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Report No: PAD5092

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROGRAM APPRAISAL DOCUMENT
ON A
PROPOSED LOAN

IN THE AMOUNT OF EUR€ 231.9 MILLION
(US$ 250 MILLION EQUIVALENT)

TO THE

PEOPLE'S REPUBLIC OF CHINA

FOR A

CHINA: LOW CARBON TRANSITION OF URBAN MOBILITY IN YICHANG (HUBEI)

May 9, 2024

Transport Global Practice
East Asia And Pacific Region

CURRENCY EQUIVALENTS

ABBREVIATIONS AND ACRONYMS

AM	Accountability Mechanism
BoCs	Bureaus of Commerce
BRT	Bus Rapid Transit
CO2	Carbon Dioxide
DEE	Department of Ecology and Environment
DLI	Disbursement Linked Indicator
DLR	Disbursement Linked Result
DOHURD	Department of Housing and Urban-Rural Development
DOT	Department of Transport
DRCs	Development and Reform Commissions
E&S	Environment and Social
EEBs	Ecology and Environment Bureaus
EFA	Expenditure Framework Assessment
EHS	Environment Health and Safety
EIA	Environment Impact Assessment
EMBs	Emergency Management Bureaus
EMSs	Environmental Management Systems
ESSA	Environmental and Social System Assessment
ETS	Emission Trading Scheme
EV	Electric Vehicle
FGBs	Forestry and Gardens Bureaus
FM	Financial Management
FY	Fiscal Year
GEF	Global Environment Facility
GHG	Green House Gas
GoC	Government of China
GPBR	General Public Budget Revenue
GPBR	General Public Budget Revenue
GPL	Government Procurement Law
GRM	Grievance Redress Mechanism
GRS	Grievance Redress Service
HLG	High-Level Government
IPF	Investment Policy Financing
IWT	Inland Water Transport
MaaS	Mobility as a Service
MOF	Ministry of Finance
MOT	Ministry of Transport
MRV	Monitoring, Reporting and Verification
NDRC	National Development and Reform Commission
NEV	New Electric Vehicle

NMT	Non-Motorized Transport
NPV	Net Present Value
OHS	Occupational Health and Safety
PAD	Project Appraisal Document
PAO	Provincial Audit Office
PDO	Program Development Objective
PforR	Program-for-Results
PLG	Project Leading Group
PLG	Project Leading Group
PMO	Project Management Office
Ras	Result Areas
SNGs	Sub-National Governments
SSRA	Social Stable Risk Assessment
STA	State Tax Administration
TBL	Tendering and Bidding Law
TBs	Transport Bureaus
TOD	Transition-Oriented-Development
TOR	Terms of Reference
TPTs	Traffic Policies Teams
TSA	Treasury Single Account
UDG	Urban Development Group
UMBs	Urban Management Bureaus
VA	Verification Agent

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DATASHEET

BASIC INFORMATION

Project Beneficiary(ies)	Operation Name		
China	China: Low Carbon Transition of Urban Mobility in Yichang (Hubei)		
Operation ID	Financing Instrument	Does this operation have an IPF component?	
P172388	Program-for-Results Financing (PforR)	No	

Financing & Implementation Modalities

[ ] Multiphase Programmatic Approach (MPA)	[ ] Fragile State(s)
[ ] Contingent Emergency Response Component (CERC)	[ ] Fragile within a non-fragile Country
[ ] Small State(s)	[ ] Conflict
[ ] Alternative Procurement Arrangements (APA)	[ ] Responding to Natural or Man-made Disaster
[ ] Hands-on Expanded Implementation Support (HEIS)	

Expected Approval Date	Expected Closing Date
07-Jun-2024	31-Dec-2029
Bank/IFC Collaboration	
No	

Proposed Program Development Objective(s)

To improve low carbon mobility and accessibility, and reduce carbon emissions from road transport in Yichang

Organizations

Borrower:	People's Republic of China
Implementing Agency:	Yichang Transport Bureau
Contact:	Zhaohui Hu
Title:	Director, Project Management Office
Telephone No:	8613997680293
Email:	hbycdpt_pmo@sina.com

COST & FINANCING (US$, Millions)

Maximizing Finance for Development

Is this an MFD-Enabling Project (MFD-EP)?	No
Is this project Private Capital Enabling (PCE)?	No

SUMMARY

Government program Cost	**1,114.00**
Total Operation Cost	**1,114.00**
Total Program Cost	1,113.38
Other Costs (Front-end fee,IBRD)	0.62
Total Financing	**1,114.00**
Financing Gap	**0.00**

Financing (US$, Millions)

World Bank Group Financing	
International Bank for Reconstruction and Development (IBRD)	250.00
Non-World Bank Group Financing	
Counterpart Funding	864.00
Local Govts. (Prov., District, City) of Borrowing Country	864.00

Expected Disbursements (US$, Millions)

WB Fiscal Year	2024	2025	2026	2027	2028	2029	2030
Annual	31.25	25.50	30.00	38.25	45.00	50.00	30.00
Cumulative	31.25	56.75	86.75	125.00	170.00	220.00	250.00

PRACTICE AREA(S)

Practice Area (Lead)

Transport

Contributing Practice Areas

Urban, Resilience and Land

CLIMATE

Climate Change and Disaster Screening

Yes, it has been screened and the results are discussed in the Operation Document

SYSTEMATIC OPERATIONS RISK- RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	● Low
2. Macroeconomic	● Moderate
3. Sector Strategies and Policies	● Moderate
4. Technical Design of Project or Program	● Moderate
5. Institutional Capacity for Implementation and Sustainability	● Substantial
6. Fiduciary	● Moderate
7. Environment and Social	● Substantial
8. Stakeholders	● Moderate
9. Overall	● Substantial

POLICY COMPLIANCE

Policy

Does the project depart from the CPF in content or in other significant respects?

[ ] Yes   [✔] No

Does the project require any waivers of Bank policies?

[ ] Yes   [✔] No

LEGAL

Legal Covenants

Sections and Description

Institutional Arrangements PA, Schedule, Section I.B.1: The Program Implementing Entity shall, through Yichang Municipality, maintain, and cause to be maintained, the following entities with composition, powers, functions, staffing, facilities, and other resources acceptable to the Bank: (a) the Municipal Program Leading Group; and (b) the Program Management Office.

Program Action Plan LA, Schedule 2, Section I.B /PA, Schedule, Section I.B.3: The Borrower shall take, and shall cause the Program Implementing Entity to, through Yichang Municipality: (a) undertake the actions set forth in the Program Action Plan; (b) not amend, revise or waive, nor allow to be amended, revised or waived, the provisions of the Program Action Plan, or any provision thereof, without the prior written agreement of the Bank; and (c) maintain policies and procedures adequate to enable it to monitor and evaluate, in accordance with guidelines acceptable to the Bank, the implementation of the Program Action Plan.

Program Implementation Plan PA, Schedule, Section I.B.4: Throughout the implementation of the Program, the Program Implementing Entity shall, through Yichang Municipality, apply the Program Implementation Plan in a timely and efficient manner acceptable to the Bank.

Mid-term Review PA, Schedule, Section III.2: The Program Implementing Entity shall, through Yichang Municipality, prepare, under terms of reference acceptable to the Bank, and furnish to the Borrower and the Bank no later than thirty-six (36) months after the Effective Date, a consolidated mid-term review report for the Program, summarizing the results of the monitoring and evaluation activities carried out from the inception of the Program, and setting out the measures recommended to ensure the efficient completion of the Program and to further the objectives thereof.

Verification Agent(s) PA, Schedule, Section III.4: The Program Implementing Entity shall, through Yichang Municipality, not later than three (3) months after the Effective Date, hire, and thereafter maintain, throughout the period of Program implementation, verification agent(s) having experience and qualifications in the relevant technical fields, acceptable to the Bank, and under terms of reference, including a timetable and adequate budget for its activities, acceptable to the Bank, to monitor and verify the achievement of the Disbursement Linked Results (DLRs).

Implementation Agreement PA, Schedule, Section I.B.2: The Program Implementing Entity shall, through Yichang Municipality, by no later than three (3) months after the Effective Date, enter into an implementation agreement with Yichang City Development Investment Group Co., Ltd. on terms and conditions satisfactory to the Bank.

Conditions

Type	Citation	Description	Financing Source
Effectiveness	Loan Agreement	LA, Section 5.01: The Additional Condition of Effectiveness is that the Program Implementing Entity, through Yichang Municipality, has adopted the Program Implementation Plan in form and substance acceptable to the Bank.	IBRD/IDA

I.   STRATEGIC CONTEXT

A. Country Context

1.   **Over the past 40 years China's development model has delivered unprecedented economic growth and development gains but was associated with rapidly rising carbon emissions and other negative environmental impacts.** As of 2022, 64 percent of the total population lived in urban areas in China, a dramatic increase from 17.9 percent in 1978 when China's reform and opening policy initiated. International trade increased from US$21 billion in 1978 to US$6 trillion in 2021.[1] Such transformation has had a profound impact on the people's lives, with 770 million people lifted out of poverty over the last 40 years. Corresponding to this economic growth, China's total Carbon Dioxide (CO2) emissions grew from 3,540 million tons in 2002 to 11.47 billion tons in 2021, at an annual growth rate of about 8 percent.[2]

2.   **China is both a major contributor to rising global greenhouse gas emissions causing climate change and negatively affected by its adverse impacts.** As the world's largest emitter—accounting for 31 percent of CO2 (2021)—China's contribution to reducing global climate risks and achieving the Objectives of the Paris Agreement is indispensable. China has made ambitious commitments to peak carbon emissions by 2030 and achieve carbon neutrality by 2060. Towards these long-term goals, the Government of China (GoC) has set up a steering group and is formulating the "1+N" policy framework, in which the "1" refers to one national-level policy framework and the "N" to specific solutions to achieve peak carbon emissions by 2030. The "1" national policy is stipulated in "the Working Guidance for Carbon Dioxide Peaking and Carbon Neutrality in Full and Faithful Implementation of the New Development Philosophy" issued in October 2021. The "N" started with the "Action Plan for Carbon Dioxide Peaking Before 2030" issued in October 2021 and will be followed by upcoming plans by sectoral ministries and sub-national governments on their respective sectors and jurisdictions, to translate the national targets into disaggregated local benchmarks and specific actions to achieve them. The policy framework focuses on the ten areas, one of which is building a green and low-carbon transportation system.

3.   **Fulfilling the climate commitments towards carbon-neutral economy, while sustaining economic growth, is the primary mid-century goal for China.** In the context of a growing middle class, rising global trade, and continuing urbanization and motorization, balancing these objectives poses serious challenges and will require a series of policy reforms, significant investments including in green infrastructure, technology innovations, and institutional strengthening to support coordinated implementation. To ensure inclusive growth, it is also essential to identify and mitigate risks associated with the transition to a carbon-neutral economy, which can have disproportionate, negative impacts on certain geographical locations, sectors, and income groups. This is a critical time for each sector and sub-national entities to make informed decisions that will define the long-term pathways to fulfill the commitments and sustain growth.

B. Sectoral (or Multi-Sectoral) and Institutional Context

4.   **China has invested significantly in infrastructure over the past 20 years, and this has been a major driver of its economic growth.** The results include the longest expressways and high-speed rail network in the world, along with significant expansions in rural roads and urban rail systems.[3] Such rapid growth has supported corresponding growth in demand: the number of vehicles doubled in just ten years, from 192 million in 2010 to 372 million in 2020; and freight

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[1] Ministry of Finance (http://zhs.mofcom.gov.cn) and WITS (https://wits.worldbank.org/)
[2] China: CO2 Country Profile - Our World in Data
[3] China Transport Sector Development Statistical Bulletin, 2020. By 2019, China's road network reached 5 million km, including about 150,000 km of expressways, railways about 140,000 km, including 35,000 km of high-speed rail.

transport grew from 14 to 20 trillion ton-km in the same period, along with the growing trade and five-fold increase in e-commerce transactions.[4, 5]

5.   **With rapid growth of both passenger and freight transport supply and demand, the transport sector has become a major contributor to energy consumption and GHG emissions in China.** Its share continues to increase with the highest growth rate among all sectors, at around 6 percent since 2010, and reaching over 11 percent of total emissions in 2019 before temporarily decreasing during 2020 due to COVID-19 induced travel restrictions (see Figure 1). The sector has been identified by the GoC as one of the key areas to promote energy conservation and emission reduction. If unmitigated, transport emissions are estimated to continue rising until they peak at about 150 percent of the current level around 2040, much later than China's target peaking year of 2030, before decreasing to the current level by 2060.

Figure 1. Transport Sector CO2 Emission and Motorization in China – Trends and Reference Case Projection
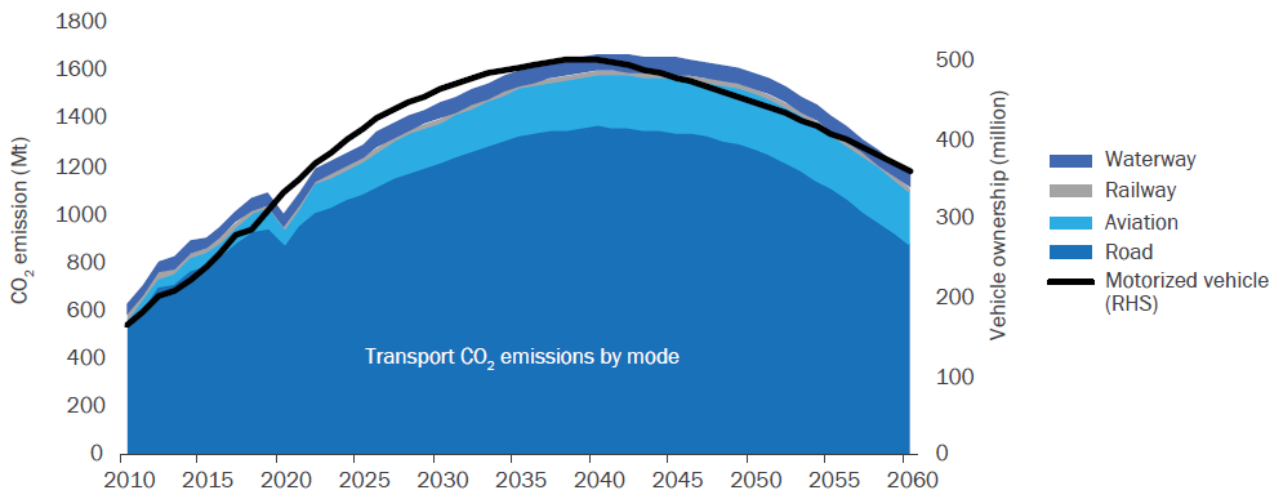
Sources: Historical data from China Academy of Transportation Science (CATS), forecast by the World Bank analysis in collaboration with CATS. Forecast is from 2020 onwards.

6.   **The carbon peaking and neutrality goals for the transport sector remain to be elaborated beyond a high-level vision and strategic priorities, as stipulated in the guidance issued by the Government of China.** Many local municipalities, especially those in less developed regions of China, require support to work out how to translate high-level national guidance into scientifically defined decarbonization pathways with timebound targets, policies, investments, and coordination across sectors.

7.   **Yichang in Hubei province is one of 70 type-II large cities[6] in China, experiencing rapid growth in its transport carbon emission trajectory**. The major issues affecting the transport sector and its emissions in the city are broadly similar across this class of cities, and the experience and lessons learned from this operation will be invaluable for developing a template for scaling up to other similar cities. Yichang has a population of 4 million, of which 1.5 million live in the urban core area. Yichang is centrally located at the heart of the nation's transportation network and is also a

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[4] National Bureau of Statistics of China, China Statistical Yearbook 2021
[5] State Post Bureau of China, China E-commerce Report 2019 & 2020
[6] China has 7 super-mega cities (over 10 million permanent residents in urban core area), 14 mega cities (5-10 million), 14 type-I large cities (3-5 million), 70 type-II large cities (1-3 million), and 500+ medium-sized (0.5-1 million). The classification is measured by permanent residents in the urban core area.

major logistics hub. Yichang displays strong commitment and interest in transport decarbonization and potential for being a demonstration pilot. It was selected as a pilot city based on a national call for proposals held by National Development and Reform Commission (NDRC) and Ministry of Finance (MOF).

8.   **Road transport is the predominant source of transport carbon emissions both in Yichang Municipality and Hubei Province.** From 2015 to 2019, transport carbon emissions in Yichang followed an escalating trend, from 2.76 million tons in 2015, to 3.95 million tons in 2019. In 2021, after a short drop in emission due to COVID-19 travel restrictions, carbon emission bounced back to 3.55 million tons, roughly equivalent to 90 percent of pre-pandemic level. In Yichang, the number of vehicles almost doubled in just six years, from 400,000 in 2015 to 760,000 in 2020.[7] The road sector contributes roughly 80 percent of transport sector emissions, with cars and road freight contributing to the bulk share (Figure 2).

Figure 2. Transport CO2 Emissions by Subsector in Yichang Municipality (2015-21)
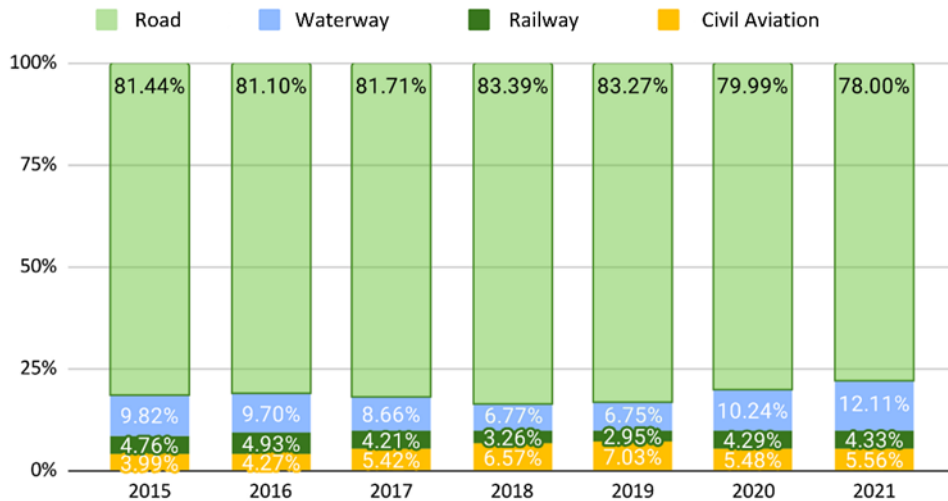
9.   **Yichang Municipality has laid out a high-level plan to develop efficient and low-carbon transport in their Yichang Municipality Transportation Development 14th Five-Year Plan (14th FYP), however, key gaps remain**. The city's Transportation 14th FYP includes actions to develop Yichang into a regional transport hub and a demonstration city for low-carbon and green transport development in the Yangtze River Economic Belt. During the 14th FYP period, Yichang plans to improve the public transport system and walking and cycling network, popularize clean energy and new energy vehicles, with a focus on battery electric vehicles, and to speed up the replacement of operational passenger and freight vehicles. Yichang, as for other type-II cities, have excelled at developing single-mode infrastructure (e.g., mass transit systems, airports, and ports) as well as quickly electrifying buses and other public vehicles. However, the predominant focus has been on vehicle electrification, which when implemented in isolation, is sub-optimal as issues of congestion and road safety remain unaddressed. Also, key gaps remain involving interlinkages and integration aspects which are often overlooked owing to the coordination efforts involved. Yichang's plan lacks clear emission reduction targets, a package of mutually reinforcing well-defined interventions based on globally accepted principles and good practice and faces institutional coordination challenges in achieving its decarbonization goals.

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[7] Yichang Bureau of Statistics

10.   **The proposed Program will support Yichang with adoption of a comprehensive approach in motivating shifts to cleaner modes in combination with avoid and improve activities[8].** The proposed Program will adopt the globally recognized Avoid-Shift-Improve (ASI) framework approach towards transport decarbonization for Yichang (see paragraph 23 for more detail on the ASI framework). This Program seeks to address gaps by (i) supporting the development of a comprehensive package of priority actions, and interventions with demonstrated high impact at the city level such as focusing on the twin levers of public transport development and demand management; (ii) channeling funding towards key activities which have been overlooked or underfunded; and (iii) ensuring inclusion of important interlinkages, inter-related policies, and actions and through coordinated integration of multiple agencies and departments. This Program represents a unique opportunity as it would be the first time a World Bank transport operation would help demonstrate a comprehensive menu of city-scale decarbonization interventions based on international good practice and develop a proof of concept for other cities in China and elsewhere.

11.   **Like all type-II Chinese cities, institutional gaps need to be filled in Yichang in order to achieve transport decarbonization.** Coordination barriers still exist between different government authorities and functional departments, which leads to fragmented planning, design, and management of transport infrastructure and services. For instance, last-mile connectivity investments such as public transport access improvement to stations involves at least four government agencies, namely Transport, Housing and Urban-Rural, Urban Management Committee, and Forestry and Landscape Bureau.

12.   **The World Bank will support Yichang in establishing an intra-departmental group to coordinate and synchronize the transport decarbonization efforts across departmental boundaries in the long term.** Once set up, this transport decarbonization group will comprise the function of planning, coordination, budgeting, and monitoring the transport decarbonization measures in a coherent manner. It is mandated to strengthen transport decarbonization leadership in the city and (i) coordinate development of a transport carbon accounting system; (ii) develop and update the transport decarbonization plans, and (iii) facilitate knowledge dissemination of experience and lessons emerging from implementing this demonstration pilot. It is expected to implement progressively more ambitious and impactful decarbonization measures (i.e., direct demand-side disincentives to private car use such as Low Emission Zones) in future phases.

13.   **The World Bank is supporting both a consistent policy framework at central level and sub-national actions and programs to implement such programs with complementary IBRD and GEF projects**. The Bank is working with MOT and sub-national governments, including Hubei province, under a proposed operation "Pathways for Decarbonizing Transport towards Carbon Neutrality in China" [P175561] funded by Global Environment Facility (GEF7). The GEF7 project would support the MOT to develop a national roadmap for decarbonizing the sector, develop a framework of national policies and technical guidelines, improve the carbon accounting system, and strengthen capacity through knowledge exchange. The GEF7 project would create an enabling policy environment at the national level, empowering provinces, and local governments pursue the decarbonizing pathway. Meanwhile, the proposed operation would be an important proof of concept for transport decarbonization in a type-II city and offer valuable lessons and feedback to further sharpen the national framework and inform sub-national policies.

14.   **The proposed IBRD operation would make significant contributions to global public goods not only by reducing carbon emissions from transport sector but also by providing valuable lessons on transport decarbonization**

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[8] This is in line with international good practice and captured in various Global Transport Unit Studies including 'Decarbonizing Urban Transport for Development'.

for medium and large sized cities. China's transport sector is responsible for nearly 3 percent of total global GHG emissions annually, at nearly 1 Gt, and its emissions are expected to continue rising under the business-as-usual scenario (see Figure 1). The transport sector is among the hardest sectors to decarbonize, not just in China but also globally. The proposed operation would contribute to the global public goods in two major ways: first, by mitigating the transport carbon emissions in China and hence the impacts on climate, and second, by demonstrating the impacts of a menu of interventions that can be replicated in China and in other countries to decarbonize transport.

C. Relationship to the CPS/CPF and Rationale for Use of Instrument

15.   **The proposed operation is aligned with the World Bank Group's Country Partnership Framework for China (FY2020-2025) (Report No. 117875-CN), in the engagement area of "Promoting Greener Development"**. It would help achieving Objective 2.5, "promoting low-carbon transport and cities" and contribute to Objective 2.2, "reducing air, soil, water and marine plastic pollution". It focuses on promoting clean energy use in transport; facilitating shifts to low- and zero-carbon modes through public infrastructure; filling the remaining institutional gap of regional coordination for transport planning; delivering global public goods by lowering overall infrastructure needs for growth and by facilitating shift to low-carbon transport modes; improving institutional coordination at city cluster level; and establishing an emission monitoring and accounting framework. Finally, the operation is consistent with the World Bank's recommendations for the transport sector in the China Country Climate and Development Report[9]. The three major urban transport decarbonization recommendations are that China should (i) promote modal shifts from private road transport to lower carbon modes, (ii) improve efficiency through regulations and pricing measures, and (iii) rapidly advance electrification for all vehicles.

