot has a design capacity of 90 buses and is designed with ETP etc.
- c) Two depots were upgraded in Jaipur (Sanganer and Vidhyadhar Nagar) with features like a water harvesting system and an effluent treatment plant.
- d) Sixty-three numbers of depot equipment were procured & installed at the four new and upgraded depots.

4. Mira Bhayander

- a) Mira Bhayander built its first ever depot under the project. The Ghodbunder depot, with a 100-bus capacity, was developed with multi-level design and sustainable features like solar panels (leading to a net zero electricity bill) and ETP. In addition, it also developed three-night parking facilities at various locations as a more effective design for a space constrained city.
- b) Twenty-three pieces of depot equipment were procured and installed under the Project.

⁴¹ The overtime bill for city bus services was Rs 6 Cr (US\$ 0.85 mn), which with the help of MIS came down to Rs 1.5 Cr (US\$ 0.2 mn), resulting in a savings of Rs 4.5 Cr (US\$ 0.65 mn)



- c) Three overnight parking facilities (with 50 bus capacity) were developed and enabled with CCTV under the project
- d) The features of the MIS system of MBMC have the same broad five categories as in the other two cities.
- e) MBMC has included Business Intelligence as well as cloud-based tracking services, e-ticketing and integrated NCMC in the scope of SI & PMC vendors.
- f) The Customer-Facing Mobile App “Majhi Bus” and Grievance Redressal Mechanisms were developed.
- g) The user satisfaction survey showed that female ridership changed over time, and the reduction in the number of female passengers in could be explained by Mira Bhayander being a part of the Mumbai Metropolitan Area, which was one of the worst affected areas by the COVID-19 pandemic.
- h) Mira Bhayander showed a significant turnaround in operations with a near doubling in fleet deployment and ridership pre-COVID and coming on stream the new depot and hiring of the private operator, from a situation of over one third of the relatively new fleet off the road, unreliable operations being run through short term labor contracts, long delays in completing the construction of the depot facility and continued difficulty in attracting a private operator.

User Satisfaction Survey

5. The user satisfaction survey between 2013-14 and the mid-term survey in 2016 had shown a higher proportion of women commuters during off peak hours and re-emphasized that women depend on PT more than men. The survey also found that women highlighted the following issues:(i) overcrowding; (ii) personal safety, problems with boarding and alighting, seating/ standing space; (iii) lack of punctuality; and (iv) need for wider coverage. Women had also indicated a preference for CCTV cameras and security presence in the buses.

Table 1912: Mid Term & End Term Survey Results

City	Bhopal	Chandigarh	Jaipur	Mira Bhayander	Total
End Term Survey (2021)					
Female (% of total)	1,771 (39%)	984 (32%)	2,694 (37%)	2,512 (34%)	7,961 (35%)
Male (% of total)	2,687 (61%)	2,073 (68%)	4,529 (63%)	4,870 (66%)	14,159
Total	4,458	3,057	7,223	7,382	22,120
Mid Term Survey (2017)					
Female (% of total)	857 (39%)	231 (28%)	2,392 (39%)	2,740 (43%)	6,220 (40%)
Male (% of total)	1,335 (61%)	590 (72%)	3,715 (61%)	3,572 (57%)	9,212 (60%)
Total	2,192	821	6,107	6,312	15,432

6. The end term survey also highlighted that women in Mira Bhayander were neutral, whereas in Jaipur both men and women in Jaipur were highly dissatisfied by the quality of services.