16.   **The operation is consistent with China's climate change commitments including the Nationally Determined Contributions[10] and China's Mid-Century Long-Term Low Greenhouse Gas Emission Development Strategy[11].** On mitigation, both documents commit to expediting the construction of a green and low-carbon transportation system with specific focus and measures to phase out polluting vehicles and investment in public transport infrastructure which this operation directly supports. In addition, both documents commit to further strengthening the market-based mechanisms including carbon trading, to which this operation also directly contributes. On adaptation, the operation does not hinder the achievement of China's adaptation actions such as implementing the Adaptation Strategy 2035 and building environmental and social resilience. At the city level, the operation is in alignment with the Yichang Municipality Transportation Development 14th FYP 2021-2025 and the Yichang City Transport Carbon Peak Implementation Plan 2021-2030.

17.   **Program for Results (PforR) rationale.** PforR is the preferred instrument because the proposed operation will be contributing to an ongoing government program for decarbonizing transport. The PforR instrument will allow the government to use and strengthen systems already in place and provide the government with flexibility to adjust implementation timing and activities as the needs arise. The PforR also provides the flexibility to design and implement a comprehensive package of interventions that can be scaled and replicated by the Government.

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[9] Eckardt et al. (2022). *China Country Climate and Development Report*. Washington, D.C.: World Bank Group. https://openknowledge.worldbank.org/server/api/core/bitstreams/35ea9337-dfcf-5d60-9806-65913459d928/content
[10] Government of China. (2022). *Progress on the Implementation of China's Nationally Determined Contributions (2022) [*Translation*]*. https://unfccc.int/sites/default/files/NDC/2022-11/Progress%20of%20China%20NDC%202022.pdf
[11] Government of China. (2021). *China's Mid-Century Long-Term Low Greenhouse Gas Emission Development Strategy* [Translation]. https://unfccc.int/sites/default/files/resource/China%E2%80%99s%20Mid-Century%20Long-Term%20Low%20Greenhouse%20Gas%20Emission%20Development%20Strategy.pdf

II.   PROGRAM DESCRIPTION

A. Government Program

18.   **The proposed Program will support the Government's program for Carbon Peaking in the Transport sector in Yichang City in Hubei Province.** The main objectives of the Government's program are to promote a shift to greener transport modes for both passenger and freight transport and ensure resilient, safe, and reliable transport services for all. The government program is articulated in two sectoral strategic plans, i.e., *Yichang Municipality Transportation Development 14th FYP (2021-2025)* and *Yichang City Transport Carbon Peak Implementation Plan (2021-2030).*

19.   **The Yichang Municipality Transportation Development 14th FYP (2021-2025), published in 2022, aims to build a green and low-carbon transportation system in Yichang and help Yichang to become a national comprehensive transportation hub city.** In the Transportation 14th FYP, Yichang has established medium-term decarbonization targets, by 2025, (i) to reduce carbon intensity of operational vehicles and vessels; and (ii) to increase the mode share of public transport out of all motorized trips.

20.   **The Yichang City Transport Carbon Peak Implementation Plan 2021-2030 was the first of its kind that provides the overarching transport decarbonization vision and a holistic package of actions.** The six pillars of the plan are (i) promoting the use of new energy vehicles and vessels; (ii) promoting a shift to low-carbon freight transport modes; (iii) promoting a shift to low-carbon passenger transport modes; (iv) improving fuel efficiency of vehicles and vessels; (v) building low-carbon transport infrastructure; and (vi) enhancing carbon emission accounting and evaluation in transport sector.

B. Theory of Change

21.   The decarbonization of the Yichang transport sector will be advanced by implementing a holistic package of interventions and strategies, carefully chosen based on international experience and the specific Yichang context.

22.   The proposed Program adopts the globally recognized ASI framework approach towards transport decarbonization, which was also recommended by the China Country Climate and Development Report. The ASI framework consists of three categories of measures:

- •   **"Avoid trips"** is to minimize the need for trips where possible or reducing trip length by co-locating closely linked activities through integrated land-use, transport plans and supporting service delivery via the Internet, such as telecommuting and telemedicine.
- •   **"Shift to cleaner modes"** is to change modes of trips away from polluting and energy-consuming modes (e.g., private, single-occupancy cars) and requires high-quality, affordable alternatives to private vehicles, including mass transit, on-demand services, and non-motorized solutions such as walking, cycling and micro-mobility.
- •   **"Improve efficiency"** is to optimize vehicle, fuel, and operational efficiency. Adoption of more efficient vehicle and fuel standards, electrification of transport, and other cleaner fuels, as well as operational improvement such as route optimization are critical elements to achieve energy efficiency of transport.

23.   The assumptions, activities, outputs, and outcomes are set out in the Results Chain below.

Figure 3. Theory of Change Diagram

Problem Statement: Yichang lacks a roadmap of policies and investments to advance decarbonization of its urban road transport sector.

Activities	Outputs	Intermediate Outcomes	PDO Outcomes	Long-Term (High-Level) Outcomes

Avoid-Shift-Improve

Results Area 1: Manage motorization and Accessibility

- Implement scrappage program [I]
- Incorporate TOD in plans [A]
- Implement TOD and accessibility investments [A-S]

Outputs:
- High-emission vehicles scrapped
- TOD principles (along mass transit corridors) included in spatial master plan and Technical Guidelines on Accessibility updated
- Cycle lanes network improvement plan prepared and implemented
- Walking plan for the BRT corridor and other major transit corridors prepared and implemented

A1 — Improved walking access to public transport stations, and cycling environment

A1 — Increased number of high-emission vehicles scrapped

Increased accessibility to jobs within 60 minutes of travel by green modes (public transit, walking & cycling)

Results Area 2: Facilitate modal shift for passengers and freight transport

- Develop a Public Transport Improvement Special Plan (S)
- Expand the network of bus priority/exclusive lanes [S]
- Improve the quality of bus services and operations [S-I]
- Extend the coverage of transit network accessible to the urban population [S]
- Develop modern Intelligent transport systems (ITS)
- Facilitate shift to rail and waterway [S]

Outputs:
- Special Plan for improving the public transport in urban core developed
  - Bus exclusive/ priority lanes implemented
  - New services introduced and existing service improved
  - Intelligent transport system enhancements implemented
  - Terminals and bus stops developed/ rehabilitated
- Incentive for water-rail shift of container cargo issued

- Increased average operating speed of buses, frequency of service, and coverage
- Increased % of population in the service area satisfied with the public transport service
- Increased % of female bus drivers
- Increased volume of waterway-railway multimodal container traffic (TEU)

Increased average daily public transit ridership

A2

Results Area 3: Incentivize low-carbon choices

- Issue and implement technical specifications, guidelines and plans on parking [A-S]
- Reform the public transport subsidy mechanism to improve Bus Operator incentives [S-I]
- Pilot an emission trading scheme (ETS) for transport [S] supported by an MRV system

Outputs:
- Parking technical/ administrative documents capturing demand management principles issued and implemented in urban core
- Design and implementation of public transport subsidy mechanism modification
- ETS implementation plan and methodologies developed; platform launched

A1 — Parking supply declines around mass transit

A3 — ETS for transport subsector piloted and functional, supported by an MRV platform

A1
A3 — Net greenhouse gas emissions reduced

Yichang is a more livable city with improved green mobility and accessibility

Yichang road transport sector greenhouse gas emissions peaking is advanced

Results Area 4: Enhance institutional capacity for decarbonizing transport

- Establish decarbonization coordination institutional mechanism [A-S-I]
- Develop Revision to Implementation Plan for Carbon Peaking based on modelling tool and carbon accounting system developed [S-I]
- Develop & implement Capacity building and knowledge sharing plans [A-S-I]

Outputs:
- Decarbonization Coordination Mechanism developed
- Carbon accounting system for road transport sector designed and developed
- Scientific modelling tools developed
- Capacity building plan developed and implemented
- Experience and lessons from implementing the Program documented and disseminated
- Strategy developed for how to scale up the Program to other cities

A3 — Coordination Mechanism operational

Critical Assumptions:
A1: Municipal government remain committed to policy reforms
A2: Private vehicle ownership and use growth rates are less than or equal to forecast
A3: Interdepartmental coordination is robust

DLI

A-Avoid; S-Shift; I-Improve

GEF 7 Project

C. PforR Program Scope

24.   **Rapid motorization has led to stagnating or decreasing share of public transport, and targeted 'Shift to cleaner modes' and 'Avoid trips' strategies will need to be deployed.** Yichang has invested in infrastructure and services including a bus-based public transport system with about 770 buses including a 23 km Bus Rapid Transit (BRT) corridor. Public transport has been experiencing a declining trend before COVID-19, which was further exacerbated during the pandemic due to public health concerns. The walking and cycling environment have also deteriorated with the growth in car use and need for parking. The mass transit ridership in urban core of Yichang has experienced a 53 percent decrease compared to pre-COVID-19. Yichang's ridership reduction mirrors a nationwide slump in bus ridership in China. Between 2014-22, total ridership nationwide declined by 55 percent. The reasons for ridership decline are multifold: (i) increasing prosperity and motorization rates; (ii) emergence of shared bikes, (iii) car hailing services by internet companies; (iv) large-scale adoption of e-bikes; (v) perceived COVID-19 health risks associated with traveling on public transport. In particular, with rising income and motorization, Yichang has not been successful in discouraging people to shift to cars, due to factors including relatively low cost of motor-vehicle use (including low cost for parking), and inability to respond to the growing expectations with regard to public transport service quality. Therefore, 'Shift to cleaner modes' and 'Avoid trips' strategies covering (i) improved public transport and walking and cycling facilities, as attractive alternatives to private modes, combined with (ii) demand management strategies to curb unconstrained personal vehicle use, will be important intervention areas for tackling the car emission growth and reversing the declining trend in public transport ridership.

25.   **Both 'Improve efficiency' and 'Shift to cleaner modes' strategies will be required to address the carbon emissions of road freight transport**. Yichang Municipality is one of the most important logistics hubs on the Yangtze River resulting in high volume of freight traffic handling. In recent years, Yichang has upgraded and constructed a few world-class inland waterway ports and logistics centers, including Baiyang, Honghuatao and Yaojiagang Ports and has potential to further increase the use of rail and inland waterway transport (IWT) for freight and logistics. Simultaneously, timely scrappage of the highly polluting old truck fleet, as per national laws, can contribute to emission reduction.

26.   **Beyond supply, demand side interventions will be critical for incentivizing green modal choices and efficiency improvements**. Limited use of parking demand management strategies is leading to easy supply of parking, including on sidewalks, for car users in city core areas, further disincentivizing transit use. High minimum parking standards prevail in buildings as opposed to good practice of adopting maximum standards. The public transport subsidy mechanism currently does not involve clear incentives for decarbonization, or service effectiveness and operational efficiency. The existing carbon pricing instruments that are available in China do not fully capture the potential of transport sector to decarbonize the sector and contribute to achieve the China's peaking target and carbon neutrality goals. While the China National ETS currently only covers the power sector, there are three regional pilot ETSs that cover road transport sector emissions. And while Hubei Province has a regional ETS, carbon pricing has not been leveraged to decarbonize the Transport Sector. Unlike some other sectors where the emission sources are singular and non-mobile, transport sector emissions are characterized by multiple emission sources, hard-to-define boundaries, and high mobility. This makes it challenging to cover tailpipe emissions (i.e., at the point emissions occur), and limits the potential to capture smaller emissions sources (e.g., residential vehicles). The World Bank is supporting the transition of the transport sector to be gradually covered

under carbon pricing as one of the effective tools for decarbonization. See Box 1 on ETS in China in Annex 2 for more information.

27.   The proposed Program would support the government program of Yichang City under the following priority Results Areas: (i) Motorization Management & Accessibility; (ii) Facilitate Modal Shift; (iii) Incentivize Low Carbon Choices; and (iv) Enhance Institutional Capacity for Transport Decarbonization. Most of the activities are to be implemented by the municipality within the urban core. Activities to be implemented by the municipality will follow a coherent approach across the city in terms of underlying policies, incentive systems, and technical standards, and the Program would support transfer of knowledge and experience from Yichang to other cities.

Table 1. PforR Program Scope

	Government program	Proposed Program for Results
Higher Level Outcome	**Dual Carbon Goals**: To peak carbon emission by 2030 and achieve carbon neutrality by 2060.	Program investments and institutions aligned with road transport decarbonization objectives in Yichang
Objective	**Yichang Transportation 14th FYP[12]:** To promote a shift to greener transport modes for both passenger and freight transport, strengthen inter-jurisdiction coordination for transport development, and ensure resilient, safe, and reliable transport services for Yichang. **Yichang City Transport Carbon Peak Implementation Plan:** To optimize the transportation system for improved efficiency, reduced energy consumption, and advance decarbonization.	To improve low carbon mobility and accessibility, and reduce carbon emissions from road transport in Yichang
Duration	2021-2030	2024-2029
Geographic coverage	Yichang Municipality comprising 5 districts and 3 counties	Yichang Municipality with a focus on 5 districts for physical and service improvements
Sector	All transport subsectors i.e., Road transport, Waterways, Railways, Aviation	Road transport subsector
Results areas	The program covers: (1) Motorization Management & Accessibility; (2) Facilitate Modal Shift; (3) Incentivize Low Carbon Choices; (4) Enhance Institutional Capacity for Transport Decarbonization;	The PforR will support the following four RAs: (1) Motorization Management & Accessibility; (2) Facilitate Modal Shift; (3) Incentivize Low Carbon Choices; (4) Enhance Institutional Capacity for Transport Decarbonization

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[12] The current 14th FYP period covers 2021-2025, after which a 15th FYP will cover 2026-2030. It is anticipated that the decarbonization targets and activities in the 15th FYP will be even more ambitious than the 14th FYP to deliver on the Dual Carbon Goals.

28.	The Program's Results Areas support a nested hierarchy of activities at the municipal levels. The PforR Result Areas and associated activities identified using the ASI Framework are the following:

a.	**Results Area 1: Manage Motorization and Accessibility.** This result area focuses on 'Improve efficiency' strategies covering enforcement of cleaner vehicle emission standards and retirement of old heavily polluting freight vehicles and buses; and 'Avoid trips' strategies to support compact and dense urban area development which prioritizes public transit and NMT.
    i.	Implementing a scrappage program and strengthening systems for improving the scrappage rate of qualified truck, bus, and coach vehicles;
    ii.	incorporating Transit-Oriented Development ("TOD") principles in the spatial master plan and updating technical guidelines for urban street designs with short and convenient walkability improvement to transit stops; and
    iii.	implementing TOD and accessibility investments by preparing a walking accessibility plan, a cycling improvement plan, and making accessibility improvements along key transit corridors.

b.	**Results Area 2: Facilitate modal shift for passengers and freight transport.** This result area substantially focuses on 'Shift to cleaner modes' strategies to encourage shifts to public transit by improving the attractiveness of the transit system.
    i.	Expanding the network of bus priority/exclusive lanes;
    ii.	improving the quality of bus services and operations through infrastructure improvements, road traffic improvements, and service improvements with respect to frequency, speed, number of transfers, and route optimization;
    iii.	modernizing intelligent transport systems for improved customer responsiveness and operational performance;
    iv.	extending the coverage of transit network and its accessibility to the urban population; and
    v.	establishing incentives to facilitate a shift of container cargo to rail and water freight transport.

c.	**Results Area 3: Incentivize low-carbon choices.** Even with provision of infrastructure and transition to cleaner vehicles, transport decarbonization cannot be achieved without transport users and operators making the right choice on the modes and routes of their trips. It is therefore critical to put in place demand management mechanisms that can incentivize transport users and influence them to apply strategies to 'Avoid trips' 'Shift to clear modes' and 'Improve efficiency' on their behavior.
    i.	Improving the subsidy mechanism for public transport operators to include incentives for decarbonization and ridership increases;
    ii.	strengthening parking demand management through price and quantity levers to influence private vehicle usage;
    iii.	implementing a parking plan for the urban core and along bus rapid transit corridors; and
    iv.	piloting transport subsector participation in ETS for Yichang through a voluntary mechanism, and establishing and maintaining a MRV system for the ETS.

d.	**Results Area 4: Enhance institutional capacity for decarbonizing transport.** The institutional foundation enables coordination across jurisdictions and with essential tools and training, can ensure achievement of carbon goals.
    i.	Establishing a decarbonization coordination institutional mechanism;

ii.   revising the Yichang City Transport Carbon Peak Implementation Plan using carbon accounting system and scientific modeling tools to simulate transport carbon emissions trajectories to define impactful policies and programs for transport carbon peaking;

iii.   developing a capacity building plan for Yichang's government officials, a knowledge sharing plan for documentation and dissemination of the experience and lessons learned from Program implementation, and strategies for scaling-up; and

iv.   conducting public communication events on green mobility and modes to build awareness and popularize sustainable urban mobility, and carrying out relevant public awareness raising events.

29.   **Program Boundary.** The Program focuses on the 5 districts of Yichang municipality, a specific period (2024-2029) of the government program's total duration, and the road transport sector.

30.   **Program Financing.** The total Program financing is US$1114 million, of which 22.5 percent will be financed by IBRD.

Table 2. PforR Financing

Source	Amount (US$ Millions)	Percentage of Total (%)
Counterpart Funding[13]	864.00	77.50
International Bank for Reconstruction and Development (IBRD)	250.00	22.50
Total Program Financing	1114.00	100.00

31.   **The GEF7 funding for Pathways for Decarbonizing Transport towards Carbon Neutrality in China and the Program are complementary.** GEF7 is supporting, at the national level, the development of policies and guidelines to benchmark and influence on the ground implementation of decarbonization strategies in the transport sector and the Program involves the design and implementation of a package of decarbonization interventions at the type-II city level. GEF7 can safeguard that the important lessons and feedback generated by the PforR operation be used to further sharpen the national framework and inform sub-national policies, which will be disseminated to other provinces through the capacity building program under the GEF7 project. More specifically, the following national level activities under GEF7 will include Yichang as a case study and guide policy formulation and implementation for: (i) urban mobility decarbonization roadmap, (ii) emission standards for freight, (iii) carbon trading, (iv) carbon accounting and monitoring systems, and (v) inland waterway decarbonization. A mechanism of exchanges between GEF7 and PforR will be established during project implementation. The Program will document its experience and share with MOT, while using the lessons to inform a scale up strategy. Leveraging these synergies will help create an active feedback loop to make the national policies evidence based, which in turn will influence the policies and programs at the subnational level and ensure effective scale up of the Yichang Program. The proposed operation would provide a valuable proof of concept and demonstration on transport decarbonization for other type-II cities in China facilitated through the important linkages with the GEF7 Project.

32.   **Knowledge sharing is an integral part of the Program design**. Result Area 4 on enhancing institutional capacity for decarbonization provides for the development of a Knowledge Sharing Plan for documentation and

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[13] Of the US$ 864 million Program financing estimate, US$ 803 million is estimated through the General Public Budget by Yichang Finance Bureau and US$ 61 million by Yichang Urban Development Group.

dissemination of the experience and lessons learned from implementation of the demonstration pilot, and its implementation. The experience and lessons learned will be documented as case studies, at a minimum for the three areas identified for exchange between MOT and this Program i.e. (i) urban mobility decarbonization roadmap, (ii) carbon trading, (iii) carbon accounting and monitoring systems. These will be disseminated by Yichang through appropriate media, such as reports, workshop presentations, and multimedia. The exchanges between the PforR operation and the proposed GEF7 project will be carried out throughout the Program cycle and a formal implementation mechanism will be put in place for the exchange to occur on a regular basis. The dissemination will be further scaled up through the GEF7 capacity building component. Based on the demo experience Yichang will help to develop a Strategy for Scale-up of the pilot to other cities to be shared with MOT for their further action. To maximize the operations impact, the knowledge generated under the operation will be widely disseminated through the World Bank–China transport partnership platform known as TransFORM, a collaborative knowledge platform managed by MOT and the World Bank since 2014. It has successfully captured, generated, and disseminated knowledge from the GEF projects in the past.

D. Program Development Objective(s) (PDO) And PDO Level Results Indicators

33.   The PDO is to improve low carbon mobility and accessibility, and reduce carbon emissions from road transport in Yichang.

34.   **Progress toward achieving the PDO will be measured through the following key results indicators**:

- a) Average daily public transport ridership (Number)
- b) Accessibility to jobs within 60 minutes of travel using green modes (public transport, walking and cycling) (Percentage)
- c) Net greenhouse gas emissions (Metric ton)

E. Disbursement Linked Indicators and Verification Protocols

35.   **The operation's DLIs provide the annual targets that need to be achieved under the proposed Program to trigger disbursements.** DLIs were chosen as they (a) represent improvements in key aspects of the Government's program and the key priorities in each RA, (b) are within the control of the Government, (c) are achievable in the Program period, and (d) are verifiable. They prioritize the use of existing indicators and reporting mechanisms within the Government system where possible, to ensure sustainability.

Table 3. PforR Program DLIs

DLI	Rationale for Selection
Results Area 1: Manage Motorization and Accessibility	
DLI 1. High-emission vehicles scrapped	This DLI aims to strengthen management of old, heavily polluting vehicles such as trucks, coaches, and buses. Heavy duty vehicles such as trucks and buses have a higher per unit emission level and are a major source of emissions in Yichang. Polluting vehicles are defined as vehicles which are National Standard 3 or below and have completed their useful life i.e., 15 years, as per National Laws. The number of vehicles eligible for scrappage (those that are no longer compliant with national emission standards) in any year can be readily tracked from the vehicle records database maintained by the Public Security Bureau. By phasing out and

retiring these vehicles in a timely manner, substantial reduction in GHG emissions and other air pollutants can be achieved. Yichang has achieved scrappage rates of 63 percent in the past and targets to increase it to 75 percent by end of Program.

PDO and Results Area 1, 2, 3	
DLI 2. Average daily public transport ridership	This DLI measures the increase in bus ridership and the shift from personal to public transport modes resulting in reductions in GHG emissions. Ridership is an indicator which captures the composite impact of a variety of interventions, while being simple to measure and track. The DLI captures the strong efforts to improve the attractiveness of public transport in the absence of which the ridership may actually continue on its declining trend (see more details in Annex 2 Para 6) leading to a faster increase in GHG emissions.

Results Area 3: Incentivize low-carbon choices	
DLI 3. Parking demand management strengthened	This DLI directly addresses the need to control personal vehicle use through more stringent parking norms. Stricter parking allocations in buildings and along major transit corridors and curbs on parking along sidewalks, can help improve the relative attractiveness of transport alternatives such as transit and walking and cycling. Focusing on transit corridors for parking management ensures better utilization of transit, while making it easier for people to switch from private cars owing to ready availability of more sustainable alternatives.
DLI 4. Functional pilot ETS for the transport sector in Yichang Municipality using a monitoring, reporting, and verification (MRV) system	This DLI aims to enable ETS as a market-driven approach to decarbonization. The existing carbon pricing instruments that are available in China do not fully capture the potential of decarbonizing transport sector (See Box. 1 in Annex 2). By piloting an ETS for the transport sector for transit and logistics service providers (private and public), governments are leveraging market forces and mobilizing private sector capital to incentivize emissions reductions. This approach can encourage innovation and cost-effective emissions reductions as companies seek to minimize their compliance costs. The proposed Program will support inclusion of the transport sector under the Hubei ETS pilot, starting from development of an ETS platform with carbon emission accounting and monitoring, reporting, and verification (MRV) built-in system in Yichang city, that tracks carbon emissions from passenger transportation and/ or logistics operations. The disbursement trigger is having the accounting methodology for the sub-transport sectors being recognized by the Hubei Province ETS pilot, which is one of the eight regional pilots, and subsequently, successful inclusion of the targeted entities in the transport sector under the Hubei pilot ETS. The proposed Program could be scaled beyond Yichang, Hubei, through its complementarity with the proposed GEF7 project, "Pathways for Decarbonizing Transport towards Carbon Neutrality". The knowledge on ETS generated under the PforR operation would offer valuable lessons and feedback to further sharpen the national framework and inform sub-

national policies to support the expansion of carbon market to transport sector in China.

Results Area 4: Enhance institutional capacity for decarbonizing transport	
DLI 5. Coordination mechanism for transport decarbonization in Yichang Municipality established and operational	This DLI will track the establishment of an intra-departmental group to coordinate the decarbonization of transportation in Yichang across departmental boundaries in the long term, going well beyond the life of the Program. It will be responsible for inter-departmental coordination, planning and budgeting the transport decarbonization measures, development, and implementation of strategic and other plans for transport decarbonization; and capacity development and knowledge dissemination and exchange.

III. PROGRAM IMPLEMENTATION

A. Institutional and Implementation Arrangements

36.   Hubei Provincial Government will supervise and provide guidance, coordination, and support to Yichang Municipality during preparation and implementation of the PforR through the Department of Transport, the Department of Finance, Development and Reform Commission, and Department of Ecology and Environment.

37.   **Project Management Office (PMO).** Yichang Municipal Government will be the implementing agency, and has established a Project Leading Group (PLG) at municipal level to coordinate and supervise preparation and implementation of the Program, which is chaired by the Vice Mayor in charge of the transport and logistics sector. All directors of relevant government agencies, including the Municipal Development and Reform Commission (DRC), Public Security Bureau, Finance Bureau, Ecology and Environment Bureau, Construction Bureau, Transport Bureau, Urban Management Commission, Government Services and Big Data Management Bureau, Public Resources Trading Center, and Yichang Urban Development Group (UDG), are members of the PLG. A Program Management Office (PMO) has been established under the PLG to be responsible for managing, coordinating, monitoring, and reporting project implementation, which is chaired by the Director General of Transport Bureau. The UDG, which is the largest state-owned enterprises in Yichang and one of the top 30 Urban Development Investment Companies (UDICs) in China, will be responsible for implementing activities related to bus service. Yichang Municipal Government will enter into an Implementation Agreement with UDG in this regard. Yichang's existing management systems will be used to implement the Program. With support of the Program, Yichang will convert the PLG into a permanent mechanism to monitor and coordinate decarbonization of the transport sector in Yichang. The PMO will establish a communication mechanism with the implementation agency of the GEF7 project under the MOT to regularly exchange implementation progress, discuss key issues and results, and share experience and lessons of linked activities.

B. Results Monitoring and Evaluation

38.   **The Program will be monitored through 3 PDO Indicators and 11 Intermediate Results Indicators, of which 5 are Disbursement Linked Indicators.** Details on these indicators, including the methodology and actors

responsible for measurement and reporting are detailed in Annex 1. The PMO will have overall responsibility for monitoring and evaluation activities under the Program.

C. Disbursement Arrangements

39.   **The World Bank will advance up to 25 percent of the total IBRD loan amount to Hubei Province by loan effectiveness.** After the DLIs against which the advances will be disbursed are achieved, the amounts of the advances will be deducted from the total amount to be disbursed against such DLIs. The Bank will record any amounts of advance as disbursed for an achieved Disbursement Linked Result (DLR) ('recovered') after it has notified the borrower of its acceptance of the evidence of achievement of the results for which the advance was provided. The IBRD loan disbursements will be made periodically upon receiving and accepting the third-party verification agency's reports on the DLRs for the respective DLIs. The PMO will submit a verification letter with the results to the Bank and, upon acceptance of the verification results by the World Bank, the Hubei Department of Finance will prepare disbursement applications and submit them to the Bank. The applied disbursed amount will depend on the verified results. Some annual allocations are scalable and non-fixed, meaning that the World Bank will disburse for over-performance up to the DLIs' total allocation. Over-performance will enable the Hubei Department of Finance to bring forward disbursements from Year 4 and Year 5 to Year 2 and Year 3. The Hubei Department of Finance can apply for disbursements as soon as Yichang meets targets, provides the necessary evidence to the Bank, and the Bank accepts that evidence in a formal notice to the borrower with the disbursement amounts. The Hubei Department of Finance can also request to be reimbursed for any disbursement-eligible results achieved beyond the indicative annual target up to and not exceeding the total Program target and amount allocated for those DLIs that are scalable and confirmed by the Bank. Such disbursements are not dependent upon or attributable to individual transactions or expenditures.

D. Capacity Building

40.   **Systematic capacity building of the Yichang Municipal government will be required to ensure optimal outcomes.** Tailored training and implementation support will address the issues identified in the technical, fiduciary, environmental, and social systems assessments (including gender). The technical training and support will focus on the integrated approach and the capacity required to carry out the necessary assessments, including various new quantitative evaluation methods such as a carbon accounting system, MRV system and the modeling tools. The PforR also includes knowledge development aspects that promotes the decarbonization concept both internally (study tours to learn best practices) and externally (documentation and workshops that promotes the experience learned).

IV. ASSESSMENT SUMMARY

A. Technical

Paris-Alignment Assessment

41.   **Designed around the ASI Framework for transportation decarbonization, all activities proposed in the Program are on the Joint Multilateral Development Banks' Universally Aligned List[14] for Paris Agreement from the climate mitigation perspective.**[15] For Universally Aligned activities, no further assessment related to transition risks and carbon-lock risks for climate mitigation is needed. The Program is not at a material risk of having a negative impact on the country's low-GHG-emissions development pathways low-GHG-emissions development pathway.

42.   **Assessment and reduction of adaptation risks.** Yichang, as a city situated along the Yangtze River, is vulnerable to climate variability and changes. The main climate and disaster risks, such as flooding and expected increases in rainfall and maximum temperature, are likely to affect the Program investments. In recent years, extreme rainfall and flooding events have occurred more frequently. The inherent physical climate risk is Low for Result Areas 3 and 4, which focus on non-physical interventions such as policy reforms, establishing mechanisms and platforms, and institutional capacity building. The primary physical climate risk exposed to the proposed Program is for Result Areas 1 and 2, which involve physical expansion and improvement of NMT infrastructure and public transport infrastructure network and services, and the inherent physical climate risk is rated as High. This infrastructure is exposed and vulnerable because it is in locations where flooding is expected to occur. Climate change risks and vulnerability to floods and extreme heat will be managed and mitigated for Results Areas 1 and 2 through targeted adaptation measures, by combining structural, nature-based, and soft adaptation solutions. Infrastructure improvements will reduce urban vulnerability to flooding through better drainage and by applying the Sponge-City concept[16], thereby enhancing the resilience of transport systems in the event of climate-related shocks. The Program activities will occur within the area subject to the Yichang City Sponge City Development Plan 2016-2030. Additional climate risk management systems that will be applied to the Program activities include design standards for urban drainage and flood prevention, and flooding emergency response procedures. The implementing agencies have adequate capacity to implement these institutional frameworks. Finally, through the enhancement of public transport management, the Program will build the city's capacity to strengthen the operational resilience of the public transport network to climate risks. Accordingly, risks from climate hazards are not likely to have material impact on the Program and its Development Objective and appropriate design measures

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[14] Universally Aligned activities are those that (i) actively contribute to decarbonization consistent with the pathways aligned with the mitigation goals of the Paris Agreement under all circumstances and in all countries, or (ii) have a negligible impact on decarbonization as they do no harm to the countries' transition to a long-term low-GHG-emission pathway. Activities that support non-motorized transport and public transport are on the Universally Aligned list.

[15] World Bank. *Transport Sector Note on Applying the World Bank Group Paris Alignment Assessment Methods (English).* Washington, D.C.: World Bank Group. http://documents.worldbank.org/curated/en/099802104072399820/IDU042c63ab700a4904fdb09fea073c99ff21977

[16] The Sponge City philosophy is to distribute and retain water at its source, slow down water as it flows away from its source, clean water naturally and be adaptive to water at the sink when water accumulates – this is in stark contrast to the conventional solution of grey infrastructure, which is to centralize and accumulate water using big reservoirs, speed up the flow by pipes and channelized drains, and fight against water at the end by higher and stronger flood walls and dams. Applying Sponge City policies and projects has been shown in other Chinese cities to effectively reduce the urban heat island (UHI) effect and other climate risks and improve the transport network's ability to adapt to extreme weather conditions such as unusually high or low levels of rain.

have been incorporated in the Program design to reduce the residual risk from climate hazards to a 'Moderate' level, which is considered acceptable.

Strategic relevance and technical soundness

43.   **The results of a combined temporal and spatial accessibility analysis suggest that accessibility to jobs within one hour of travel is low at 31 percent in Yichang**. The analysis combined the geospatial distribution of population and employment with, not only the location of public transport infrastructure (bus stops) but with the time taken to travel between two points. The travel time includes access time by walking to a bus stop, with the speed and frequency of service on each route. This process was undertaken using a hosted subscription model "Conveyal Analysis" which integrates public transport and land use data to compare current system performance and accessibility with various scenarios. The results of the analysis shows that the base public transport network provides accessibility to 31.3 percent jobs within a 60-minute travel time cutoff (the Baseline Scenario).

44.   **The planned list of Program interventions is underpinned by analysis of GHG reduction potential of various possible combinations of interventions.** The Program interventions under Results Areas 1 to 4 contributing to GHG reduction include those from (i) freight transportation (scrappage of trucks, coaches, and buses, and shifting of freight from road to rail/IWT); (ii) public transit (increases in bus ridership); (iii) NMT improvements (improvements in last mile walkability and bikeability); and (iv) parking (reduction in on-street parking and introducing maximum parking requirements). In sum, these interventions are estimated to cumulatively reduce GHG emissions by 500,000 tons over the Program lifetime compared with if the Program did not occur (BAU Scenario) based on a Scope 1 analysis (tank to wheel). By the end of the Program, annual Yichang Road transport sector GHG emissions are expected to be 6 percent less than what they would otherwise be, on path for carbon peaking by 2033 (Figure 4).

Figure 4. **Transport CO2 Emission by Subsector in Yichang Municipality (2019)**
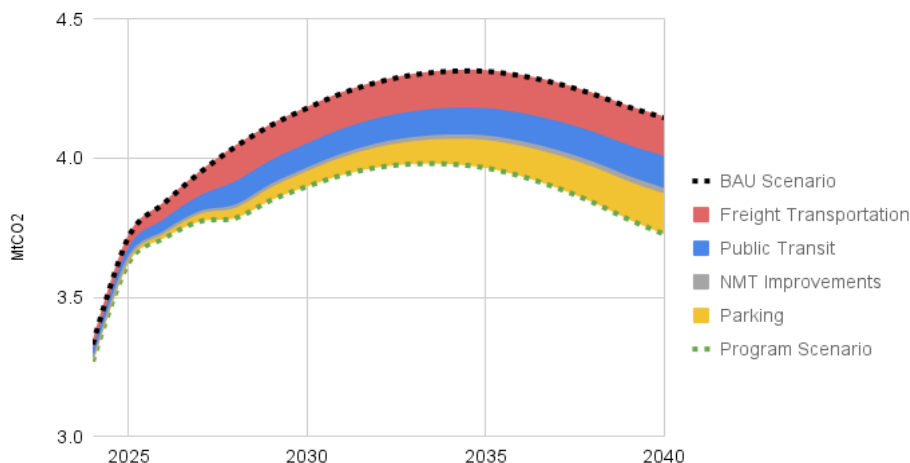
Source: ITDP Calculations.

45.   There are some technical design risks associated with the Program interventions. The Program takes a comprehensive approach to decarbonize transport sector, engages multiple sectors, and includes innovative activities, such as development of ETS, priority to public transport and improved implementation of demand management. Yichang has prior experience with BRT systems but may require more support with implementation of busways and traffic priority systems. While Yichang does not have similar experience, it can learn good practices and lessons from the other cities in China and the world. Implementation of these activities will be enhanced through commitment and coordination from high level management, innovative solutions, and change of practices and policies. Mitigation measures are considered in aspects of institutional arrangement, technical assistances, coordination between the Program and the proposed GEF7, and technical support from the Bank team during preparation and implementation. The Bank team has already secured grant trust funds to support the ETS implementation.

Expenditure Framework Assessment

46.   The Expenditure Framework Assessment (EFA) was carried out based on data and information provided by Yichang Municipal Government, a review of public finance management regulations, and interviews with government officials. The EFA covered the following aspects: (i) fiscal sustainability and resource predictability; (ii) budget allocation and execution; and (iii) incentives for efficient service delivery and value for money. The Program covers Yichang municipality (excluding subordinate counties). The total Program financing is estimated to be US$ 1114 million equivalent, of which US$ 864 million equivalent will be financed by the Chinese government and US$ 250 million will be financed by the IBRD Loan.

47.   **Expenditure Boundary**. The Program consists of four result areas (Ras). Table 4 provides the breakdown of the Program government financing by Ras. Of the total government financing of US$ 863.6 million equivalent, RA1 accounts for 18.0 percent, RA2 for 70.1 percent, RA3 for 4.3 percent and RA4 for 7.6 percent. The RA2 involves massive public expenditures, while RA1, RA3 and RA4 put more emphasis on the institutional strengthening and innovation, for which the public expenditure is relatively small. Thus, the EFA put more emphasis on the budget expenditures related to RA2, namely, facilitating modal shifts.

Table 4: Program Government Financing in Yichang Municipality by Result Areas (FY 2024-28)

Result Areas	FY 2020-2022 actual	FY 2024-2028 estimated	
	Amount **(US$ million)**	Amount **(US$ million)**	Share (%)
RA1	93.2	155.3	**18.0**
RA2	363.2	605.3	**70.1**
RA3	22.5	37.4	**4.3**
RA4	39.3	65.5	**7.6**
Sub-total	**518.1**	863.6	**100.0**

Note: We use the simple average number of the Program government financing for FY 2020 to 2022 to forecast the Program government financing for FY 2024 to 2028. Data source for actual Program government financing in 2020 to 2022 is Table A2.4.

48.   **Program Financing**. In general, the bulk of the ear-marked funds supporting the activities under the Program is from the own-source revenue of Yichang municipality, but it is worth noting that the scale and proportion of transfers from the central and provincial governments have risen rapidly. From 2020 to 2022, the proportion of High-Level Government (HLG) transfers rose from 2.8 percent to 36.7 percent.

49.   **Expenditure Performance**. It is found the earmarked transfers related to the program activities are adequate and the expenditure performance evaluation system is in place. The quality of program expenditure

management will be critical to achieving the Program objectives. While the Yichang municipality government is responsible for implementing the program activities and deliver the results, the national and provincial government are responsible for providing incentives to Yichang municipality through (i) earmarked transfers that mandate Yichang municipality to use the funds for implementing activities that are critical to the achievement of expected results; (ii) expenditure performance evaluation and rewards; and (iii) technical guidance and close supervision.

50.   **Financial Sustainability**. The recent General Public Budget Revenue (GPBR) in Yichang has been relatively stable, despite the negative impacts of COVID-19 pandemic. In addition, the total expenditure of the Program accounts for only about 0.4 percent (=0.9/ [(47+48+36+47)/4*5]×100) of the public budget revenue in Yichang. Therefore, the financial sustainability is not deemed as a major concern for the Program.

Economic Assessment

51.   **The proposed Program is expected to generate economic benefits beyond carbon emission reduction, in the form of congestion reduction, transport operating efficiency, energy efficiency, and health benefits from improved air quality**. The Program is also expected to reduce local pollutants which are main contributors of poor air quality in many Chinese cities. Better integration and incentive system that rewards the choice of green modes—public transport and NMT, primarily—would help reducing traffic congestion and enhance the livability in the city. Pricing incentives that reflect environmental externalities generated by transport would incentivize individual travelers and commercial entities to adjust their behaviors for better energy and operating efficiency, such as better utilization of the capacity (e.g., carpooling, cargo consolidation) and fuel conserving habits (eco-driving). Emission reduction that can be achieved through the activities under the proposed Program is being estimated through transport modeling for the city.

52.   The total Program in Yichang covers a wide range of areas but the key focus of the Program is on increasing the use of public transport and reducing the use of cars in the municipality. As there is no detailed schedule of the Program works whose impacts can be assessed and evaluated, an economic evaluation was done of the costs and benefits assuming that the key DLIs associated with the bus services have been achieved.

53.   The relevant results underpinning the evaluation are that, by 2028, patronage increases to 30 percent above the current (normalized level), average bus travel speed increases by 15 percent and peak service frequencies increase by 20 percent. In the absence of the Program, demand would instead steadily decline, as would average bus speeds. Further details are given in Annex 2.

54.   The Program has an EIRR in the BAU case of 23 percent and a Net Present Value (NPV), discounted at 6 percent to 2023 of RMB 2037 million. A series of sensitivity tests show the project is robust with respect to changes in capital cost and the projected increase in patronage (as most of the economic benefits accrue to existing passengers) but is sensitive to changes in the vehicle travel time reduction. However, even if the projected travel speed only improves by 10 percent, the Program still has an EIRR of 18 percent. The Program includes potential improvements in accessibility to bus stops, stop facilities and improved information systems as these will all increase the overall benefit to bus passengers.

55.   GHG emissions have been calculated on a Scope 3 (or 'well-to-wheel') basis and thus allow for the emissions associated with electricity used by electric vehicles. They have also been calculated on two scenarios with different rates for the uptake of electric vehicles and for the decarbonization of the electricity supply. Full

details are given in Annex 2. The Program covered by the evaluation will save 34-60,000 tons (depending on scenario) of carbon dioxide annually from 2028 until the end of the evaluation period based on Scope 3 estimates.

B. Fiduciary

56.   **Adequacy of the Program's fiduciary systems.** Pursuant to the World Bank's Policy (effective on November 11, 2017, and latest revision March 25, 2022) and its associated Directive (effective on September 17, 2020, and latest revision on March 8, 2022) on PforR Financing, as well as the World Bank's PforR Fiduciary Systems Assessment Guidance Note (effective on June 30, 2017, and latest revision on March 8, 2022), the World Bank's Fiduciary Team carried out a fiduciary systems assessment (FSA). According to the FSA and given the agreed actions to strengthen the fiduciary systems, as reflected in the Program Action Plan (PAP), and other proposed mitigation measures that will be implemented-the Program's fiduciary systems, including the financial management (FM), procurement, and governance systems, are considered to adequately meet the requirements laid out in the World Bank's PforR Policy and Directive. They provide reasonable assurance that the Program's financing proceeds will be used for the intended purposes, with due attention to the principles of economy, efficiency, effectiveness, transparency, and accountability.

57.   **Procurement assessment.** Procurement under the Program will follow the Tendering and Bidding Law (TBL) and the Government Procurement Law (GPL), as well as relevant implementation regulations. Open competitive bidding is the preferred procurement method. Standard bid documents issued by respective line ministries and sectoral departments will be used. An overall assessment of the legal framework and the procurement system found them to meet the Bank's principles of economy, efficiency, effectiveness, transparency, and accountability. The Program does not include activities with either significant environmental and social impacts or those with a contract value at or above US$ 115 million for works / supply & installation of plant / Public-Private-Partnership, and US$ 75 million for goods / information technology / non-consulting services, and US$ 30 million for consultant services.

58.   **Mitigation measures in procurement.** Two major procurement risks were identified. The first risk is that contracts may be awarded to firms or individuals which are debarred or are under temporary suspension by the Bank or other multilateral development banks. The following mitigation measures have been proposed in this regard: (a) Upon Program loan effectiveness, Yichang Finance Bureau shall issue an official letter to require that all Program implementation agencies ensure that no contract will be awarded to ineligible firms or individuals; and (b) Procurement staff of implementation agencies should check the latest lists of the debarred and temporarily suspended firms and individuals each time before contract award; (c) the TOR for annual external audit shall include the task of verifying whether the mentioned screening mechanism works and implementation agencies shall demonstrate this to audit office. The second risk is that the Bank may not be informed of allegations of fraud and corruption during Program implementation. The mitigation is that a Program Implementation Plan shall require the Client to inform the Bank of any credible and material allegations of fraud and any corruption issues as part of the semi-annual Program progress reports. In case there is no issues to be reported, the semi-annual Program progress report shall also include one paragraph to confirm.

59.   **Financial management assessment**. Major FM risks identified include the following: (i) Budget quota of upper level transfer funds was distributed to the municipality in the middle of current year which prevents the municipal government from including the entire program funds in its annual budget; (ii) 'program' is not a budget

classification element in China and the required program financial reporting can't be generated from government treasury system; (iii) the Budget execution rate is not stable in the past three years and there are big gaps among the budget line items involved; (iv) there is a conflict of interest for relevant Yichang municipal government bureau's as the internal audit is conducted by financial staff; and (v) Government auditors did not audit the program funds and prepare the program audit report.

60.   **Mitigation measures in financial management.** The proposed mitigation measures include:

a. Municipal government should include all program funds in its approved annual budget and one way to do this is to establish multi-year program budgeting to ensure program financing sources are reliable and predictable.
b. Select the budget lines associated with program expenditures and report on them. In addition, as an alternative measures, a budget tagging mechanism which can trace program expenditures from government existing integrated financial management system has been recommended and it is expected to be piloted during project implementation. This also creates fundamental basis for generating program financial reporting from government treasury system.
c. Related entities should identify the issues which impact the budget completion and take necessary actions to ensure the approved annual budget could be fully completed.
d. It is recommended that the full-time internal auditors for relevant Yichang municipal government bureaus should be recruited, or the function is outsourced to an accounting firm.
e. The Bank will work with the Provincial Audit Office (PAO) to develop the terms of reference (TOR) for Program auditing to ensure Program funds could be audited in line with the Bank's policy. Trainings will be provided to strengthen the capacity of external auditors on Program auditing.

61.   **Fiduciary supervision.** Procurement and FM are subject to annual audit by government audit offices. Procurement following the procedures of the TBL is subject to regular supervision and oversight by DRCs at various levels and relevant sector authorities. The Finance Department or Bureaus at various levels exercise regular supervision and oversight for procurement following the procedures of the GPL.

62.   **Fraud and corruption risks.** The government has put in place multiple institutions to prevent, report, detect, investigate, prosecute, and sanction fraud and corruption. These institutions include the discipline inspection commissions within all implementation agencies, supervision bureaus, anti-corruption bureaus under the People's Procuratorates, and audit offices at the central, provincial, prefectural, and county levels. These agencies have comprehensive mandates to combat fraud and corruption, and any bidder or party can report fraud and corruption issues to any of these government agencies. The World Bank's right to conduct an inquiry into such allegations or other indications, independently or in collaboration with the borrower regarding activities and expenditures supported by the Program, as well as its right to access to the required persons, information, and documents will be observed in accordance with the standard arrangements for this purpose between the Government and the World Bank. The Program's Legal Agreement will also oblige the client to fully comply with obligations under the World Bank's Anti-Corruption Guidelines for PforR operations.

63.   **The Program will be subject to the World Bank "Guidelines on Preventing and Combating Fraud and Corruption in Program-for-Results Financing' dated February 1, 2012, and revised on July 10, 2015 (the Anti-Corruption Guidelines).** These guidelines shall be applied in an unrestricted manner on all activities within the

Program boundary. To implement the various areas covered in the Anti-Corruption Guidelines, the implementation agencies shall perform the following:

a. Maintain and compile a report of Program related complaints as part of the Program progress report.
b. Incorporate the World Bank's list of debarred and suspended firms / individuals in the filter used by procuring entities under the Program as part of their due diligence before contract award.
c. Maintain and compile a report of any contract awards made to any ineligible/suspended firms/individuals, as part of Program progress reports.
d. Ensure that each participating bidder submits a self-declaration that the firm is not subject to ineligibility or has not been sanctioned under the World Bank system of debarment and cross-debarment at the time of bidding.
e. Ensure that timely and appropriate actions are taken to address issues and indications of fraud and corruption, and that these actions are reported to the World Bank.
f. Ensure that the Program's implementation agencies will cooperate fully with the World Bank, or any firm/individual appointed by the World Bank, in any inquiry conducted by the World Bank into allegations or other indications of fraud and corruption in connection with the Program.

C. Environmental and Social

64.   **An Environmental and Social Systems Assessment (ESSA) has been completed and the PAD includes the Bank's assessment.** The ESSA assesses the potential environmental and social (E&S) impacts/risks and the existing management systems associated with the Program (see Annex 4 for details).

65.   **In general, the Program is expected to bring significant E&S benefits** by constructing physical infrastructure (BRT corridors, bus depots, bus terminals, bus lanes, bicycle lanes, pedestrian walkways, etc.) and promulgating and implementing a set of transport decarbonization policies, regulations, and mechanisms (e.g., vehicle emissions policies, parking policies, TOD policies, carbon accounting system and evaluation mechanism, MRV system, etc.). It is designed to secure broadly positive E&S effects by addressing GHG emissions of the transport sector in Yichang as well as improving quality of bus operations in terms of speed of service, frequency of service, reduced waiting time, and reduced transfers.