ANNEX 8. LIST OF WORKSHOPS AND TRAININGS ORGANIZED UNDER THE PROJECT

S.no.	Dates	Duration (days)	Topic	No. of Participant	Location (National/ City/ Virtual)
1.	4 Sep 2017	1	The Workshop on Knowledge Exchange & Mid-Term Review	63	New Delhi
2.	Dec 2018 - Sept 2019	-	PC5 ESMAP- Zone 1 (9 depots) - 4 rounds	440	North & West zone
3.	Dec 2018 - Sept 2019	-	PC5 ESMAP- Zone 2 (9 depots) - 4 rounds	800	South zone
4.	Dec 2018 - Sept 2019	-	PC5 ESMAP- Zone 3 (9 depots) - 4 rounds	148	East zone
5.	22 -23 Feb 2019	2	Knowledge Exchange Workshop - Hubli	71	Hubli
6.	12 March 2019	1	PC3- 1st Experts Review Panel Meeting - Development of a Manual for Developing Functional Specifications for ITS and MIS for Urban Bus System	22	New Delhi
7.	10 May 2019	1	PC4- Expert Panel Review Meeting- Development of a manual for the planning, Design and Implementation of Bus Depots on May 10, 2019	16	New Delhi
8.	3 July 2019	1	PC1- Focus Group Discussion- Developing options & Recommendation for Resolving Regulatory, Institutional & Fiscal constraints	25	New Delhi
9.	16 – 19 Sep 2019	4	PC2- Pilot Training Attendance - Design & Testing of Skill Development Program for professionals Engaged in City Bus Operations	83	New Delhi
10.	11-15 Oct 2019	5	Domestic Program- Capacity Building Program-Bhopal	5	CEPT, Ahmedabad
11.	11-15 Oct 2019	5	Domestic Program- Capacity Building Program-Jaipur	4	CEPT, Ahmedabad
12.	11-15 Oct 2019	5	Domestic Program- Capacity Building Program-Chandigarh	5	CEPT, Ahmedabad
13.	11-15 Oct 2019	5	Domestic Program- Capacity Building Program-Mira Bhayander	7	CEPT, Ahmedabad
14.	11-15 Oct 2019	2	Driver, Artisans / Maintenance officials and Technicians, Conductors- Capacity Building Program on bus operations and maintenance	100	Bhopal
15.	21-22 Oct 2019	2	Driver, Artisans / Maintenance officials and Technicians, Conductors- Capacity Building Program on bus operations and maintenance	94	Jaipur
16.	Sep - Nov 2019		PC5 ESMAP- Zone 1 (3 substituted depots) - 1 round	49	North & West zone



17.	11 Nov 2019	1	PC4- Expert Panel Review Meeting- Development of a manual for the planning, Design and Implementation of Bus depot	13	New Delhi
18.	15 – 17 Nov 2019	3	Urban Mobility India Conference cum Expo 2019	38	Lucknow, UP
19.	24 – 29 Nov 2019	6	LUTP Program conducted by the CEPT, Ahmedabad- study visit to London (TFL)	37	London (TFL)
20.	26 – 27 Nov 2019	2	Driver, Artisans / Maintenance officials and Technicians, Conductors - Capacity Building Program on bus operations and maintenance	101	Chandigarh
21.	3- 4 Dec 2019	2	Driver, Artisans / Maintenance officials and Technicians, Conductors - Capacity Building Program on bus operations and maintenance	90	Mira Bhayander
22.	21 Jan 2020	1	PC5- Workshop on Energy Sector Management Assistance Program (ESMAP) in City Bus Fuel Efficiency Improvement by targeted Driver Training & Bus Maintenance	54	New Delhi
23.	19 June 2020	1	PC3- 2nd Experts Review Panel Meeting - Development of a Manual for Developing Functional Specifications for ITS and MIS for Urban Bus System	21	Google Meet, 10.30 AM - 1 PM
24.	28- 29 Aug 2020	2	PC4- Workshop and Training on Planning, Design and Implementation of Bus Depots for City Bus Operations and on use of Manual & Guidance Documents	60	Online
25.	25 – 26 Sep 2020	2	PC3- Online Workshop on Development of a Manual for Developing Functional Specifications for ITS and MIS for Urban Bus System	332	Online
26.	25 Sep 2020	1	PC5- Lessons Learned from National Scale up of ESMAP	205	Online
27.	14 – 18 Dec 2020	5	PC1- State Level Workshops - Final Recommendations on Regulatory, Institutional and Fiscal Constraints in Urban Bus Sector	76	Online (State Level Workshops)
28.	28- 29 Dec 2020	2	PC1- National Level Workshops- Final Recommendations on Regulatory, Institutional and Fiscal Constraints in Urban Bus	92	Online (National Level Workshops)
Total				3,051	