66.   **A thorough E&S screening of the proposed Program activities has been undertaken to exclude those with high-risk potential to the environment and/or affected people and communities** including: (i) activities that involve new or significant expansion of large-scale transport infrastructure, particularly those requiring large-scale land acquisition or resettlement or having significant environmental impacts during implementation, for example, construction or expansion of highways, expressways, urban metro systems, etc.; (ii) activities that the site selection involves resettlement legacy issues; (iii) activities that involve heavy polluting processes or high safety risks, for example, scrappage and disassembly of old vessels, purchase and use of hydrogen vehicles, etc.; (iv) activities that involve acquisition of basic farmland; (v) activities that require land use not compliant with the up-to-date overall national and local terrestrial and spatial planning; (vi) activities that have livelihood impacts arising from restriction of access or transfer of user rights; and (vii) other activities with potential significant E&S impacts, particularly those subject to full environmental impact assessment (EIA) reports under China's existing EIA system, etc. The exclusion list will be further reviewed and revised as needed along with the process of the Program preparation.

67.   **With these exclusions, the overall E&S risk associated with the Program is considered Substantial** considering the likely E&S effects, the contextual risks, the institutional risks, and the political risks, especially the

complexity of multiple stakeholders' coordination. The physical works like BRT corridors, bus depots, bus terminals, bus lanes, NMT lanes, pedestrian walkways, etc. will be undertaken in the three core urban districts of Yichang City (Xiling District, Yiling District and Wujiagang District), where no ethnic monitory counties, districts, communities/villages are present and the locations are already disturbed by human activities and unlikely to be in vicinity of any legally protected or customarily recognized critical habitats or cultural heritage. The physical investments (and their associated activities/facilities) will have potentially adverse E&S impacts in construction phase (such as dust, noise, solid waste, and disturbance to traffic, etc.) and operational phase (such as vehicle emissions, traffic noise, scrapped vehicles, hazardous waste, road runoff, traffic accidents, and health and safety risks, etc.). The non-physical activities might induce downstream E&S risks (e.g., solid waste from scrapping more vehicles, influence on owners of scrapped vehicles, etc.). The potential impacts from land acquisition, worker and community health and safety within the Program area of Yichang makes the social risk Substantial. These adverse E&S effects are neither significant nor irreversible and are expected to be readily avoided, minimized, and mitigated through known technologies and measures. Annex 8 of the ESSA provides the mitigation measures developed based on the good international industrial practice and EHSGs of the World Bank, and the practice adopted in China. For example, in construction phase, water spray to depress dust in sites, warning lights and fence around the construction sites for traffic safety management; in operation phase, strengthening vehicle safety inspection and maintenance to ensure safe operation of vehicles, as well as strengthening supervision on and training to drivers to improve safe driving and reduce violations, etc. Neither OP/BP 7.50 Projects on International Waterways, nor OP/BP 7.60 Projects in Disputed Areas, will be triggered.

68.   **The ESSA concludes that China has established comprehensive systems to manage the Program-related E&S impacts/risks at the national, provincial, and local levels.** The performance of the E&S systems associated with the Program is found to be basically effective, with sound regulatory frameworks, management procedures, and institutional arrangements in place for E&S management covering EIA, social stability risk assessment (SSRA), pollution prevention and control, traffic safety management, land acquisition and resettlement, management of labor and working conditions, community health and safety, and management of ethnic minorities, women, children, the low-income and other vulnerable groups. The system provides a good basis for addressing the potential E&S issues.

69.   **The ESSA identified some gaps in E&S management practices**: Some activities especially those with minor E&S impacts and exempt from EIA, SSRA, and/or Feasibility Study as per Chinese regulations didn't go through sufficient public consultation and participation in the project cycle. For instance, in developing new public transportation policies or designing/optimizing bus routes and affiliated facilities, there were no meaningful public consultation and participation undertaken during the project preparation and implementation to understand and incorporate the needs (e.g., for travel convenience and safety) of different groups of people, especially the vulnerable groups; or some public participation activities were carried out but lacked corresponding records and documentation. Additionally, planning and implementation of non-physical activities in the existing regulatory framework lack adequate considerations of potential downstream E&S risks/impacts and need enhance stakeholder engagement as well.

70.   **The ESSA recommends that the Program be taken as an opportunity to enhance E&S management capacity and efficiency in Yichang**. This will be achieved by implementing the Program Action Plan, including: (a) to carry out meaningful public consultation and information disclosure during the preparation and implementation stages of the activities under the Program, especially those with minor E&S impacts and exempt from EIA, SSRA,

and/or feasibility study as per Chinese regulations, in diverse channels and at proper time and location, identify and assess potential E&S impacts and risks, understand the needs (e.g., for travel convenience and safety) of different groups of people, especially vulnerable groups and directly affected people, incorporate mitigation measures and public opinions in subproject planning, design and implementation, and record and document the process of public consultations and information disclosures and grievance redressing; and (b) to incorporate E&S considerations in non-physical activities planning (ToR development) and implementation (control of the quality of results) through E&S risk screening and stakeholder engagement to avoid or mitigate the potential downstream E&S impacts/risks associated with the targeted deliverables.

71.   **Meaningful stakeholder engagement was conducted during the ESSA preparation.** Since July 2023, relevant governmental authorities at municipal level in Yichang and district level in three districts (Xiling, Yiling and Wujiagang) and local communities from the Xiling District have been consulted during the field visits to understand the Program-related E&S issues and the management practice. The draft ESSA of Chinese version was disclosed on the website of Yichang Transport Bureau on September 19, 2023, and public consultation for the ESSA was carried out on September 26, 2023. The ESSA is now finalized, and this PAD summarizes that assessment.

72.   **Demand management interventions supported by the Program will impact usage of private cars, which may cause concerns from car users.** Consultations were carried out to collect feedback from various stakeholders, and more public consultations will be conducted during implementation to mitigate stakeholder risk. The Result Area 4 provides for public communication on green modes and building public awareness and to help address risks of public opposition.

73.   **Appendix 8 of the ESSA provides the mitigation measures for potential environmental and social impacts during the construction and operation of the Program.** These mitigation measures are developed in line with the best practice as provided by the Environment, Health and Safety Guidelines (EHSGs) of the World Bank Group and as adopted in China. These mitigation measures are comprehensive and adequate covering the key environmental and social aspects related to the Program on traffic safety, community safety, OHS, pollution control, labor management, and vulnerable groups, etc. A focal point will be designated by the PMO to ensure these mitigation measures be incorporated into the design of the Program and be taken into account in the preparation of the domestic environmental and social safeguard documents for the Program activities.

74.   **Grievance Redress.** Communities and individuals who believe that they are adversely affected because of a Bank supported PforR operation, as defined by the applicable policy and procedures, may submit complaints to the existing program grievance mechanism or the Bank's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed to address pertinent concerns. Project affected communities and individuals may submit their complaint to the Bank's independent Accountability Mechanism (AM). The AM houses the Inspection Panel, which determines whether harm occurred, or could occur, because of Bank non-compliance with its policies and procedures, and the Dispute Resolution Service, which provides communities and borrowers with the opportunity to address complaints through dispute resolution. Complaints may be submitted at any time after concerns have been brought directly to the Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the Bank's Grievance Redress Service (GRS), visit https://www.worldbank.org/GRS. For information on how to submit complaints to the Bank's Accountability Mechanism, visit https://accountability.worldbank.org.

D. Gender

75.   The Program will promote better economic opportunities for women in the public transport sector in Yichang as it accelerates its low carbon transition in urban mobility[17]. According to a gender analysis conducted[18], gender gaps in labor force participation in the public transport sector in Yichang are more obvious in technical positions such as bus drivers, vehicle maintenance, and electricians. These disparities arise from entrenched gender norms, limited access to relevant training and education, and systemic biases that reinforce stereotypes regarding suitable professions for women. Women constitute only 23.7 percent of the total workforce (1351 male, 420 female employees in the sector), with a mere 15.17 percent representation in technical positions of vehicle maintenance and electricians and 10 percent of bus drivers. Conversely, in operational and management roles (e.g., Human Resources, finance, administrative management, public transportation service, scheduling, and department management), the gender gap is less pronounced, with women comprising 47.39 percent of these positions. Remarkably, in management roles, female representation even reaches 84 percent. Additionally, the company's chairman is a woman, reflecting a commitment to elevating female presence in leadership positions. Moreover, the gender pay gap across different roles is minimal, at less than 2 percent. This difference is attributed to factors such as seniority and male employees receiving more night shift allowances (as women rarely occupy night-shift positions). Given the technical constraints and service limitations of Yichang's public transport system, promoting greater female participation in technical roles is seen as crucial for enhancing the overall quality of public transportation services. Based on the analysis, the Program will help advance gender equality in the transport sector in Yichang by creating equal employment opportunities for men and women while developing its low carbon mode of transport system. Key gender actions include development of guidelines for promoting gender equality in transport sectors, development of certified upskilling training programs for present/future female bus drivers and strengthening local people's gender awareness in transport sector. The gender indicator considered for the Program is, proportion of female bus drivers in Yichang increase to 15 percent (baseline: circa 10 percent).

76.   Elevating the representation of female drivers in the public transportation system not only cultivates a positive public image, attracting a more diverse ridership and garnering community support, but also serves as a catalyst for low-carbon commuting choices. This initiative contributes to global recognition by aligning with international efforts to champion diversity and inclusion, positioning the transportation system as a benchmark for cities striving to build world-class, sustainable, and socially progressive public transportation networks.

V. RISK

77.   **The overall risk of the Program is rated Substantial,** which is informed by technical, fiduciary, and environmental and social systems assessments. Major sub-risks and mitigation measures are summarized below.

78.   **The Institutional Capacity risk is rated Substantial.** Decarbonizing the road transport sector involves multiple sectors and stakeholders. Successful implementation of the Program requires close coordination across various stakeholders beyond transport authorities at provincial and municipal level. Many stakeholders at various levels of government, each of which is only partially responsible for achieving the decarbonization goals, would pose challenges in ensuring accountability and efficiency. In addition, decarbonizing the transport sector requires

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[17] To be incorporated also in the Program Implementation Plan.17 Studies have shown that having more women bus drivers can improve service because women often have better communication and interpersonal skills, creating a more positive atmosphere, which can increase ridership and enhance the overall experience for passengers.
[18] Please find the gender analysis in the end of Annex 2.

participation of road users and transport companies. Given that the Program is complex with multiple stakeholders and a strong demand on coordination, Hubei and Yichang set up leading groups at provincial and municipal level respectively to facilitate the coordination in an efficient manner. In addition, Yichang established a dedicated project management office, assigned staff with experience of implementing MDB-financed projects, and engaged consultants to support the Program implementation. Finally, Yichang will establish a permanent mechanism to monitor and coordinate decarbonization of the transport sector in the future.

79.   **The Environment and Social risk is rated Substantial.** The Program will have different kinds of activities in Yichang, including civil works activities such as improvement of last miles to BRT stations, development of BRT, depots, and terminals, which may involve some land acquisition and resettlement and have potentially adverse E&S impacts during construction and operation, and some other activities like scraping high emission vehicles and issuing of new policies and regulations, which may might induce downstream E&S risks and affect the lives of people. The physical investments (and their associated activities/facilities) will have potentially adverse E&S impacts in construction phase (such as dust, noise, solid waste, and disturbance to traffic, etc.) and operational phase (such as vehicle emissions, traffic noise, scrapped vehicles, hazardous waste, road runoff, traffic accidents, and health and safety risks, etc.). The non-physical activities might induce downstream E&S risks (e.g., solid waste from scrapping more vehicles, influence on owners of scrapped vehicles, etc.). The social risk is largely related to land acquisition, worker and community health and safety within the Program area of. These adverse E&S effects are expected to be readily avoided, minimized, and mitigated through known technologies and measures. A thorough E&S screening of the Program activities has been undertaken to exclude those with potential high-risk to the environment and/or affected people and communities. Annex 8 of the ESSA provides the mitigation measures developed. For example, in construction phase, water spray to depress dust in sites, warning lights and fence around the construction sites for traffic safety management; in operation phase, strengthening vehicle safety inspection and maintenance to ensure safe operation of vehicles, as well as strengthening supervision on and training to drivers to improve safe driving and reduce violations, etc. Public consultation and disclosure of the Program information has been carried out during preparation. Grievance Redress channels are available for public to express their concern or complaint. The ESSA has been disclosed locally on September 26, 2023, and on the World Bank's website on February 23, 2024.

ANNEX 1. RESULTS FRAMEWORK MATRIX

Program Development Objective(s)

To improve low carbon mobility and accessibility, and reduce carbon emissions from road transport in Yichang

PDO Indicators by Outcomes

Baseline	Closing Period
To improve low carbon mobility and accessibility, and reduce carbon emissions from road transport in	
Accessibility to jobs within 60 minutes of travel using green modes (public transport, walking & cycling) (Percentage)	
Sep/2023	Jun/2029
31	35
Average daily public transport ridership (Number)	
Dec/2023	Jun/2029
230000	300000
Net greenhouse gas emissions (Metric ton)	
Sep/2023	Jun/2029
2963500	500000

Intermediate Indicators by Results Areas

Baseline	Period 1	Period 2	Period 3	Period 4	Closing Period
Results Area 1: Manage motorization and accessibility					
Incorporate TOD and accessibility principles (along public transport corridors) into key plans and guidelines (Text)					
Sep/2023	Jun/2025	Jun/2026			Jun/2029

Current plans do not emphasize ToD and accessibility along transit corridors	TOD development principle is incorporated in the "Yichang City Land and Space Master Plan"	Supplement content related to accessibility to public transport stops and easy pedestrian connections in the "Guidelines for Integrated Urban Street Design"			Plans and guidelines updated with ToD and accessibility principles
Number of walking accessibility improvements within 500m of public transport stops along major transit corridors (Number)					
Jun/2022	Jan/2027				Jun/2029
0	80				130
Number of high-emission vehicles scrapped (Number) [DLI]					
Jun/2023	Jun/2025	Jun/2026	Jun/2027	Jun/2028	Jun/2029
3897	835	2754	2272	4109	4716
Results Area 2: Facilitate modal shift for passengers and freight transport					
Average operating speed of buses during peak hours (Number)					
Sep/2023					Jun/2029
0.65					0.75
Share of the population satisfied with the public transport service (Percentage)					
Sep/2023	Jan/2027				Jun/2029
84.9	87				90
Average Headway on Route Network in peak hour (Minutes)					
Sep/2022					Jun/2029
10.26					8.25
Volume of waterway-railway multimodal container traffic (TEU) as a result of rail-water award policy (Number)					
Dec/2022	Jan/2027				Jun/2029
4752	7000				8500
Number of people that benefit from improved access to sustainable transport infrastructure and services (Number (Thousand))					
Sep/2023					Jun/2029
0					1360
Percentage of female bus drivers (Percentage)					
Sep/2023	Jan/2027				Jun/2029
10.57	12				15
Results Area 3: Incentivize low-carbon choices					
Parking demand management strengthened (Text) [DLI]					
Sep/2023	Jun/2024	Jun/2025	Jan/2026	Jun/2027	Jun/2029

Demand management through building parking allocation not in place; Establishment of parking on sidewalks and around mass transit stations permitted	Yichang Municipality has maintained 2198 or less parking spots on pedestrian sidewalks on an annual basis starting in 2024	Yichang Municipality has (a) set limits targets for on-street parking allocations reductions within the vicinity of mass transit stations; and (b) implement the said reduction in on street parking around mass transit stations	Yichang Municipality has implemented a ceiling for building parking standards and additional limits to said allocations based on the proximity to mass transit stations	Yichang Municipality has implemented new classifications for determining parking allocations for new buildings in accordance with the National Standards	Yichang Municipality has applied good practice criteria such as population density, land use, transit availability in the establishment of parking zones for parking allocations to new buildings

Functional pilot ETS for the transport sector in Yichang Municipality using a MRV system (Text) DLI

Sep/2023	Jun/2025	Jun/2026	Jun/2027	Jun/2028	Jun/2029
The current ETS does not cover transport sub-sectors	Yichang Municipality has issued an implementation plan for the establishment of a municipal ETS for the transport sector	Yichang Municipality has issued guidelines for the management of the municipal ETS for the transport sector	Yichang Municipality has established a municipal ETS platform for the transport sector and successfully registered an ETS project proposal using a MRV system	Yichang Municipality has developed at least two transport sector methodologies for carbon emission estimation	At least one transport carbon emission reductions transaction has been completed and recorded at Hubei Province's carbon exchange market

Results Area 4: Enhance institutional capacity for decarbonizing transport

Coordination mechanism for transport decarbonization in Yichang Municipality established and operational (Text) DLI

Sep/2023	Jun/2025	Jun/2027	Jun/2026	Jun/2028	Jun/2029
No coordination mechanism is established	Yichang Municipality has established a leading group to coordinate the decarbonization of transportation with defined leadership and membership and a technical secretariat	Yichang Municipality has developed a carbon accounting tool for the road transport sector and modeling tools and publicly released the carbon emission estimates for the road transport sector	Yichang Municipality has developed a capacity building plan and knowledge sharing plan for transport decarbonization	Yichang Municipality has documented and disseminated lessons from pilot implementation, and developed a scale-up strategy for other cities	Yichang Municipality has revised the Yichang City Transport Carbon Peak Implementation Plan using the tools developed under DLR #5.2

Disbursement Linked Indicators (DLI)

Period	Period Definition		Timeline

Period 1	Year 1	
Period 2	Year 2	
Period 3	Year 3	
Period 4	Year 4	
Period 5	Year 5	

Baseline	Period 1	Period 2	Period 3	Period 4	Period 5
1 : Number of high-emission vehicles scrapped (Number)					
3897	835	2754	2272	4109	4716
4,193,172.00	898,460.00	2,963,304.00	2,444,672.00	4,421,284.00	5,079,108.00
DLI allocation		20,000,000.00	As a % of Total DLI Allocation		8.02%
2 : Average daily public transport ridership (Number)					
230000	230000	245000	265000	285000	300000
0.00	0.00	28,928,571.00	38,571,429.00	38,571,429.00	28,928,571.00
DLI allocation		135,000,000.00	As a % of Total DLI Allocation		54.14%
3 : Parking demand management strengthened (Text)					
Demand management through building parking allocation not in place; Establishment of parking on sidewalks and around mass transit stations permitted	DLR #3.1: Yichang Municipality has maintained 2198 or less parking spots on pedestrian sidewalks on an annual basis starting in 2024	DLR #3.2: Yichang Municipality has (a) set limits targets for on-street parking allocations reductions within the vicinity of mass transit stations; and (b) implement the said reduction in on street parking around mass transit stations	DLR #3.3: Yichang Municipality has implemented a ceiling for building parking standards and additional limits to said allocations based on the proximity to mass transit stations	DLR #3.4: Yichang Municipality has achieved DLR#3.3 and implemented new classifications for determining parking allocations for new buildings in accordance with the National Standards	DLR #3.5: Yichang Municipality has achieved DLR#3.3 and applied good practice criteria such as population density, land use, transit availability in the establishment of parking zones for parking allocations to new buildings
0.00	5,000,000.00	15,000,000.00	18,000,000.00	3,000,000.00	4,000,000.00
DLI allocation		45,000,000.00	As a % of Total DLI Allocation		18.05%
4 : Functional pilot ETS for the transport sector in Yichang Municipality using a MRV system (Text)					

The current ETS does not cover transport sub-sectors	DLR #4.1: Yichang Municipality has issued an implementation plan for the establishment of a municipal ETS for the transport sector	DLR #4.2: Yichang Municipality has issued guidelines for the management of the municipal ETS for the transport sector	DLR #4.3: Yichang Municipality has established a municipal ETS platform for the transport sector and successfully registered an ETS project proposal using a MRV system	DLR #4.4: Yichang Municipality has developed at least two transport sector methodologies for carbon emission estimation	DLR #4.5: At least one transport carbon emission reductions transaction has been completed and recorded at Hubei Province's carbon exchange market
0.00	4,375,000.00	10,000,000.00	10,000,000.00	5,000,000.00	5,000,000.00
DLI allocation		34,375,000.00	As a % of Total DLI Allocation		13.78%
5 : Coordination mechanism for transport decarbonization in Yichang Municipality established and operational (Text)					
No coordination mechanism is established	DLR #5.1: Yichang Municipality has established a leading group to coordinate the decarbonization of transportation with defined leadership and membership and a technical secretariat	DLR #5.2: Yichang Municipality has developed a carbon accounting tool for the road transport sector and modeling tools and publicly released the carbon emission estimates for the road transport sector			DLR #5.3: Yichang Municipality has revised the Yichang City Transport Carbon Peak Implementation Plan using the tools developed under DLR #5.2
0.00	5,000,000.00	5,000,000.00	0.00	0.00	5,000,000.00
DLI allocation		15,000,000.00	As a % of Total DLI Allocation		6.02%

Monitoring & Evaluation Plan: PDO Indicators by PDO Outcomes

To improve low carbon mobility and accessibility, and reduce carbon emissions from road transport in Yichang	
Accessibility to jobs within 60 minutes of travel using green modes (public transport, walking & cycling) (Percentage)	
Description	Measures the increase in accessibility as a result of improved mobility through the share of opportunities (ie. Jobs) accessible within 60-minutes travel using green modes (public transport, walking and cycling)
Frequency	Mid-term and End of Program
Data source	Five datatypes are required: 1) Public Transportation Network: A digital representation of the public transport network – either the General Transit Feed Specifications (GTFS) which is the standard data used for planning routes or a Geographic Information System (GIS) shapefile with the information on travel speeds and frequencies. a) GTFS: General Transit Feed Specification (GTFS), is a free and open template for entering data related to basic transit system services, such as routes, stops, fares, and schedules. b) GIS: The information on routes may also be digitally recorded as a GIS shapefile. This shapefile must include each route that is served in the city. Additional to the routes the file must contain information about the frequency and speed, at different times of day 2) Spatially distributed Population: The number of people in the city is used to calculate accessibility indicators and to assess the number of people accessing a point of the city at one time. WorldPop provides geo-referenced information on free 100m population, if local information is not available. This information must be presented as a GIS vector shapefile 3) Spatially distributed Opportunities a) Employment: Employment information will be used to calculate the number of jobs that are accessible. The information must be georeferenced, or spatially distributed. This information must be presented as a GIS vector shapefile. Data on the spatial distribution of employment is however rarely available, which was also the case for the study area. This analysis therefore applied methodology recently developed by the World Bank[1] which comprised a machine learning approach for high-resolution urban employment prediction that utilizes open-source data from satellite remote sensing, extracted from Google Earth Engine (GEE), and open source data from OpenStreetMap (OSM). [1] Barzin, Samira, Paolo Avner, Jun Rentschler, and Neave O'Clery. 2022. "Where Are All the Jobs ?: A Machine Learning Approach for High Resolution Urban Employment Prediction in Developing Countries." World Bank Policy Research Working Paper, no. 9979. https://openknowledge.worldbank.org/handle/10986/37195 b) Other: Just as we can calculate the number of jobs available, we can calculate the number of schools, health centers, or resorts that are accessible. This information also must be georeferenced. This information must be presented as a GIS vector shapefile 4) Urban Area / Study Area boundaries: GIS shapefile of the study area 5) Access Network: A digital representation of the network of roads and paths that public transport users can use to access public transport stops by walking or cycling. This can be obtained from OpenStreetMap or from other available GIS datasets, and must be presented as a GIS vector shapefile.
Methodology for Data Collection	To calculate accessibility in Yichang, utilize the access and public transport networks to calculate the travel times for every origin destination pair in the city. Then utilize the estimated travel times for each origin-destination to calculate the number of opportunities that are within the 60 minute travel time threshold. This process is done using the data collected to run a model in Conveyal (https://conveyal.com/) or similar, to calculate the employment accessibility for every point in the city at the smallest spatial resolution possible (e.g. block-level job access). Finally, use population to calculate the weighted average for the city.
Responsibility for Data	Municipal Transport Bureau, Municipal Government Services and Big Data Management Bureau

Collection	
Average daily public transport ridership (Number) DLI	
Description	Measures the average daily ridership for the year and the likely shift from personal to public transport modes
Frequency	Annual
Data source	Semi-annual progress report
Methodology for Data Collection	Ridership data from Bus Group portal
Responsibility for Data Collection	UDG (Bus Group); Municipal Transport Bureau
Net greenhouse gas emissions (Metric ton)	
Description	Measures the cumulative reduction in greenhouse gas emissions [CO2] avoided by End of Program relative to business as usual case if the Program did not occur.
Frequency	Mid-term and End of Program
Data source	Semi-annual progress report
Methodology for Data Collection	GHG emission reduction will be calculated based on the carbon accounting tool and modeling tool developed to simulate policy and investment program
Responsibility for Data Collection	Transport Bureau, Ecology and Environment Bureau

Monitoring & Evaluation Plan: Intermediate Results Indicators by Results Areas

Results Area 1: Manage motorization and motorized travel demand	
Incorporate TOD and accessibility principles (along public transport corridors) into key plans and guidelines (Text)	
Description	This indicator will measure the extent to which (i) ToD principles (density, diversity, design) along road and rail based mass transit corridors are incorporated into territorial spatial planning; and, (ii) Street Design Technical Guidelines are updated to include accessibility planning and design to transit stations including M&E indicators.
Frequency	Annual
Data source	Semi-annual progress report
Methodology for Data Collection	Official document issued
Responsibility for Data Collection	Natural Resources and Planning Bureau; Housing and Urban-Rural Development Bureau
Number of walking accessibility improvements within 500m of public transport stops along major transit corridors (Number)	
Description	Interventions include: (i) new interventions – add new sidewalks, pedestrian crosswalks, opening up dead-end roads, new entrances to residential complexes, etc. (>=35 percent); (ii) existing interventions – including upgrading road pavement, widening sidewalks and pedestrian crossing, installing pedestrian barrier, opening up dead-end roads, new entrances to residential complexes, etc (>=35 percent).
Frequency	Mid-term and End of Program
Data source	Semi-annual progress report;
Methodology for Data Collection	Provided by implementation agency: Accessibility Improvement Plan; Annual physical progress reports; photos of before and after interventions with geographic information identifiable; physical verification of 15 percent connections
Responsibility for Data Collection	Municipal Housing and Urban-Rural Development Bureau; Municipal Urban Management Commission; Municipal Public Security Bureau; Municipal Foresty and Landscape Bureau
High-emission vehicles scrapped (Number) DLI	
Description	The actual number of scrapped trucks, coaches and buses following standard procedures and by the certified scrappage centres. The targets are set based on the number of vehicles eligible for scrappage in that year defined by the compliance with National Emission Standards (NS3 or below) and life of vehicle (15 years) for trucks and coaches, and life of vehicle (8 years according to experience in Yichang city) for traditional fuel buses. In the baseline year, an exceptionally large number of vehicles were eligible for scrappage but the actual scrappage rate was 63 percent .
Frequency	Annual

Data source	Semi-annual progress report
Methodology for Data Collection	The target number of vehicles which become eligible for scrappage in a given year based on their emission standard will be collected from the vehicle records database of the Public Security Bureau; and the number of actually scrapped vehicles will be collected based on the vehicle database managed data and records provided by Public Security Bureau and Vehicle Scrappage Centres
Responsibility for Data Collection	Municipal Vehicle Administrative Office (Public Security Bureau)

Results Area 2: Facilitate modal shift for passengers and freight transport	
Average operating speed of buses during peak hours (Number)	
Description	Measures the ratio of average speed at which buses operate on their routes during morning peak traffic hours (7:00-8:00) on workdays in March-June weighted by vkm or route km and average speed of traffic during morning peaks hours on workdays in the urban area.
Frequency	Annual
Data source	Semi-annual progress report
Methodology for Data Collection	Operating speed of buses will be collected based on onboard GPS data from Bus Group. Average traffic speed will be provided by the Transport Bureau, with the assistance of the Municipal Government Services and Big Data Management Bureau. These were calculated based on cab operation data.
Responsibility for Data Collection	Bus Group; Municipal Transport Bureau; Municipal Government Services and Big Data Management Bureau
Share of the population satisfied with the public transport service (Percentage)	
Description	Measures the percentage of users (and non users) who are satisfied with various aspects of the public transport system, including reliability, comfort, affordability, safety and accessibility.
Frequency	Annual
Data source	Semi-annual progress report
Methodology for Data Collection	Surveys of users and non users (sample size of 1000 and 500 respectively)
Responsibility for Data Collection	UDG (Bus Group)
Average Headway on Route Network in peak hour (Minutes)	
Description	Measures the frequency of the services and the average time between consecutive vehicles (headway) in AM peak hours 7-8am for all routes, weighted by passengers.
Frequency	Annual
Data source	Semi-annual progress report
Methodology for Data Collection	Service frequency and ridership data collected from the intelligent information platform operated by Bus Group
Responsibility for Data Collection	UDG (Bus Group)
Volume of waterway-railway multimodal container traffic (TEU) as a result of rail-water award policy (Number)	
Description	Measures the volume of waterway-railway multimodal container traffic during Program period, inclusive of baseline.
Frequency	Annual
Data source	Semi-annual progress report
Methodology for Data Collection	Port container cargo official data
Responsibility for Data Collection	Logistics Development Center
Percentage of female bus drivers (Percentage)	
Description	Share of female bus drivers in the public transport system of Yichang
Frequency	End of Program
Data source	Semi-annual progress report

Methodology for Data Collection	Data will be collected based on the staff payroll provided by the Bus Group
Responsibility for Data Collection	UDG (Bus Group)

Number of people that benefit from improved access to sustainable transport infrastructure and services (Corporate Score Card)

Description	Beneficiaries of improved transport conditions in urban and rural contexts enabled by IBRD, IDA, IFC, and MIGA operations. It assesses the number of people that experience improved access to sustainable transport infrastructure or services that have been built or rehabilitated through financed or guaranteed interventions (e.g., climate-resilient highways, rural roads, urban and interurban roads, non-motorized transport facilities, public transport, railways, ports, and airports). It will build on SDG 11.2 to systematically measure improvements in sustainable transport in countries that are financed or guaranteed through IBRD, IDA, IFC, and MIGA interventions.
Frequency	Mid-term and End of Program
Data source	Semi-annual progress report
Methodology for Data Collection	The proposed approach defines the types of interventions and their expected area of influence using a consistent methodology that is broadly applicable to World Bank operations even in data-scarce environments. The methodology will capture beneficiaries from a wide range of improved sustainable transport infrastructure and services, but not necessarily freight service improvements that cannot be measured using the number of beneficiaries. The methodology considers at least two types of sustainable transport interventions: (i) linear infrastructure and services to move people and goods, and (ii) single-location facilities that are part of long-distance transport networks. If the intervention is linear in nature, the indicator is the sum of the populations living within the project's beneficiary or buffer areas considering the following parameters and consistent with international accessibility practices: • 0.5 km radius around non-motorized transport facilities (e.g. safe bikeways and walkways) • 2 km radius around mass transit corridors (e.g. BRT, metro, urban rail lines) • 1 km around all other public transport (e.g. bus stops and routes) and sustainable urban road interventions including people-centered traffic management, "complete street" or "integrated corridor" design, and travel demand management. • 5 km radius around transport terminals or large passenger stations in urban areas (including bus, rail or waterway) • For infrastructure or service improvements in urban areas, the catchment area of the multimodal network should be considered, and it is reasonable to assume that the number of beneficiaries from outside the buffer area (i.e. long-distance passengers) is offset by the number of non-user residents in the buffer area. The location, length, and number of improved sustainable transport interventions for each operation will be estimated using project-level inputs from WB Operations Portal (PAD/ISR/ICR), IFC Results Measurement System, and MIGA Results Measurement System. If no reliable or geo-referenced population data is available, average population densities (Sources: WB and UN Habitat databases, WorldPop project) may be multiplied by the project's beneficiary area to estimate the indicator. If the intervention is a facility where most beneficiaries come from outside the immediate vicinity, such as a transport terminal, airport, or other strategic node in a long-distance network, the indicator will be estimated using the average number of [monthly] users or customers (Sources: studies, surveys, and other records as reported in ISR/ICR).
Responsibility for Data Collection	Municipal Transport Bureau, Municipal Government Services and Big Data Management Bureau

Results Area 3: Incentivize low-carbon choices

Parking demand management strengthened (Text) DLI

Description	Parking demand management is strengthened by incorporation of parking demand management principles in the planning and implementation of parking allocations. To achieve this, the DLI supports the implementation of select interventions aimed at rationalizing parking supply in Yichang by reducing parking spots to pedestrian sidewalks and the size of on-street parking allocations within the vicinity of mass transit stations, as well as implementing ceilings for building parking standards and additional limits to said allocations based on the proximity to mass transit stations and new classifications for determining parking allocations for new buildings in accordance in accordance with the National Standards (i.e., GB/T 51149 (2016)), and applying good practice criteria such as population, land use, transit availability

	in the establishment of parking zones for parking allocations to new buildings.
Frequency	Annual
Data source	Semi-annual progress report
Methodology for Data Collection	Official document on the issuance
Responsibility for Data Collection	Municipal DRC, Urban Management Commission, Municipal Natural Resources and Planning Bureau, Municipal Housing and Urban-Rural Development Bureau

Functional pilot ETS for the transport sector in Yichang Municipality using a MRV system (Text) [DLI]

Description	This DLI measures the piloting of a functional voluntary carbon trading system for transport sector, supported by an ETS platform with built-in system of carbon emission accounting and monitoring, reporting, and verification (MRV), that will track carbon emissions from passenger transportation and logistics operations. For this purpose, Yichang Municipality will: (1) issue an Implementation Plan for the establishment of a municipal ETS for the transport sector; the plan will outline the establishment of a municipal trading platform (objective, institutional structure, and timeline) and incentive mechanism of ETS trading; (2) issue Guidelines for the management of the municipal ETS for the transport sector; the guidelines will include monitoring, reporting, accounting and trading guidelines, and establish clear roles and responsibilities for municipal government departments; (3) establish a municipal ETS platform for the transport sector and successfully register an ETS project proposal using a MRV system; and (4) develop at least two transport sector methodologies for carbon emission estimation; and (5) complete at least one transport carbon emission reduction transaction and records at Hubei Province's carbon exchange market.
Frequency	Annual
Data source	Official document issued
Methodology for Data Collection	Official document on the issuance and the transaction record of a successful voluntary-based transport ETS in Yichang on the Hubei Carbon Exchange Market
Responsibility for Data Collection	Ecology and Environment Bureau, Transport Bureau

Results Area 4: Enhance institutional capacity for decarbonizing transport

Coordination mechanism for transport decarbonization in Yichang Municipality established and operational (Text) [DLI]

Description	This DLI will measure the establishment and operationalization of a coordination mechanism for transport decarbonization in Yichang municipality.
Frequency	Annual
Data source	Semi- annual progress report, Official document
Methodology for Data Collection	Official document issued; Number of reports published in a public website, number of Yichang lessons dissemination events
Responsibility for Data Collection	Municipal Transport Bureau, Municipal Finance Bureau, Municipal DRC

Verification Protocol Table: Disbursement Linked Indicators

1 : High-emission vehicles scrapped (Number)	
Formula	From CY 2023 to CY 2027: $ 1,076 per High Emission Vehicle scrapped; and for CY 2028: $5,074,416 for scrapping 4716 High-emission Vehicles eligible for scrapping in said year and achieve a 75 percent scrappage rate (as set forth in the PIP)
Description	The actual number of scrapped trucks, coaches, and buses (National III and below) following standard procedures and by the certified scrappage centres
Data source/ Agency	Traffic Police (Public Security Bureau)
Verification Entity	Verification Agency
Procedure	Verification will be carried out by the third-party verification agency based on: (i) Number of actually scrapped vehicles will be collected based on the vehicle database managed by Public Security Bureau and Vehicle Scrappage Centres; and (ii) sampling 5 percent of the scrapped vehicle records.

2 : Average daily public transport ridership (Number)	
Formula	US$ 9,642,857 per 5000 average daily public transport ridership increase beyond 230,000 ridership baseline
Description	Measures the average daily ridership for the year and the shift from personal to public transport modes
Data source/ Agency	UDG (Bus Group)
Verification Entity	Verification Agency
Procedure	Verification will be carried out by the third-party verification agency based on online data provided. Average daily ridership is defined as total annual or monthly ridership divided by the number of days in that year or month.

3 : Parking demand management strengthened (Text)	
Formula	DLR #3.1: Yichang Municipality has: maintained 2198 or less parking spots on pedestrian sidewalks on an annual basis starting in 2024: US$ 5,000,000 [US$ 1,000,000 per year]. DLR #3.2: Yichang Municipality has (a) set targets for on-street parking reductions within the vicinity of mass transit stations [US$ 4,000,000]; and (b) implemented the said reduction in on street parking around mass transit stations [US$ 11,000,000]: US$ 15,000,000. DLR #3.3: Yichang Municipality has implemented a ceiling for building parking standards and additional limits to said allocations based on the proximity to mass transit stations: US$ 18,000,000. DLR #3.4: Yichang Municipality has achieved DLR#3.3 and implemented new classifications for determining parking allocations for new buildings in accordance with the National Standards: US$ 3,000,000. DLR #3.5: Yichang Municipality has achieved DLR#3.3 and applied good practice criteria such as population density, land use, transit availability in the establishment of parking zones for parking allocations to new buildings: US$ 4,000,000.
Description	Parking demand management is strengthened by incorporation of parking demand management principles in the planning and implementation of parking allocations. To achieve this, the DLI supports the implementation of select interventions aimed at rationalizing parking supply in Yichang by reducing parking spots to pedestrian sidewalks and the size of on-street parking allocations within the vicinity of mass transit stations, as well as implementing ceilings for building parking standards and additional limits to said allocations based on the proximity to mass transit stations and new classifications for determining parking allocations for new buildings in accordance in accordance with the National Standards (i.e., GB/T 51149 (2016)), and applying good practice criteria such as population, land use, transit availability in the establishment of parking zones for parking allocations to new buildings.
Data source/ Agency	Municipal DRC, Urban Management Commission, Municipal Natural Resources and Planning Bureau, Municipal Housing and Urban-Rural Development Bureau
Verification Entity	Verification Agency
Procedure	Data collection is based on official documents and government data available through the Parking Application for on-street parking and Urban Management Committee for on-street parking allocations. The third-party verification agency will verify that:

	a) parking spots on sidewalks have been maintained to 2198 (or less) on an annual basis. This maintenance is expected to be underpinned by the revisions to the Management Regulation on Motor Vehicle Parking Management and Guidelines required under the PAP;
	b) the size of on-street parking reduction target within the vicinity of mass transit stations has been set based on Parking Demand Management studies conducted as required under the PAP and is then captured in the revised Management Regulation on Motor Vehicle Parking Management required under the PAP; and the on-street parking in the vicinity of mass transit stations (typically 500 meters) is reduced as per the set target;
	c) all new building approvals granted by [Municipal Bureau of Natural Resources and Planning] within XX year after the re-issuance of the Technical Specification on Urban and Rural Planning Management of Yichang City (to establish ceilings (maximum standards) for building parking allocations, specify further limits (typically 15 percent) on the allocations for buildings in the proximity (typically 500 meters) to mass transit stations, introduce new classifications for determining parking allocations for new buildings in accordance with the National Standards (i.e., GB/T 51149 (2016)) and new good practice criteria such as such as population density, land use, transit availability, accessibility in the establishment of parking zones for parking allocations to new buildings), apply the revised building classifications, parking allocation zoning, and ceilings adopted.

More specifically, the following official documents and data are expected to be used as evidence for verifying whether each result under this DLI has been met (the issuance of the document will not suffice if the content does not reflect the afore-mentioned standards and good practices):
DLR 3.1: Annual Parking Application data;
DLR 3.2: Parking Demand Management Study conducted as per PAP; Management Regulation on Motor Vehicle Parking Management revised as per PAP; and Annual Parking Application data and relevant data from Urban Management Committee
DLR 3.3: Building approval document(s) issued within XX years after the re-issuance of the Technical Specifications
DLR 3.4: Building approval document(s) issued within XX years after the re-issuance of the Technical Specifications
DLR 3.5: Building approval document(s) issued within XX years after the re-issuance of the Technical Specifications.

Disbursements against DLRs#3.4 and 3.5 will be contingent on the achievement of DLR#3.3. |
| **4 : Functional pilot ETS for the transport sector in Yichang Municipality using a MRV system (Text)** |
| Formula | DLR #4.1: Yichang Municipality has issued an implementation plan for the establishment of a municipal ETS for the transport sector: US$ 5,000,000.
DLR #4.2: Yichang Municipality has issued guidelines for the management of the municipal ETS for the transport sector: US$ 10,000,000.
DLR #4.3: Yichang Municipality has established a municipal ETS platform for the transport sector and successfully registered an ETS project proposal using a MRV system: US$ 10,000,000.
DLR #4.4: Yichang Municipality has developed at least two transport sector methodologies for carbon emission estimation: US$ 5,000,000.
DLR #4.5: At least one transport carbon emission reductions transaction has been completed and recorded at Hubei Province's carbon exchange market: US$ 5,000,000. |
Description	This DLI measures the piloting of a functional voluntary carbon trading system for transport sector, supported by an ETS platform with built-in functions of carbon emission accounting and monitoring, reporting, and verification (MRV), that will track carbon emissions from passenger transportation and logistics operations. For this purpose, Yichang Municipality will: (1) issue an Implementation Plan for the establishment of a municipal ETS for the transport sector; the plan will outline the establishment of a municipal trading platform (objective, institutional structure, and timeline) and incentive mechanism of ETS trading; (2) issue Guidelines for the management of the municipal ETS for the transport sector; the guidelines will include monitoring, reporting, accounting and trading guidelines, and establish clear roles and responsibilities for municipal government departments; (3) establish a municipal ETS platform for the transport sector and successfully register an ETS project proposal using a MRV system; and (4) develop at least two transport sector methodologies for carbon emission estimation; and (5) complete at least one transport carbon emission reduction transaction and records at Hubei Province's carbon exchange market.
Data source/ Agency	Ecology and Environment Bureau, Transport Bureau
Verification Entity	Verification Agency

Procedure	Data collection is based on official documents. The third-party verification agency will verify:
	(a) the official issuance by competent municipal government authorities of an Implementation Plan for Transport ETS in Yichang, and confirm that such plan clarifies the establishment of a municipal trading platform, incentive mechanism of ETS trading;
	(b) the official issuance by competent municipal authorities of Guidelines for ETS Management in Yichang, and confirm that such guidelines include monitoring, reporting, accounting, and trading guidelines, and establish clear roles and responsibilities for the Municipal Ecology and Environment Bureau and the Municipal Transport Bureau in the establishment of the MRV platform and development of methodologies;
	(c) the establishment of an ETS platform by Ecology and Environment Bureau through the registration of the first voluntary-based ETS project on the platform;
	(d) the development of two transport methodologies and their entry into the records of Hubei Provincial Dept of Ecology & Environment (official acknowledgement of the PDEE); and
	(e) the transaction record of a successful voluntary-based transport ETS in Yichang on the Hubei Carbon Exchange Market.

5 : Coordination mechanism for transport decarbonization in Yichang Municipality established and operational (Text)	
Formula	DLR #5.1: Yichang Municipality has established a leading group to coordinate the decarbonization of transportation with defined leadership and membership and a technical secretariat: US$ 5,000,000. DLR #5.2: Yichang Municipality has developed a carbon accounting tool for the road transport sector and modeling tools and publicly released the carbon emission estimates for the road transport sector: US$ 5,000,000. DLR #5.3: Yichang Municipality has revised the Yichang City Transport Carbon Peak Implementation Plan using the tools developed under DLR #5.2: US$ 5,000,000.
Description	This DLI will measure the establishment and operationalization of a coordination mechanism for transport decarbonization in Yichang municipality.
Data source/ Agency	Municipal Transport Bureau, Municipal Finance Bureau, Municipal DRC
Verification Entity	Verification Agency
Procedure	Data collection is based on official documents. The third-party verification agency will: (a) verify the official issuance by competent municipal government authorities of an administrative instrument for the establishment of the coordination mechanism for transport decarbonization, and confirm that such documents defines the leadership and membership arrangement for such mechanism, designates a lead department and secretariat office, outlines key responsibilities and management procedures; (b) verify the official public release of carbon emission estimates for road transport sector based on carbon accounting mechanism; modelling tools developed to help evaluate the impacts of policies, programs, investments on carbon emissions and sustainability in the future. An official endorsement letter with Report on modelling tool design and methodology, low carbon pathway options and recommendations for Carbon Peaking based on the analysis from the modelling tool; and (c) verify the official issuance and public disclosure of the 'revised' Yichang City Transport Carbon Peak Implementation Plan and confirm that it incorporated results from the carbon accounting mechanism and report on the modeling analysis, results, and recommendations.

**Strategic relevance and technical soundness**

1. The proposed operation addresses the critical gaps in China's current efforts for decarbonizing transport, focusing on urban areas, through a demonstration pilot in Yichang City in Hubei Province in Central China with the potential for replication across other Chinese cities. While national policies and guidance on carbon peaking and net zero serve as a high-level vision they fail to provide concrete guidance on implementing decarbonization agenda and disconnects arise in their implementation at the local level. They need to be translated to scientifically defined decarbonization pathways and a combination of timebound targets, policies, investments, and coordination across sectors. The complexity of transport sector, which involves multiple sub-sectors, stakeholders, and geographical diversity, bring additional challenges to producing an analytically sound and implementable roadmap, both at national and provincial levels, to achieve decarbonization.

2. An important aspect of this operation would be to focus comprehensively on transport decarbonization at the city level and help prioritize a menu of Program interventions closely aligned to the internationally accepted Avoid-Shift-Improve framework (which underlies transport sector decarbonization) and customized to the Chinese context.

3. **Yichang City is a representative type-II large city** experiencing rapid growth in its carbon emission trajectory, with road transport the primary contributor at almost 80 percent. The major issues affecting the transport sector and its emissions in the city and the proposed solutions are outlined below. These are broadly similar across this class of cities (around 70), and the experience and lessons learned from this operation will be used to formalize a template for scaling up to other cities. The lessons learned are also planned to inform the development of national policies, standards, and guidelines under the proposed GEF7 Project.

4. **Manage Motorization**
   a. Issues: Road transport is a major contributor to GHG emissions, and largely constitutes passenger cars and diesel trucks. Timely and early retirement of high emission vehicles such as old diesel trucks is an urgent priority that can go a long way in curbing emissions. Statistics indicate that majority of the light, medium and heavy trucks in Yichang are diesel. However, sometimes delays in issuing necessary regulation and plans at provincial and city level, and inadequate tracking and enforcement could lead to non-compliance of vehicle emission standards despite national policies being in place. The actual scrappage rate achieved of the set of eligible vehicles was 63 percent in 2022.
   b. Proposed solutions: Coordination and improved tracking and implementation, can help ensure reasonable reductions in emissions. International experience suggests that adoption of improved vehicle emission standards could lead to between 5-15 percent reduction in emissions.

5. **Transit-oriented-Development & Accessibility**
   a. Issues: Although the city has made large investments in its public transport system, there is limited adoption of transit-oriented development (TOD) principles including accessibility improvement along major transit corridors.
   b. Proposed solutions: Adoption and implementation of TOD and accessibility principles into key plans, policies and regulations can go a long way in reducing motorized trips and or trip lengths, by making walking and cycling an attractive mobility option including for seamless connectivity to mass transit, improved attractiveness of transit, and reduced attractiveness of car usage.

6.   **Structural shift to low -carbon modes**

a.   <u>Issues:</u> Despite the success in building an extensive transit network comprising of urban mass rapid transit systems and bus transit the mode shares and ridership have declined sharply especially with pandemic related impacts and has not recovered since. Pre-pandemic average daily ridership of 410,000 declined by almost 50 percent to 210,000 in 2020 and was at 257,000 in 2022. There has been a nationwide slump in bus ridership in China that predates and been exacerbated by COVID-19. Since 2014, the public transport ridership has been on a declining trend. Between 2014-22, total ridership nationwide declined by 55 percent. It is to be determined whether this trend can be reversed, and ridership can return to pre-pandemic levels.