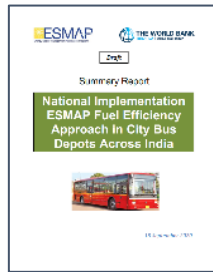


ANNEX 9. NEWSPAPER AND OTHER MEDIA REPORTS ON THE PROJECT

1. Dec 4, 2020 “Track CTU buses on mobile phone soon”
<https://www.tribuneindia.com/news/chandigarh/track-ctu-buses-on-mobile-phone-soon-179649>
2. Dec 4, 2020 “Mira Bhayander: MBMC launches 'Majhi Bus' app for smart commuting”
<https://www.freepressjournal.in/mumbai/mira-Bhayander-mbmc-launches-majhi-bus-app-for-smart-commuting>
3. Aug 22, 2020 “Now, track Chandigarh Transport Undertaking buses live on mobile phone”
<https://www.hindustantimes.com/chandigarh/now-track-chandigarh-transport-undertaking-buses-live-on-mobile-phone/story-J0cdOv67Xjq5ekd0lKrn1.html>
4. Aug 21, 2020 “Administrator Launches IT System In CTU Buses”
<http://chdpr.gov.in/dashboard/?q=node/82228>
5. Aug 16, 2020 “Chandigarh set to launch intelligent transport system for local buses”
<https://www.hindustantimes.com/chandigarh/chandigarh-set-to-launch-intelligent-transport-system-for-local-buses/story-QFmXRBNmrl2lv7m6wuWTN.html>
6. June 14, 2019 “Efficient and Sustainable City Bus Services” <https://www.iea.org/policies/7393-efficient-and-sustainable-city-bus-services>
7. Sep 4, 2018 “Smart bus stuck, World Bank called in to push”
http://timesofindia.indiatimes.com/articleshow/65663965.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst
8. April 24, 2018 “World Bank to help Chandigarh Transport Undertaking improve”
http://timesofindia.indiatimes.com/articleshow/63887777.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst
9. Sep 17, 2017 “Chandigarh adopts intelligent transport system to promote public transportation”;
<https://smartcitiescouncil.com/tags/escbs>
10. Aug 27, 2017 “Ministry conducts survey to improve traffic, public transport” ;
<https://timesofindia.indiatimes.com/city/chandigarh/ministry-conducts-survey-to-improve-traffic-public-transport/articleshow/60238799.cms>
11. Sep 21, 2016 “Bus service modernization: World Bank officials review ITS project”
<https://indianexpress.com/article/cities/chandigarh/world-bank-officials-review-its-project-3041668/>
12. May 31, 2016 “World Bank to offer 9.2 mn grant for city bus project”
<https://economictimes.indiatimes.com/industry/transportation/world-bank-to-offer-9-2-million-grant-for-city-bus-project/articleshow/52523915.cms?from=mdr>
13. May 31, 2016 “The Government of India and World Bank Sign Agreement to Improve Efficiency and Attractiveness of City Bus Services” <https://www.worldbank.org/en/news/press-release/2016/05/31/the-government-india-and-world-bank-sign-agreement-to-improve-efficiency-and-attractiveness-city-bus-services>
14. May 2015, recruitment notice for ESCBS program at Chandigarh
<http://admser.chd.nic.in/uploadfiles/press/advrt/CONNNNNNNNN.pdf>



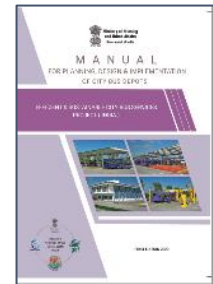
ANNEX 10. PHOTOS OF PROJECT ACHIEVEMENTS



National implementation of ESMAP Approach in city bus depots



Manual for Developing Functional Specifications for ITS & MIS for Urban Bus Systems inaugurated by Ho'n Minister MoHUA, GoI



Manual for planning, design and implementation of city bus depots



Two-level bus depot (130 bus capacity) with ETP, rainwater harvesting at Bagrana, Jaipur



Depot layout for Bhopal based on the Depot Manual



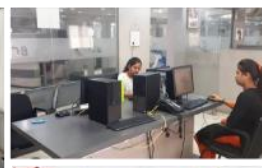
At grade depot (100 buses) with Solar PV roof, inter-connected pits next to inventory storage at Ghodbunder Depot, MBMC



Bus Monitoring System



Helpdesk



ITS/ MIS at Bhopal



Video Surveillance



Temporary Central Command Centre (CCC) at Chandigarh



Lathe machines amongst other equipment installed



App at Chandigarh



ITS - CCTV cameras installed at parking locations (MBMC)



ITS - PIS display boards installed at bus stops in MBMC area



MIS - Business Intelligence (BI) interface at Mira Bhayander



Training program for Drivers & Conductors of JCTSL (Jaipur) - with the help of CEPT, Ahmedabad. It was a unique program for conductors because of generally driver training program is organized.



Capacity Building Program in bus operations and maintenance- City Level at Jaipur