Figure A2.1 Annual bus ridership compared to peak levels for Yichang and nation.
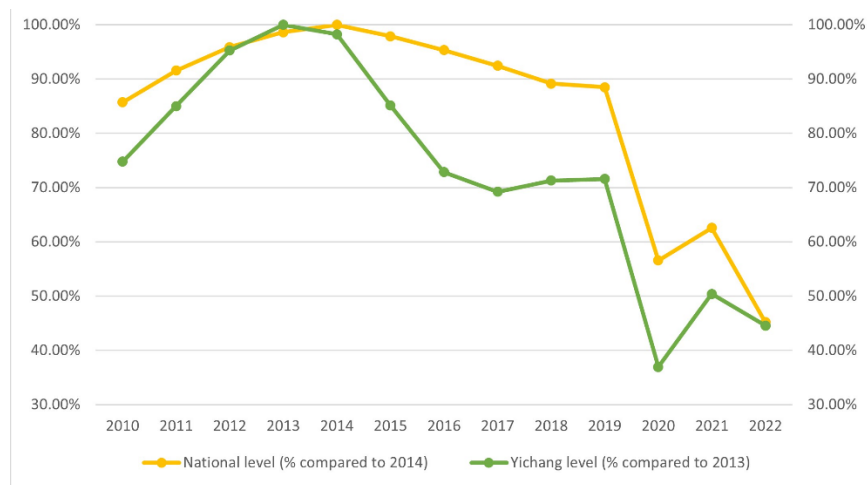
Source: Ministry of Transport; Yichang Bus Group

Large shifts in ridership to personal modes has been led by increasing income levels, the pandemic related health concerns and the greater convenience of personal modes. The car ownership levels grew rapidly from 87 cars per 1000 inhabitants to 210 cars per 1000 inhabitants between 2014-2021. Surveys of transit users throw light on some of the areas of concern, i.e., slow speeds, long waiting time and high number of transfers. Further, the public transport network has a population coverage of only 50 percent. In freight transport: although waterway and railway are cheaper for per km-ton of freight transported, they would usually require transshipment to/from road transport. Due to underdeveloped intermodal transport, transshipment cost in China accounts for one-third of total freight transport cost if more than one mode is used and transshipment significantly delays the transportation time of cargos. While Yichang has made significant strides in improving multimodal transport many difficulties still exist. And road freight accounts for three-quarters of the freight carbon emissions in Yichang and one-quarter of all emissions.

b.   <u>Proposed solutions:</u> To transform the public transport system through improvements in the public transport quality of service (speeds and frequency) and coverage and make it an attractive alternative to personal vehicle use. With growing income levels, the service quality and convenience (in terms of faster service, reduced waiting time and improved frequency, easy access) of the transit service needs to keep pace, and large investments will be required in upgrading and revitalizing the system if existing passengers are to be retained and new passengers added. The World Bank analysis shows that meaningful shifts to low-carbon

modes, which requires both physical and operational integration across modes and relative pricing that reflects externalities, can bring about nationwide emission reduction of 4,000 Mt over the 40-year period, equivalent to 7 percent of total cumulative transport emissions in China under the reference scenario during 2020-2060.

7. **Efficiency improvement both through pricing and regulatory measures**

    a. Issues: China's approach to promoting low-carbon transport modes has been driven primarily by supply—massive scale construction of high-speed rail network, urban rail and BRT systems, and EV subsidies—lacking demand-side and pricing measures. This is not efficient considering the significant externalities of transport, including (i) environmental externalities associated with trips, including air pollution, GHG emission, accidents, and traffic congestion, and (ii) externalities associated with vehicles, including scarce road space occupation for parking and congestion, as well as pollution caused by vehicle production, maintenance and end-of-life scrappage. The current costs of transport borne by users do not fully include these externalities. It is estimated that the average externalities costs of each private vehicle in Beijing is about RMB 8,500 yuan per year, and only about one-third of it is borne by the car user.[19] This means that a large portion of the travel cost of transport users is de facto subsidized, distorting incentives and resulting in greater energy use and emissions in transport. In fact, the relative prices of carbon-intensive modes (road and air transport) have decreased compared to lower-carbon modes (rail and waterway) over the last 10 years. Yichang is experiencing rapid growth in private car ownership and resulting declining public transport ridership. Between 2015 to 2020, non-operational vehicles (mainly private cars) almost doubled in number to 640,770, car ownership levels per 1000 inhabitants grew from 100 to 210 between 2015-2021, and the emissions from this source constituted over 70 percent of road transport emissions by 2020. While the pandemic and related health concerns provided a major impetus, the upward trend was already evident well before the pandemic. While Yichang Government has made efforts to reduce the on-street parking and recently raised prices there is deployment of demand management strategies such as parking pricing and supply measures for curbing personal vehicle use and improving the attractiveness of public transport especially in the city core and around mass transit.

    b. Proposed solutions: Combine regulatory measures with pricing—on fuel use or carbon emissions— and other incentive mechanisms to encourage fuel and energy efficiency improvement by private sector. China has effectively implemented administrative measures towards stricter fuel economy and energy efficiency standards of vehicles over time. These regulatory tools, combined with gradually internalizing externalities[20] in fuel or carbon pricing, would provide strong incentives to private and commercial fleet operators to reduce their fuel consumption, through for instance, investing in fuel-efficient vehicles, minimizing empty mileage, increasing occupancy rates, introducing eco-driving, and so on. The incentives of the bus operator can also be better aligned with decarbonization objectives by improving their key performance indicators for accessing

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[19] CATS, "Study on Low Carbon Development Strategy of Urban Transportation in China", 2015. The calculation is based on the average annual emissions of CO2 and various local pollutants (CO, NOx, PM, and HC) per private passenger vehicle and applying the EU's carbon price and marginal abatement cost for each pollutant. For instance, in 2015, when the report was produced, MAC for CO was RMB 4,941/ton, NOx at RMB 29,100/ton, PM at RMB 52,832/ton, and HC at RMB 4,541/ton.

[20] It is estimated that the average externalities costs of each private vehicle in Beijing is about RMB 8,500 yuan per year, and only about one-third of it is borne by the car user. The calculation is based on the average annual emissions of CO2 and various local pollutants (CO, NOx, PM, and HC) per private passenger vehicle and applying the EU's carbon price and marginal abatement cost for each pollutant. For instance, in 2015, when the report was produced, MAC for CO was RMB 4,941/ton, NOx at RMB 29,100/ton, PM at RMB 52,832/ton, and HC at RMB 4,541/ton. China Academy of Transportation Science (2015). "Study on Low Carbon Development Strategy of Urban Transportation in China".

the government subsidy. Parking demand management can also help incentivize the use of transit vis-à-vis personal modes through effective use of various quantity and price levers which can vary in the context of location (city center vs. outer core; on-street vs. off-street) and time (peak vs off-peak hour). Building parking allocations, standards for mass transit corridor catchments are some areas of improvement identified in the case of Yichang. The World Bank analysis shows that this would lead to significant improvement in energy efficiency beyond meeting the minimum standards and is estimated to bring about nationwide emission reduction of up to 7,300 Mt from now until 2060, equivalent to 12 percent of total cumulative transport emissions in China under the reference scenario during 2020-2060.[21]

8. **Using carbon pricing as a market tool**
    a. <u>Issues:</u> The existing carbon pricing instruments that are available in China do not fully capture the potential of transport sector to decarbonize the sector and contribute to achieve the China's peaking target and carbon neutrality goals. While the China National ETS currently only covers the power sector, the Chinese Government is considering expanding the coverage to other sectors including the transport sector in the future. There are already three regional pilot ETSs that cover road transport sector emissions (see Box 1 on ETS in China). However, unlike some other sectors where the emission sources are singular and non-mobile, transport sector emissions are characterized by multiple emission sources, hard-to-define boundaries, and high mobility. This makes it challenging to cover tailpipe emissions (i.e., at the point emissions occur), and limits the potential to capture smaller emissions sources (e.g., residential vehicles). ETSs implemented in other countries have addressed this issue by placing the point of regulation for transport emissions on fuels entering the economy (e.g., California and New Zealand).
    b. <u>Proposed solution:</u> The World Bank is supporting the transition of the transport sector to be gradually covered under carbon pricing as one of the effective tools for decarbonization. The proposed Program will support inclusion of the transport sector under the Hubei ETS pilot, starting from development of a carbon emission accounting and monitoring, reporting, and verification (MRV) platform in Yichang city, that tracks carbon emissions from passenger transportation and/ or logistics operations. The World Bank China transport team and Global Transport Unit have secured funding from the Global Facility to Decarbonize Transport (GFDT) to deliver technical support to help Yichang in this important activity. The disbursement trigger is having the accounting methodology for the sub-transport sectors being recognized by the Hubei Province ETS pilot, which is one of the eight regional pilots, and subsequently, successful inclusion of the targeted entities in the transport sector under the Hubei pilot ETS. The proposed Program could be scaled beyond Yichang, Hubei, through its complementarity with the proposed GEF7 project, "Pathways for Decarbonizing Transport towards Carbon Neutrality". The knowledge on ETS generated under the PforR operation would offer valuable lessons and feedback to further sharpen the national framework and inform sub-national policies to support the expansion of carbon market to transport sector in China.

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[21] World Bank (forthcoming in 2022), Country Climate and Development Report; calculation for Hubei and Yi-Jing-Jing-En City Cluster will be done during preparation.

Box 1. Emissions Trading Schemes in China

Carbon emission trading schemes (ETS) are being piloted in China, in the absence of a broad-based carbon tax. Under an ETS, enterprises with relatively low emission reduction costs would reduce emissions below their allowances allocated by the scheme, sell the excess allowances to enterprises with higher emission reduction costs, and gain additional revenues in return. China's ETS has focused on key sectors with high emissions: The national ETS launched in 2021 covers the power sector with over 2,000 power plants, which are responsible for over 4 billion tons of annual CO_2 emissions, about 40 percent of the national total CO_2 emissions.[1] One year since the launch, by July 2022, the cumulative trading volume reached 194 million tons and the transaction amount RMB 8.5 billion.[2] The national ETS is expected be expanded to include several other sectors, including steel industry, petroleum chemicals, paper making, and aviation. According to an estimate, the value of the national carbon market may reach about RMB150 billion yuan, and if considering the trading volume of carbon futures and other derivatives, the scale may reach RMB600 billion yuan.[3]

Beyond the national ETS and several sub-national ETS pilots, there is a complementary mechanism to encourage decarbonization in sectors that are not covered under the ETS schemes. In addition to the ETSs in operation, there are also various crediting mechanisms, where tradable credits are issued to actors who voluntarily implement approved emission reduction or removal activities. The China National ETS and all subnational pilots allow entities to use carbon credits to meet their ETS compliance obligations. There are two types of crediting mechanisms in operation in China depending on whether the project is developed in line with certain reduction mechanisms and methodologies: one is various domestic and foreign carbon emission reduction mechanisms that have fixed methodologies, including the international Clean Development Mechanism (CDM) and the domestic voluntary GHG reduction trading mechanism (CCER, China Certified Emission Reduction); There are also four subnational crediting mechanisms that are intended to generate carbon credits to be used to help entities meet compliance obligations under specific sub-national pilot ETSs. By December 31, 2021, there were 3,184 companies/organizations included in the eight sub-national ETS pilots, with a total cumulative trading volume of 517 million tons and a transaction amount of RMB 12.83 billion. Carbon credits must meet certain specifications through the registration and issuance process approved by designated authorities before entering being eligible to be used to meet ETS compliance requirements.

Carbon credits issued under the national and subnational crediting mechanisms can be used to help reduce compliance obligations under ETSs or traded on the voluntary carbon market. In CCER, emission reductions from the participating companies are certified by the Chinese government; companies regulated by the national ETS, as well as the eight subnational ETSs can use CCER credits to help meet part of their compliance obligations. For voluntary markets, the total cumulative CCER trading volume reached 443 million tons with a transaction amount of over RMB 3 billion.

Increasingly, several sub-national ETS pilots are expanding to transport sector, which though small in scale, are showing some momentum to accelerate decarbonization in transport sector with the use of carbon pricing instruments in China. While still small in scale, the ETS pilots (e.g., Beijing, Shanghai, and Shenzhen) cover emissions from the transport sector, such as urban rail, bus, taxi, and aviation. In Beijing, 21 transport corporations are subject to mandatory regulation and control, accounting for 2.4 percent of total enterprises that have emission reduction commitment. Some examples include the first emission trading in bike-sharing services, between "Mobike", Guotai Junan Securities, and Beijing Green Chain Technology Co. Ltd., which resulted in transaction value of over RMB 1 million. The practice of transport sector participating through carbon inclusion schemes on regional pilots is gaining popularity. This involves advocating a green and low-carbon lifestyle, and guiding the public to preferentially choose public transport, walking, and cycling etc.

Sources: [1] Unlike other carbon markets (EU and North America) that uses the cap-and-trade model, China's carbon market currently uses an out-put based allocation - that is, the amount of carbon quota allocated to each company is calculated based on the power generation capacity.
[2] China Beijing Green Exchange
[3] CATS, Urban Transportation Carbon Peaking and Deep Emission Reduction Strategic Pathway Study, 2021

9. **Institutional Capacity Development**
    a. <u>Issues:</u> Limited knowledge and analytical basis to decision making on decarbonization. Decarbonization remains a relatively new area for public policy officials and decision makers, as such policies and programs are devised without full knowledge and understanding of their effectiveness. Equally, the tendency to work within departmental boundaries poses challenges for an area that depends on joint efforts of multiple stakeholders.
    b. <u>Proposed solutions:</u> Investment in decision support and management information tools, plans and training of officials across disciplines to help develop capacity and expertise in transport decarbonization. At the same time, it would be important to set up an empowered institutional mechanism to help streamline and coordinate the decarbonization agenda across departments.

Public Transport Accessibility & GHG Analysis

10. **The results of a combined temporal and spatial accessibility analysis suggest that accessibility to jobs within one hour of travel is low at 31 percent in Yichang**. The analysis combined the geospatial distribution of population and employment with, not only the location of public transport infrastructure (bus stops) but with the time taken to travel between two points. The travel time includes access time by walking to a bus stop, with the speed and frequency of service on each route. This process was undertaken using a hosted subscription model "Conveyal Analysis" which integrates public transport and land use data to compare current system performance and accessibility with various scenarios. The results of the analysis shows that the base public transport network provides accessibility to 31.3 percent jobs within a 60-minute travel time cutoff (the Baseline Scenario).

11. **The GHG reduction potential of various possible combinations of interventions was modelled and based on this analysis the planned list of Program interventions was determined.** The Program interventions under Results Area 1 to 4 contributing to GHG reduction include those from (i) freight transportation (scrappage of trucks, coaches, and buses, and shifting of freight from road to rail/IWT); (ii) public transit (increases in bus ridership); (iii) NMT improvements (improvements in last mile walkability and bikeability); and (iv) parking (reduction in on-street parking and introducing maximum parking requirements). In sum, these interventions are estimated to cumulatively reduce GHG emissions by 500,000 tons over the Program lifetime compared with if the Program did not occur (BAU Scenario). By the end of the Program, annual Yichang Road transport sector GHG emissions are expected to be 6.26 percent less than what they would otherwise be, on path for carbon peaking by 2033 (Figure A2.2).

Figure A2.2 Program CO2 Emission Reduction Scenario Analysis
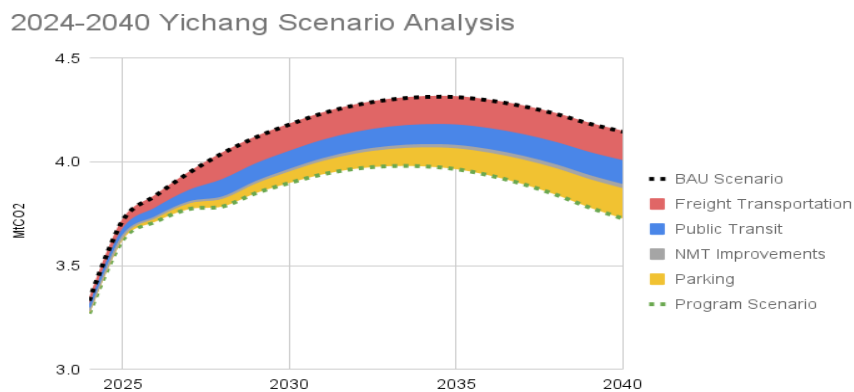
Source: ITDP Calculations.

Table A2.1 Program CO2 Emission Reduction Scenario Analysis Methodology and Assumptions

Interventions		Methodology	Assumptions
R A 1	● Scrappage of high emission vehicles ● trucks (National III and below) ● coaches (National III and below) ● buses (traditional fuels))	Number of trucks/coaches/buses scrapped * Average annual mileage * CO2 emission per km traveled	● Calculating the CO2 emission savings under two scenarios: a) the replaced vehicles are zero-emission electric vehicles or no replacement (10 percent large & medium trucks, 50 percent light trucks, 100 percent coaches and buses in 2028) and b) the replaced vehicles are China VI/above vehicles. ● The accumulated effects of the emission saving each year are counted since the baseline scenario is that the old vehicles will not be retired and still operate on the road.
	TOD-walking accessibility improvements within 500m of public transport stations	Evaluated by a four-step transport model	● 400 interventions implemented in 2028 ● Increase the walking speed of implemented areas from 4 km/h to 4.5 km/h in the model
	TOD-improve the coverage of cycling lanes as a share of urban core road network	Increased cycling travel volume * The proportion of travel transfer willingness from motor vehicles to cycling * Average travel distance of Yichang residents * Emission factor	● Improve the coverage of cycling lanes as a share of urban road network (urban core area) from 20 percent to 29 percent ● Based on Aziz (2017)'s research[22], the cycling travel volume will increase by 47.69 percent in the urban core area.
R A 2	Public Transport Modal shift ● Develop a Public Transport Improvement Special Plan ● Implement the identified investment and service improvements	Evaluated by a four-step transport model	Model setting based on project target: ● increase the bus speed of all routes by 15 percent ● increase the bus frequency of all routes by 25 percent ● increase the coverage of transit network from 50 percent to 65 percent ● reduce waiting time weights by 5 percent in the mode choice model ● For BRT 2-Fazhan Avenue, the bus travel speed will increase by 30 percent. The weight attributed to waiting time is projected to decrease by 5 percent. Additionally, there will be no transfer fees for passengers.
	Support the multi-modal policy for incentivizing growth/shift to	CO2 emission if the freight transportation is undertaken by road - CO2 emission if the freight transportation	● increase container rail-water transport volume) from 4752 TEU in 2022 to 8500 TEU in 2028 ● The average travel distance, energy consumption, and emission factors for various modes of transportation are based on national averages

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[22] Aziz, H. M. Abdul; Nagle, Nicholas N.; Morton, April M.; Hilliard, Michael R.; White, Devin A.; Stewart, Robert N. (2017). Exploring the impact of walk–bike infrastructure, safety perception, and built-environment on active transportation mode choice: a random parameter model using New York City commuter data. Transportation, (), –. doi:10.1007/s11116-017-9760-8

	waterway/rail transport	is undertaken by rail and water through intermodal transportation modes	
R A 3	Implementation of parking policies and regulations ● Cancel on-street parking ● Control pedestrian parking ● Reduce residential parking allocation	Travel volume discount * average travel distance * CO2 emission per km travel	● Yichang had 5010 on-street parking berths in 2021, then canceled 1510 berths in 2022 and 400 berths in 2023. Yichang is planning to cancel 100 berths in 2024. ● The theoretical amount of on-street parking berths is suggested to be no more than 5 percent of the total berths. Assume that if Yichang does not control on-street parking, the gap between theoretical and actual on-street parking would be gradually filled from 2023 to 2040. ● The parking allocation index without policy control is fitted based on the historical data. The suggested maximum parking allocation is defined as 20 percent more than the existing minimum standard. Assume Yichang would implement the adjusted parking allocation standard in 2026.
	Design and pilot an emission trading scheme (ETS) for transit and logistics	number of people affected * the average carbon reduction per person	● Based on data from similar Shenzhen ETS projects, the average carbon reduction per year is 2993.67t/million people in 2020

Source: ITDP Calculations.

Expenditure Framework Assessment

12. The Expenditure Framework Assessment (EFA) was carried out based on data and information provided by Yichang municipality government, a review of public finance management regulations, and interviews with government officials. The EFA covered the following aspects: (i) fiscal sustainability and resource predictability; (ii) budget allocation and execution; and (iii) incentives for efficient service delivery and value for money.

13. The PforR Program will be implemented during fiscal year (FY) 2024 to 2028. The Program covers Yichang municipality (excluding subordinate counties) in Hubei. The total Program financing is estimated to be US$ 1114 million equivalent, of which US$ 864 million equivalent will be financed by Chinese government and US$ 250 million will be financed by the IBRD Loan. Of the US$ 864 million government financing, it is estimated that US$ 803 million will be arranged through the General Public Budget by Yichang Finance Bureau and US$ 61 million will be arranged by Yichang Urban Development Group (see Table A2.2).

Table A2.2 Program Financing (FY2024-28)

Source	Sector	Yichang City	
		Amount (US$ Million)	Percentage of Total (%)
Government	Yichang General Public Budget	803	72.1
	Yichang Urban Development Group	61	5.5
IBRD	IBRD	250	22.5
Total		**1114**	100

Note: The adopted exchange rate is US$1 for RMB7, the same below.

Expenditure Boundary

14.   The Program consists of four result areas (RAs). Table A2.3 provides the breakdown of the Program government financing by RAs. Of the total government financing of US$ 863.6 million equivalent, RA1 accounts for 18.0 percent, RA2 for 70.1 percent, RA3 for 4.3 percent and RA4 for 7.6 percent. The RA2 involves massive public expenditures, while RA1, RA3 and RA4 put more emphasis on the institutional strengthening and innovation, for which the public expenditure is relatively small. Thus, the EFA put more emphasis on the budget expenditures related to RA2, namely, facilitating modal shifts.

Table A2.3 Program Government Financing in Yichang Municipality by Result Areas (FY 2024-28)

Result Areas	2020-2022 actual	2024-2028 estimated	
	Amount (US$ million)	Amount (US$ million)	Share (%)
RA1	93.2	155.3	18.0
RA2	363.2	605.3	70.1
RA3	22.5	37.4	4.3
RA4	39.3	65.5	7.6
Sub-total	**518.1**	863.6	**100.0**

Note: We use the simple average number of the Program government financing for FY 2020 to 2022 to forecast the Program government financing for FY 2024 to 2028. Data source for actual Program government financing in 2020 to 2022 is Table A2.4.

15.   **The Program government financing in Table A2.3 is derived through estimation of government expenditure on the Program activities during the implementation period of the Program.** Various levels of governments in China adopt uniform budget classification codes and report public expenditures based on formats provided by the Ministry of Finance (MOF). Hubei is using an integrated public finance management system to allocate budget funds and track public expenditures. Typically, for the functional expenditure classification, expenditures are broken down by reference to the responsible government agencies if possible.

16.   In Hubei, government responsibilities related to decarbonizing transport are taken by several departments such as Department of Transport (DOT), Department of Housing and Urban-Rural Development (DOHURD), Department of Ecology and Environment (DEE), for which the first 3-digit budget codes are "214","212" and "213" respectively. Table A2.4 lists the 5-digit budget codes and 7-digit budget codes under "214","212" and "213" that are related to decarbonizing transport. According to the specific usages of budget funds under these budget codes and the activities supported by the government program and the PforR Program, we define the 5-digit budget codes in Table A2.4 as the expenditure boundary of the government program with regard to various government departments, and the 7-digit budget codes as the expenditure boundary of PforR program with regard to these government departments. According to Yichang counterpart, the expenditure on decarbonizing transport arranged by government department is all reported on the General Public Budget of Yichang Municipality government.

17.   As an important state-owned enterprise in Yichang, Yichang Urban Development Group has also raised a large amount of funds to support the low-carbon transportation in Yichang. Therefore, we treat the amounts invested by Yichang Urban Development Group to the projects within the scope of Program result areas as part of the government financing for the Program. To avoid double counting. we exclude the government subsidies to the group and include only the investment using funds self-owned or borrowed from banks or other non-government lenders.

18.   Based on the actual project investment data from Yichang Urban Development Group and final account data of Yichang General Public Budget in 2020-2022, the government expenditure for the Program is estimated to be US$ 518.1 million, or about 36.9 percent of government program (see Table A2.4).

Table A2.4 Program Expenditure Boundary in 2020-2022 (US$ million)

| Code | Budget Line | Government Program | | PforR Program | | |
		Urban Development Group	Yichang General Public Budget	Result Area	Urban Development Group	Yichang General Public Budget
	Actual Project Investment	26.9		RA1	26.9	
	Actual Project Investment	9.8		RA2	9.8	
21101	**Environmental protection management affairs**		26.8			
2110101	Administrative operation		23.5	RA1		23.5
2110102	General administrative services		0.6	RA1		0.6
2110104	Ecological and environmental protection publicity		1.5	RA4		1.5
21103	**Pollution control**		124.8			
2110301	atmosphere		22.9	RA4		22.9
21110	**Energy conservation and utilization (Item)**		5.7			
2111001	Energy conservation and utilization (Item)		5.7	RA4		5.7
21111	**Pollution reduction**		6.4			
2111101	Ecological environment monitoring and information		0.6	RA4		0.6
21201	**Urban and rural community management affairs**		47.4			
2120101	Administrative operation		12.3	RA1		12.3
2120102	General administrative services		0.1	RA1		0.1
2120104	Urban management law enforcement		4.6	RA1		4.6
2120105	Preparation and supervision of engineering construction standards		5.2	RA4		5.2
21202	**Urban and rural community planning and management**		1.9			
2120201	Urban and rural community planning and management		1.9	RA4		1.9
21203	**Urban and rural community public facilities**		487.6			
2120303	Small town infrastructure construction		286.3	RA2		286.3
21206	**Construction market management and supervision**		1.5			
2120601	Construction market management and supervision		1.5	RA4		1.5
21401	**Road and waterway transport**		105.0			
2140101	Administrative operation		19.0	RA1		19.0
2140102	General administrative services		0.0	RA1		0.0
2140104	Highway construction		27.4	RA2		27.4
2140106	Highway maintenance		8.9	RA2		8.9
2140109	Information construction of transportation		0.1	RA3		0.1
2140110	Road and transport safety		1.2	RA2		1.2
2140112	Highway transport management		0.0	RA1		0.0
2140122	Port facility		0.0	RA2		0.0
2140127	Ship survey		0.9	RA1		0.9
2140136	Waterway transport management expenditure		5.3	RA1		5.3
21404	**Fuel price reform subsidies for transportation**		3.8			
2140401	Subsidies for city buses		0.8	RA3		0.8
2140402	Subsidies for rural road passenger transport		1.1	RA3		1.1
2140403	Subsidies for taxis		1.8	RA3		1.8
21406	**Vehicle purchase tax expenditure**		30.9			
2140601	The vehicle purchase tax is used to pay for infrastructure construction such as roads		29.7	RA2		29.7

2140602	Vehicle purchase tax is used for rural road construction expenditure		0.1	RA2		0.1
2140603	The vehicle purchase tax is used to subsidize the scrapping and replacement of old cars		0.0	RA2		0.0
21499	**Other transportation expenditures**		36.9			
2149901	Public transport operation subsidy		18.6	RA3		18.6
Total Amount		**36.6**	**1366.3**		**36.6**	**481.5**
			1403.0			**518.1**
As percent of government program (%)						**36.9**

Source: Yichang Urban Development Group and Yichang Finance Bureau.

Program Financing

19.   In China, the responsibility for providing public services is mainly borne by sub-national governments (SNGs). As of 2021, SNGs accounted for about 85.73 percent of total public expenditure. In particular, the sub-national share of the expenditure on "Transportation", was as high as 92.81 percent. In contrast, on the revenue side, China is highly centralized. Tax rates are set centrally, and the tax revenue are collected by the State Tax Administration of (STA) and allocated to sub-national governments in the forms of shared tax revenues, general transfers, and earmarked transfers. As such, sub-national government shall finance the provision of local public goods through both own-source revenues and higher-level government (HLG) transfers. Similar to HLG transfers, some of the expenditures from own-source revenue are arranged through ear-marked programs, other are arranged as general expenditures.

20.   Regarding the Program, as shown in Table A2.5, the ear-marked budget funds arranged through Yichang General Public Budget supporting the Program activities from 2020 to 2022 amounted to US$ 356.0 million, equivalent to about 75 percent of the overall budget expenditure on the Program activities. Though allocated ear-marked funds may not be spent in the same fiscal year, it is still reasonable to conclude the majority of the Program expenditure shall be financed by ear-marked funds.

Table A2.5 Ear-marked Funding Arranged through Yichang General Public Budget Supporting Program Activities by RA (2020-2022), US$ million

Result Area	Amount	Percent of Total
RA1: Manage Motorization and Accessibility	**55.7**	**15.7**
Issue policies and standards on vehicle and vessel emissions	0.6	**0.2**
Enforce strict standards for truck l emissions	31.9	9.0
Improve the network of bicycle lanes	4.4	**1.2**
Improve last-mile walkability from bus stops and BRT stations	18.8	**5.3**
RA2: Facilitate modal shift for passengers and freight transport	**255.4**	**71.7**
Improve the quality of bus services and operations	12.3	3.5
Improve intermodal connectivity between rail and waterway	13.8	3.9
Expand the network of bus priority/exclusive lanes	212.1	59.6
Reform the subsidy mechanism for public transport operators	15.4	4.3
Provide commuter feeder bus services	1.8	0.5
RA3: Incentivize low-carbon choices	**28.8**	**8.1**
Establish and maintain monitoring, reporting and verification (MRV) system to enable ETS	9.8	2.8
Introduce carbon crediting mechanism for mobility service users	0.1	0.0
Design and pilot an emission trading scheme (ETS) for logistics operators	5.3	1.5

Design and pilot an emission trading scheme (ETS) for transit operators	0.1	0.0
Issue and enforce policies and regulations on parking	13.5	3.8
RA4: Enhance institutional capacity for decarbonizing transport	16.1	4.5
Capacity building and knowledge sharing	**14.4**	**4.0**
Establish and maintain carbon accounting system and evaluation mechanism	1.7	0.5
Total	**356.0**	**100.0**

Data source：Financial department of Yichang municipality

21.   The ear-marked funds arranged through Yichang General Public Budget supporting Program activities are from Yichang own-source revenue or HLG transfers. In general, the share of Yichang own-source revenue is dominant, but it is worth noting that the scale and proportion of transfers from the central and provincial governments have risen rapidly. From 2020 to 2022, the proportion of HLG transfers rose from 2.8 percent to 36.7 percent (see Table A2.6), so it can be concluded that the Program financing from the government has become more predictable.

Table A2.6 Source of Ear-marked Funds from Yichang General Public Budget Supporting the Program Activities during 2020-2022 (US$ million)

	2020		2021		2022		Total (2020-2022)	
	Amount	Percentage of Total (%)	Amount	Percentage of Total (%)	Amount	Percentage of Total (%)	Amount	Percentage of Total (%)
Own-source Revenue	88.9	97.2	148.9	87.5	63.2	63.3	**301.0**	**83.3**
HLG Transfer	2.6	2.8	21.3	12.5	36.7	36.7	**60.5**	**16.7**
Total	91.4	25.3	170.2	47.1	99.9	27.6	**361.5**	**100.0**

22.   We also obtained information on the projects implemented by Yichang Urban Development Group supporting Low-carbon transportation. As shown in Table A2.7, during the past three years, most of the funds supporting Program activities arranged by Yichang Urban Development Group were spent on RA1 and RA2.

Table A2.7 Projects Implemented by Yichang Urban Development Group Supporting the Program Activities 2020-2022 (US$ million)

Result Area	Amount	Percentage of Total (%)
RA1: Manage Motorizaton and Accessibility	**26.9**	**73.3**
Improve the network of bicycle lanes	26.9	73.3
RA2: Facilitate modal shift for passengers and freight transport	9.8	**26.7**
Expand the network of bus priority/exclusive lanes	9.8	26.7
Total	**36.6**	**100.0**

23.   As for the sources of Program funding from Yichang Urban Development Group, it is found that the shares of self-owned funds and borrowed funds are not quite stable (see Table A2.8). However, the scale of self-owned and borrowed funds increased significantly in 2022, which will contribute much to the Program implementation.

Table A2.8 Source of Actual Project Investment from Urban Development Group to Support the Program Activities in Yichang during 2020-2022 (US$ million)

	2020	2021	2022	Total (2020-2022)	
		Amount		Amount	Percentage of Total (%)
Borrowed funds	0	0.00	9.2	9.2	25.03
Self-owned funds	0	1.94	25.5	27.5	74.97
Total	0	1.94	34.7	36.6	100.00

Expenditure Performance

24.   The quality of Program expenditure management will be critical to achieving the PforR Program objectives. While the Yichang municipality governments are responsible for implementing the Program activities and deliver the results, the central and provincial government are responsible for providing incentives to Yichang municipality through (i) earmarked transfers that mandate Yichang municipality to use the funds for implementing activities that are critical to the achievement of expected results; (ii) expenditure performance evaluation and rewards; and (iii) technical guidance and close supervision.

25.   **It is found the ear-marked transfers related to the Program activities are adequate and the expenditure performance evaluation system is in place.**

26.   In Yichang, a number of central and provincial earmarked transfers are aligned with supported objectives, including Grants from Vehicle Purchase Tax Revenue, Air Pollution Prevention Fund, Refined Oil Price Subsidy for City Public Transportation, General Transfer on Transportation Affairs , Power Use-right Trading Fund, Refined Oil Price Subsidy for Rural Passenger Transportation and Taxi Sector Development, Subsidy for Energy Conservation and Emission Reduction, Central Grants for the Tax and Free Reform on Refined Oil, etc. Of the transfers from central government and provincial governments, those from the central government accounted for about 74.2 percent (see Table A2.9).

Table A2.9 Major HLG Transfer Programs Supporting Program Activities in Yichang (2020-2022), US$ million

Transfer Program	Province	Percent	Central	Percent	Total
Total	14.9	25.8	43.1	74.2	58.0

Note: 1. Relevant management document stipulates that this Fund can only be used for the maintenance of rural roads, the construction of county-level passenger stations and township transport service stations, the construction of comprehensive freight and passenger hubs, the construction of inland waterways, the construction of Smart Transportation and other designated directions, which are within the Result Areas of the Hubei Transport PforR Program.

27.   A series of documents on management of the ear-marked funds have been issued by MOF, as well as DEEP, DHURD and DT in Hubei. Accordingly, the transferred funds shall only be used for the specified activities. Specifically, for the biggest ear-marked transfer, Grants from Vehicle Purchase Tax Revenue, the relevant management document stipulates that the funds can only be used for the maintenance of rural roads, the construction of county-level passenger stations and township transport service stations, the construction of comprehensive freight and passenger hubs, the construction of inland waterways, the construction of Smart Transportation and other designated directions, which are within the Result Areas of the Yichang PforR Program[23].

28.   The allocation of the funds is factor-based or project-based and shall all be subject to performance evaluation. The performance evaluation results are taken as an important factor for the fund allocation. Taking Refined Oil Price Subsidy for City Public Transportation as an example, in 2022, Yichang municipality issued the relevant municipal bus subsidy management documents, which stipulates that 10 percent of the total city bus operating subsidy shall be allocated on basis of performance (performance subsidy). According to the "Yichang City Bus Operation Service Quality Evaluation Method", the actual operation situation of public transport enterprises should be evaluated annually, and the performance subsidy was determined according to the evaluation results. If the comprehensive evaluation score reaches 90 points or above, the performance subsidy will be paid in full; If the comprehensive evaluation score is lower than 90 points, 10 percent of the total performance subsidy will be deducted for each point lower. Therefore, there are strong

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[23] Though the Program will be implemented largely in urban area, the activities such as maintenance of rural roads and the construction of county-level passenger stations and township transport service stations will contribute to RA2 (Facilitating Modal Shifts).

incentives for public transport enterprises to improve the efficiency of the use of city bus operating subsidy and provide citizens with more high-quality and convenient bus services.

29.   As for the funds arranged by Yichang Urban Development Group, according to relevant rules, the Group shall prepare the *Urban Construction Project Plan* every year and implement the *Plan* upon approval of Yichang government. Meanwhile, the Group has formulated the "Fund Management Rules (Trial)" and "Fund budgeting Rules (Trial)". Yichang State-owned Assets Supervision and Administration Commission is responsible for arranging audits on the financial status of the Group every year. These measures help to ensure efficient use of funds by the Group.

Financial Sustainability

Table A2.10 Financial Situation in terms of General Public Budget in Hubei

Item	Hubei			
	2018	2019	2020	2021
General public budget revenue (GPBR), US$ billion	47.2	48.4	35.9	46.9
Transfer from central government (TFCG), US$ billion	61.6	67.8	89.0	77.3
GDP, US$ billion	600.3	649.0	614.4	714.5
Debt balance (DB), US$ billion	95.4	114.9	144.0	170.5
Debt repayment amount of this year (DRA)	51.5	59.0	67.7	——
Debt-to-GPBR ratio (=DB/GPBR+TFCG), percent	87.6	98.8	115.3	137.2
Debt-to-GDP ratio (=DB/GDP), percent	15.9	17.7	23.4	23.9
Debt repayment ratio (=DRA/GPBR+TFCG), percent	43.2	46.4	49.6	——

30.   The recent General Public Budget Revenue (GPBR) in Hubei province has been relatively stable (see Table A2.10), despite the negative impacts of COVID-19 pandemic. In addition, the total expenditure of the PforR accounts for only about 0.4 percent (=0.9/[(47+48+36+47)/4*5]×100) of the general public budget revenue in Yichang.

Economic Assessment

31.   This economic evaluation considers the US$ 250 million IBRD contribution to the Yichang Program to accelerate low carbon transition of urban mobility in Yichang as well as estimates of the associated change in GHG emissions. Although the total program in Yichang covers a wide range of areas, the key focus of the IBRD funds has been agreed to be increasing the use of public transport and reducing the use of cars in the municipality. As is standard practice with PforR Programs, there is no detailed schedule of the IBRD-funded works whose impacts are to be assessed and evaluated. Instead, the evaluation assumes that the key targets associated with the bus services have been achieved and then evaluates what that implies in terms of economic costs and benefits.

32.   The relevant results for 2028 are:
- Patronage increases to 30 percent above the current (normalized level)
- Average bus travel speed increases by 15 percent
- Peak service frequencies increase by 20 percent

33.   This is expected to be achieved through a combination of Yichang's planned initiatives, which include:
- Infrastructure improvements along major transit corridors;
- Extended bus priority measures;
- Improved walk and cycle access to bus stops and terminals;

- Upgraded stop and interchange facilities;
- Restrictions on parking, either by limiting capacity or by increasing parking charges;
- Improved information services.

34.   The remainder of the annex undertakes an economic evaluation of the IBRD contribution, covering the period from 2024 to 2044, and then estimates the associated change in GHG over the same period.

35.   The Yichang bus network carried about 150 million passengers annually prior to Covid but patronage has since declined to around 85 million (and fell to about 70 million in 2023 due to the temporary closure of a major cross-Yangtze link). Average passenger journey distance is not known precisely but is estimated at 8 km. It has a fleet of 740 buses, all of which are under 11 years old and in 2023 is operating 80 routes covering 1980 km. Services average 16 km/hr and are relatively frequent with an average wait time of 5 minutes (both statistics calculated on a patronage-weighted basis). In total, the system operates about 3.1 million revenue bus-km per annum, the same as before Covid.

36.   Unsurprisingly, given the post-Covid drop in patronage, bus loadings are generally light, with an average of 12 passengers per bus (on a passenger-km/bus-km basis) and there is considerable capacity to carry any increase in patronage at a low incremental cost.

37.   In the absence of the project:
- demand steadily declines at 1 percent p.a.
- travel speed declines at 0.5 percent p.a. as congestion increases
- the 2023 (normalized) network and service frequency is maintained
- electrification of the bus fleet is not completed until 2034

38.   With the project:
- Demand increases by 30 percent over the normalized 2023 demand of 230,000 per day and then remains constant at 300,000 per day.
- 85 percent of this increase in demand occurs on existing routes and the remaining 15 percent on new routes serving areas previously without buses. The new routes are assumed to average 1 passenger boarding per bus-km and to operate 22 services each way daily (i.e., 1 -2 services per hour). This is equivalent to 85 km of new routes by 2028.
- Travel speed improves by 15 percent over the current level by 2028 and then remains constant.
- Service frequency improves by 20 percent. This leads to an increase of annual bus-km on the existing routes from 31.1 million currently to 37.4 million in 2028.
- Improvement of access routes to stops and terminal upgrades, equivalent to an average of one minute of in-vehicle time.
- Electrification of the bus fleet is completed by 2028.

39.   Figure A2.3 shows the future demand under these assumptions.

Figure A2.3 Demand with and without-Program (million p.a.)
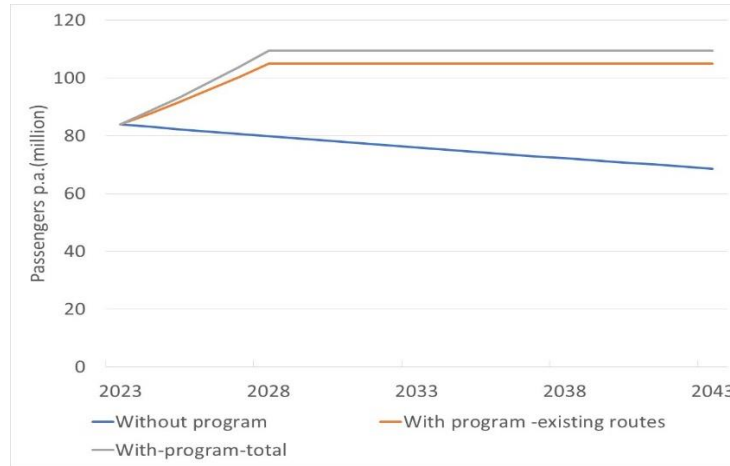
40.   The evaluation assumes that 100 percent of the difference in demand between the with- and without-Program cases transfers from car, with an average occupancy of 1.2 passengers per car.

41.   Table A2.1 summarizes the key demand and operating statistics for three key years: 2023 (current), 2028 (project-end) and 2043 (end-evaluation). Two scenarios[24] are assumed for car and bus electrification, described in detail in the following GHG analysis, with buses 100 percent electrified by about 2030 and over 40 percent of cars electrified by 2040 and all emission estimates based on Scope 3.

Table A2.1 Key demand and operating statistics 2023-2043

	2023	2028	2043
Passengers (million)			
Without Program	84	87	75
With Program- existing routes	84	105	103
With Program- new routes	0	5	3
Bus -km (million)			
Without Program	31	31	31
With Program- existing routes	31	35	35
With Program- new routes	0	2	2
Bus hours (000)			
Without Program	2.0	2.0	2.1
With Program	2.0	2.1	2.1
Difference between with and without Program			
Car - km (difference) (000)	0	198	272
Passenger time (hours) (000)	0	11.3	9.8
Accidents (fatalities)	0	4	5
GHG (tonnes)			
BAU	0	57	60
AE	0	50	38

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[24] BAU – Business as usual; AE – accelerated electrification, covering both vehicle electrification and electricity generation.

42.   The physical resources summarized in Table A2.1 have been converted into costs and benefits using the following unit costs and benefits:

- Bus operating costs of RMB 1.07 per bus-km and RMB 49.30 per bus-hour, based on the 2022 accounts of the Yichang bus company.
- Car operating costs, covering fuel and tolls, of RMB 0.08 per car-km.
- Value of time (VOT) for passengers in 2024 of RMB 23 per hour, based on an average wage in Yichang of RMB 90,000 per annum and assuming 20 percent of bus trips are non-leisure and the other 80 percent are for non-business with an average VOT of 30 percent of the non-leisure rate. This has been increased at 3 percent p.a. in real terms.
- Value of life for accidents of RMB 6.3 million p.a. per fatality, based on the GDP per head for Hubei in 2022 of RMB 90,000. Injuries have been costed at RMB 0.63 million.
- Value of GHG of US$ 31/tonne in 2023, increasing to US$44/tonne in 2043. For the AE scenario, these prices have been doubled.

43.   The results for the BAU case are summarized in Table A2.2. The project has an EIRR in the BAU case of 23 percent and an NPV, discounted at 6 percent to 2023 of RMB 2037 million.

Table A2.2. Project evaluation (BAU electrification)(RMB million 2023)

	Construct-ion	User benefits	Operating costs	Accidents	GHG	Net
2024	-365	43	0	6	2	-314
2025	-365	92	0	13	4	-256
2026	-365	148	1	21	6	-189
2027	-365	212	1	30	9	-113
2028	-365	286	2	39	12	-27
2029		293	3	41	12	349
2030		301	4	44	12	360
2031		309	5	46	12	372
2032		317	5	49	13	384
2033		325	6	52	13	396
2034		334	7	54	13	409
2035		342	8	57	14	421
2036		351	9	60	14	435
2037		361	10	63	14	448
2038		370	11	67	15	462
2039		380	12	70	15	477
2040		390	13	73	15	491
2041		400	14	77	16	506
2042		411	15	81	16	522
2043		421	15	85	16	537
2044	-913					-913

44.   The benefits are dominated by user benefits, which are directly related to the two DLI's defining the travel time and service frequency improvements. The project aims to encourage a shift from what is currently a predominantly internal combustion car fleet (ICEV) to lower-emission modes such as bus, which are predominantly powered by electricity (EV).

Table A2.3. Analysis of BAU scenario (RMB million 2023) (discounted to 2023 at 6 percent p.a.)

	NPV
Investment	-1806
User benefits	3123
Operating costs (net)	62
Accident reduction	510
GHG	149
Total NPV	2037
EIRR (percent)	23

45.   Table A2.4 gives a series of sensitivity tests, which emphasize the key role of the user benefits and particularly the in-vehicle travel time reduction. While a reduction in the passenger growth with the project reduces the EIRR and NPV, the impact is relatively light, as the bulk of the benefits accrue to the existing passengers[25]. The evaluation is particularly sensitive to the travel time saving that is achieved, but rather less so to the service interval. The potential improvements in accessibility to bus stops, stop facilities and improved information systems will also reduce the overall disbenefit to bus passengers.

Table A2.4. Sensitivity tests (discounted to 2023 at 6 percent p.a.)

	EIRR (percent)	NPV (RMB million
Base scenario	23	2037
Capex + 20 percent	18	1675
User benefits -25 percent	17	1256
Travel speed only improves by 10 percent	18	1364
No change in frequency	21	1754
Passenger growth of 15 percent	18	1429
Base (AE scenario)	23	2017

ESTIMATED IMPACT ON GHG EMISSIONS

46.   The project aims to encourage a shift from what is currently a predominantly internal combustion car fleet (ICEV) to lower-emission modes such as bus, which are predominantly powered by electricity (EV). As the GHG savings have been estimated on a 'well-to-wheel' basis, two key parameters are:
   a.   The GHG emissions created by electricity generation
   b.   The proportion of the Yichang vehicle fleet that is ICEV and EV

47.   In Hubei in 2020, 39 percent of Hubei's electricity was generated from non-fossil fuel sources (solar and wind, hydropower, and nuclear), and under its current energy transition plan, the ratio is expected to gradually increase. Two scenarios have been considered, the current target transition in which the non-fossil fuel proportion reaches 53 percent

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[25] The benefits per passenger for transferring from car have been assessed at half those for the existing passengers, in line with the Rule of a Half.

by 2030 and 67 percent by 2040 and a slower transition in which the ratio increases slowly in the energy mix at an assumed rate of 3 percent every five years (Table A2.5).

Table A2.5 Electricity emission factors – Yichang 2020 – 2040 (Scope 1)

	Current	Slow Transition				Target Transition			
	2020	2025	2030	2035	2040	2025	2030	2035	2040
Share of non-fossil power generation (percent)	39	42	45	48	51	46	53	60	67
Emission factor of standard coal (tCO2/tce[26])	1.92	1.85	1.78	1.72	1.65	1.85	1.78	1.70	1.64
Coal consumption of coal power unit (gce/kWh)	302	297	292	287	282	297	291	285	280
Emission Factor (tCO2/MWh)	0.36	0.32	0.29	0.26	0.23	0.30	0.24	0.20	0.15

48.   The emission factors in Table A2.5 represent emissions at the power station itself and are thus Scope 1 only. There are losses in transmission and distribution, typically around 6 percent as well as emissions associated with the production and supply of the source fuel (largely coal in China). An estimated 15 percent has been added to convert to Scope 3 emissions.

49.   The vehicle ownership in Hubei is still relatively low at just over 200 vehicles per every 1,000 population but is expected to steadily rise to 237 vehicles per every 1,000 people by 2025 and 363 by 2040. Two scenarios for the share of EV in the fleet have been considered: the business-as-usual (BAU) and accelerated electrification (AE) scenarios, with and without targeted policies to promote electrification, respectively. Under the two scenarios, electrification rates by vehicle types are given in Table A2.6.

Table A2.6. Electrification rate by vehicle types for BAU and AE scenarios

	2020 (baseline) (%)	2040 (BAU) (%)	2040 (AE) (%)
Passenger Cars	1.6	22	42
Buses	54	100	100

Source: World Bank estimates

50.   Table A2.7 summarizes the fuel and electricity consumption figures used in the estimation.

Table A2.7. Fuel and electricity consumption by vehicle type

	Gasoline (l/km)	Diesel (l/vkm)	Electricity (kwh/km)
Passenger Cars	.08		0.24
Buses		0.3	1.0
CO2 kg per l/kwh	2.88	3.24	See Table A2.5

51.   Table A2.8 summarizes the annual savings in GHG for key years.

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[26] Tce – tonnes of coal equivalent. Gce – grams of coal equivalent

**Table A2.8 GHG reduction from project (000 tons p.a.)**

	2028	2033	2038	2043
Base (BAU)s	57	58	60	60
Base (AE)	50	53	51	38
Passenger growth of 15 percent (BAU)	34	35	39	41

Gender Gap Analysis

52.   **Gender gaps have been identified in the public transport sector in Yichang, with the most significant gaps observed in technical positions. This is in contrast to the fact that women are more frequent users of public transport.** According to data provided by the local government, over 50 percent of the public transport passengers are women. In June 2023, 271,847 male passengers and 366,461 female passengers used Yichang's public transport. On June 1st, there were 291,530 passengers in total, with 124,133 male passengers accounting for 42.58 percent and 167,397 female passengers accounting for 57.42 percent. However, the public transport is largely male dominated. Women only make up 23.7 percent of the total workforce (1350 male, 420 female employees in the sector), with a mere 15.17 percent representation in technical positions of vehicle maintenance and electricians.

53.   Conversely, in operational and management roles (e.g., Human Resources, finance, administrative management, public transportation service, scheduling, and department management), the gender gap is less pronounced, with women comprising 47.39 percent of these positions. Remarkably, in management roles, female representation even reaches 84 percent. Additionally, the company's chairman is a woman, reflecting a commitment to elevating female presence in leadership positions. On average women earn around 1 percent less than men. This difference is attributed to factors such as seniority and male employees receiving more night shift allowances (as women rarely occupy night-shift positions).

Figure A2.4. Public Transport Sector Average Salary and Number of Employees in Yichang
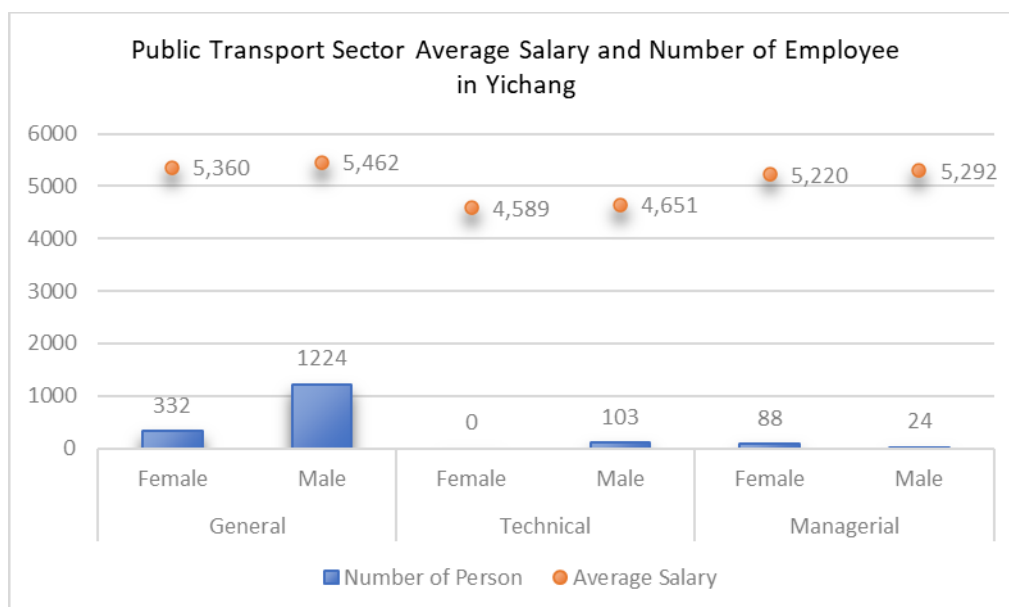
54.   **The representation of women in the position of bus drivers in Yichang is low, with women constituting only around 10 percent of the total bus drivers.** Among the 1012 front-line drivers with the Bus Group, there are only 107 female drivers, accounting for a mere 10.57 percent. As public transport, such as buses, plays an increasingly important

role in driving the agenda of "greening" the urban mobility in Yichang in the coming years, increasing the presence of female drivers can be a crucial factor for enhancing the safety perception, satisfaction, and low carbon development awareness of women and vulnerable groups who commute with these buses. Many studies have argued that women can be strong agents of change for transport and climate change, not only as users but also as transport workers and decision-makers, as they possess a different landscape of knowledge and experiences[27]. Women can put more focus on addressing climate change and ensuring environmental sustainability[28] and women can exhibit greener living and working habits than men, according to data collected in China.[29]

Gender Actions

55.   To improve women's participation in Yichang's efforts in decarbonizing its transport sector, the Program proposes the following gender actions:
- Supporting the government in developing guidelines for promoting gender equality in transport sectors. Key points include securing equal pay for equal work, ensuring equal opportunities for both genders in recruitment, retention, and advancement across all types of positions in the transport sector.
- Supporting the development of certified upskilling training programs for present and future female bus drivers. These targeted training programs should focus on the poor population and aim to better link them to the bus driver positions provided by the Bus Group.
- Implement policies supporting work-life balance, family-friendly benefits, and awareness campaigns to foster an inclusive and supportive culture.
- Helping local authorities enhance local people's gender awareness in the transport sector. Key activities include designing and delivering gender equality trainings series targeting the staff of relevant government bureaus and the Bus Group, cooperating with local women's federation in developing gender and climate thematic workshops, and featuring female role models working in or leading transport sector via social media or by closely working with the local TV programs/media.

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[27] Kronsell, A., L. Smidfelt Rosqvist and L. Winslott Hiselius (2016), "Achieving climate objectives in transport policy by including women and challenging gender norms – the Swedish case", International Journal of Sustainable Transportation, 10(8): 703-711.
[28] Stevens, C. (2010), "Are women the key to sustainable development?" Sustainable Development Insights, Sustainable Development Knowledge Partnership (SDKP), The Frederick S. Pardee Center for the Study of the Longer-Range Future at Boston University, **www.bu.edu/pardee/files/2010/04/ UNsdkp003fsingle.pdf**
[29] Li, F. and Joffre, V.M. (2020), https://blogs.adb.org/blog/people-s-republic-china-helping-women-will-help-environment

ANNEX 3. SUMMARY FIDUCIARY SYSTEMS ASSESSMENT

1.   **Program Scope**. The scope of the Fiduciary System Assessment is based on the defined boundary and Program Expenditure Framework. The government programs for the proposed PforR include the Yichang City Transport 14th FYP, Yichang City Transport Carbon Peak Implementation Plan, and Yichang Master Plan (2021-2035). The geographic boundary of Program only concentrates on the urban level covering five districts . The counties under the administrative management of the municipality are excluded since most of Program activities are implemented at the municipal level.

2.   **Assessment of Fiduciary Systems.** The fiduciary team has assessed the fiduciary systems of all key Program implementing agencies in Yichang municipality, including Yichang Municipal Development and Reform Commission, Yichang Municipal Finance Bureau, Yichang Municipal Transport Bureau, Yichang Municipal Ecology and Environment Bureau, Yichang Municipal Housing and Construction Bureau, Yichang Municipal Forestry and Landscape Bureau, Yichang Municipal Urban Management Commission, Yichang Urban Development Group, and Yichang Bus Group.

3.   **The assessment concludes that the Program's fiduciary systems are adequate** for meeting the Bank's PforR Policy and Directive requirements. The systems can reasonably assure that the Program's financing proceeds will be used for the intended purposes, with due attention to the principles of economy, efficiency, effectiveness, transparency, and accountability.

4.   **Planning and budgeting**. The funds to be invested in the proposed program would stem from various funding sources, including transfer funds from the central and provincial governments, as well as funds from the municipal government's budget. The upper-level transfers from central and provincial government account for less than 30 percent of total program budget and most program funds are financed by municipal government budget. The sectoral bureaus involved were required to provide data about requested budget and approved budget in the last three years to assess the reliability of budgets allocated in each bureau. The Bank was informed the ratio of requested budget to approved was about 70-80 percent in the past three years but the detailed data was not provided as they prefer to share published data. The Bank also noted some entities did not take the budget preparation process seriously. For example, some entities adjusted their annual budget to keep them the same as the final account, which made the comparison between the annual budget and final account not reliable. The upper-level government transfers are normally distributed to the municipality in batches. Although most central government transfers for the current year are distributed at the end of previous year, the transfer funds received by the municipality were quite late and most in the middle of current year. The delay of Yichang municipality receiving budgeted funds was due to the delay of Hubei Province making the transfer since transfers from the central government to the province are made on time. As a result, Yichang municipality did not include the upper lever transfers in its approved annual budget. The lack of predictability of the budget quota hampers the capacity of local governments to forecast cash or credibly allocate budgets to budgetary units. The budget preparation process at the municipality appears to be carried out in an orderly manner. However, the annual approved municipal government budget was not complete since the upper-level transfer funds were received late, and they were not included in the approved annual budget. The transfer funds received by the municipality in the middle of the year would not be reflected in the budget at the beginning of the year, and the relevant funds would be directly appropriated and used in the current period when the budget quota was received. If there were surplus funds in the current year, the surplus would be automatically included in the next year's budget, and generally carried forward at most two years.

5.   Considering the above issues, the Bank is concerned about the predictability and reliability of funds for the proposed program. Therefore, to address this weakness the Bank recommends that a multiple year program budgeting should be established in the municipality to ensure program financing sources are reliable and predictable. This would

moreover support the Government in moving towards program-based PFM, including program-based financial reporting. Since this is an innovation in China, to minimize the impact on the existing government budgeting system, the multiple year program budgeting could be prepared separately from the existing system. In addition, provincial entities should revisit their budget quota distribution and take actions to ensure the budget quota could be distributed to the municipality in advance. Municipal government should include all program funds in its approved annual budget.

6.   **Budget execution**. Since program is not an element of budget classification in China, the required program reporting can't be generated from government IFMIS system. The municipal government was not required to report program expenditures regularly. Several budget items which can capture program expenditures were selected and the data was analyzed to review the budget execution status. The Bank noted budget completion rate was not stable in the last three years and the budget completion rate was 63.17 percent, 72.61 percent and 148.10 percent respectively in FY20-FY22. Big gaps among different budget line items were also observed during this period. Related entities are recommended to identify the issues which impact the budget completion and take necessary actions to ensure the approved annual budget could be fully completed. The municipal governments have integrated all financial funds into the treasury single account (TSA) system. All revenues are directly collected into the TSA or the special financial account, and all expenditures are paid to the contractors/suppliers/beneficiaries through the TSA. Related regulations have been established by related government entities to standardize the appropriation principle, appropriation conditions, appropriation process and account review procedures to ensure the fund appropriation system is implemented within a time limit, and the funds are allocated to the user unit in a timely manner, which has improved the use of funds and ensured the safety of fund operations.

7.   Municipal governments have effectively strengthened fund supervision and ensured the standard and efficient use of funds by strictly following the basic requirements for special funds, centralized payment by the national treasury, public bidding, and government procurement. The municipal finance bureaus allocate funds based on relevant materials such as the acceptance and settlement statement prepared by project supervisory entity, and project unit. Payments can be made to the budgetary units within the approved budget. The centralized payment center at municipal finance bureau is responsible for initiating all payments, following the request of the budgetary units. In addition, the external auditors will be required to verify the timely delivery of Program funds in annual program audit.

8.   The efficient inspection mechanism has been established in some bureaus. For example, the municipal transport bureau organizes county and urban transportation bureaus to conduct performance self-evaluation every year for upper lever transfer funds, and report to the provincial transportation department after being reviewed by the local financial bureau. The provincial transportation department hires an intermediary to conduct performance evaluation or audit investigation on the transfer payment funds every year. The municipal transport bureau also organizes the budget units of the municipal transportation system to conduct self-assessment every year for the municipal budget funds, and in the middle of the year, the municipal finance bureau hires an intermediary agency to conduct re-evaluation. Yichang ecology and environment bureau organizes the performance self-assessment of the upper-level transfer funds issued in the previous year every year, and accept the third-party organization entrusted by the municipal finance bureau to conduct performance evaluation on the municipal financial expenditure, and at the same time entrust the third-party organization to conduct performance evaluation on the ecological environment fund project for the previous year.

9.   Given the weaknesses identified on budget preparation and execution, the Bank would like to communicate with municipal finance bureau to find the possibility of conducting PEFA assessment in Yichang municipality to help them to find the gaps based on international good practices and prepare an action plan to strengthen its PFM capacity.

10.   Disbursement of the IBRD loan will follow the traditional procedures. After the loan agreement is signed by the Bank and MOF, MOF will sign an on-lending agreement with Hubei province. Therefore, a separate account will be opened and managed by Hubei provincial finance department. The IBRD loan will be disbursed to the account based on the request from provincial finance department for advance and achievement of DLIs. As the IBRD loan will be in foreign currency and can't be disbursed to government treasury single account (which is in local currency) directly. Therefore, the government requires that a segregated account is opened to receive IBRD loan. However, this segregated account is also managed by the treasury division of provincial finance department. The project will request advances and prior results. The transfer of funds from Hubei province to Yichang municipality is quite straightforward and follows the normal government internal funds transfer procedures and the same control measures. Based on the discussion with the interviewed sectoral bureaus, the Bank noted that each bureau prepared its annual sectoral final account report and submitted it to the municipal finance bureau. The approved final account report is also published in the government website.

11.   Since 'Program' is not a budget classification element, Program-based financial reports cannot be generated from the government treasury system, Yichang municipality, which receives Program funds, was not required to report on Program expenditures regularly to the upper-level government. As a result, Program expenditures were not properly monitored and managed. In addition, some transferred funds are distributed in the form of general budget rather than ear-marked budget. This absence of regular monitoring dilutes efficient budget management. Therefore, a budget tagging system is recommended by the Bank to ensure Program expenditures can be traced and monitored properly. The detailed arrangement of the budget tagging needs to be further discussed with related government entities. It was agreed that the municipality will explore piloting "Budget Tagging Program" for Program related expenditures in the Government treasury system. This would allow Program Financial Reports to be generated directly from the treasury system during project implementation. Detailed arrangements will be prescribed in the Program Implementation Plan to be developed by the municipal PMO.

12.   Based on the discussion with the municipal finance bureau, it was noted that selecting some budget line items which can capture Program expenditures and summing up the account balances, is the normal practice for them to report on Program expenditures when needed. Therefore, a similar measure will be adopted to design a tailored Program financial reporting template, which will be discussed and agreed on by the Bank and all involved government entities. Project activities to be implemented by government entities will be recorded according to the General Budget Accounting which is cash basis.

13.   **Internal control**. There is adequate control over, and stewardship, of program funds, with well-defined delegation of authority. Following the national policy and regulations issued by the MOF and NDRC, the Provincial Governments have issued a series of regulations regarding fund management, implementation measures, and result verification procedures, etc. The leading group and office have been established in Yichang Municipal Finance Bureau responsible for financial and accounting supervision. The main responsibilities include coordinating and supervising the implementation of financial and accounting supervision, reviewing the financial and accounting supervision work plan and key measures, and guiding the financial and accounting supervision work within the municipality. Verification of the achievement of DLIs will rely on a third-party verification agent (VA) through on-site review. A detailed verification protocol has been designed and is reflected in the PAD.

14.   It is noted that the internal audit function has been established in most line bureaus involved in Yichang municipality and the responsibilities are well defined. However, due to the restrictions on the number of public servants, the internal audits are performed by the contracted audit firms under most circumstances. By reviewing the reports issued by the audit firms, it is noted the internal audit was conducted in line with related requirements and the internal control

weaknesses were identified and related entities were required to take remedial actions. There is a conflict of interest for Yichang municipal transport bureau as the internal audit is conducted by financial staff. It is recommended that the full-time internal auditors should be recruited, or the function should be outsourced to an accounting firm.

15.   **Auditing**. Although government auditors may audit program funds when they carry out budget execution audit, accountability audit and other types of audits, no specific program audit was conducted by provincial audit office (PAO) and municipal audit office on the usage of program funds in the past years. To mitigate this risk, annual program audit is required, and the audit of the proposed Program will be conducted by the Hubei provincial audit office. Besides conducting the audit on budget execution and other provincial level entities, the PAO has been the auditor of Bank financed projects for about three decades. The first year's audit report issued by the PAOs is subject to the quality review by the CNAO.

16.   **FM Capacity**. A project management office (PMO) has been set up at Yichang municipal transport bureau in Hubei province. The PMO is responsible for coordinating and supervising the preparation and implementation of the proposed PforR operation. Although the municipality has previous experiences of implementing several IPF projects, the PMO and the various implementing agencies are quite new to PforR operations, and a consulting firm has been hired to assist them with project preparation. In addition, a Program Implementation Plan (PIP) is required, which will include WB FM and disbursement related guidance for PforR. The Bank team will also provide more guidance and training to PMO staff on PforR FM and disbursement related requirements. The PMO and the various implementing agencies have adequate FM staff to manage Program funds. The assessment also noted that related regulations and decrees associated with the program have been established, which provide detailed guidance to implement program activities.

Public Procurement System.

17.   **Procurement Profile of the Program**: Procurement activities under the Program will include improve management of on-street parking by installing smart parking facilities such as geomagnetic sensors and parking fee collection system; construct bus exclusive lanes, BRT corridor, and new bus stops and supporting ITS facilities; rehabilitate community micro-bus routes; construct micro-bus stops and supporting ITS facilities; improve pedestrian walkways along main roads; improve street crossings; construct bicycle lanes along main roads; improve bicycle parking; improve bus interchange stations; renovate bus stops with large traffic; renovate passenger transport hubs; improve bus depots and terminals; add new parking spaces with charging facilities and related supporting utilities; establish intermodal freight information platform for Inland waterway transport to railway transport; develop a transport carbon emission data platform; and develop a carbon credit mechanism. The Program does not include activities with significant environmental and social impact or with a contract value at or above US$ 115 million for works / supply & installation of plant / Public-Private-Partnership, US$ 75 million for goods / information technology / non-consulting services, and US$ 30 million for consultant services.

18.   **Procurement Regulatory Framework.** Generally, the procurement of works, goods, material that will be incorporated into permanent works, and consultancy services that is related to works, including geological exploring and survey, engineering design, cost estimating and pricing, and construction supervision follows the procedures specified in the Tendering and Bidding Law (TBL) and the related implementation regulations enacted by the governments at central, provincial, prefectural, and county level in accordance with the TBL. The TBL was promulgated on August 30, 2000 and became effective on January 1, 2000. It was amended on December 27, 2017 and the amendment became effective on December 28, 2017. At the central level, the implementing regulation came into force on February 1, 2012, and was amended on March 1, 2017, March 19, 2018, and March 2, 2019. Other procurement (such as procurement of goods, works and services that are included in the government catalog for recurrent expenditure for centralized procurement)

follows the procedures stipulated by the Government Procurement Law (GPL) and the related implementing regulations promulgated by the governments at central, provincial, prefectural, and county level. The GPL was promulgated on June 29, 2002 and became effective on January 1, 2003. It was amended further on August 31, 2014. At central level, the implementing regulation for the GPL issued by the State Council became effective as of March 1, 2015.

19. **Procurement Capacity**. All agencies have extensive experience of carrying out procurement following domestic procurement laws and regulations. The capacity of procurement staff is adequate in all agencies assessed. Training on procurement policies, procedures, and case studies are provided and attended regularly.

20. **Governance and Anti-Corruption Arrangement**. Legal liability provisions of TBL and GPL regulate conduct and provide remedial measures of misconduct while tendering and bidding. Integrity Responsibility Letter (IPL) is a mandatory part of the issued procurement document and later part of the signed contract for signing by both parties. IPL regulates behavior of the two parties to prevent the occurrence of violations of laws and disciplines for seeking illegal interest. China National Audit Office (CNAO) at central level, audit offices at provincial level, carry out compliance and performance audit annually. Where violations of state regulations on government and financial revenues and expenditures are identified, remedial measures will be taken in accordance with the law. An audit institution, within its mandates, can make an audit decision or put forward to the department in charge its recommendations as to how to deal with or take remedial measures.

21. The Program will be subject to the World Bank "Guidelines on Preventing and Combating Fraud and Corruption in Program-for-Results Financing" dated February 1, 2012, and revised on July 10, 2015 (the Anti-Corruption Guidelines). These guidelines shall be applied in an unrestricted manner on all activities within the Program boundary. To operationalize implementation of the various areas covered in the Anti-Corruption Guidelines, the Yichang municipality shall perform the following:

   a. Maintain and compile a report of Program related complaints as part of Program progress report. Each implementation agency will send its own report to PMO who will integrate the report and send it to the Bank.
   b. Incorporate the World Bank's list of debarred and suspended firms / individuals in the filter used by procuring entities under the Program when they conduct due diligence before contract award.
   c. Maintain and compile a report of whether any contract awards are made to any ineligible/suspended firms/individuals as part of Program progress report.
   d. Ensure that each participating bidder shall submit a self-declaration that the firm is not subject to ineligibility or has not been sanctioned under the World Bank system of debarment and cross-debarment at the time of bidding.
   e. Ensure timely and appropriate actions are taken to address issues and indications of fraud and corruption and shall report these actions to the World Bank. Each implementation agency will send its own report to PMO who will integrate the report and send it to the Bank.
   f. Ensure that the implementation agencies of the Program will cooperate fully with the World Bank, or any firm/individual appointed by the World Bank in any inquiry conducted by the World Bank into allegations or other indications of fraud and corruption in connection with the Program.

22. **Key Conclusions and Recommendations.** A comprehensive PFM framework has been established including government regulations, decrees, standards, and procedures, etc. which regulate the Program activities to ensure Program funds are used for the intended purposes. However, the enforcement varies at different places and the Bank's involvement could strengthen the institutional capacity of related government entities. Given Program is not an element for budget classification in China, which brings challenges on most PFM areas. During the fiduciary assessment, the major financial management risks have been identified and mitigation measures provided:

a. Budget quota of upper-level transfer funds was distributed to the municipality in the middle of current year which prevents the municipal government from including the entire program funds in its annual budget. Provincial entities should revisit their budget quota distribution and take actions to ensure the budget quota could be distributed to the municipality in advance. Municipal government should include all program funds in its approved annual budget and one way to do this is to establish multi-year program budgeting to ensure program financing sources are reliable and predictable.

b. 'Program' is not a budget classification element in China and the required Program financial reporting can't be generated from government treasury system. Budget lines associated with program expenditures will be selected and reported on. In addition, as an alternative measures, A budget tagging mechanism which can trace program expenditures from government existing integrated financial management system has been recommended and it is expected to be piloted during project implementation. This also creates fundamental basis for generating program financial reporting from government treasury system.

c. Budget execution rate is not stable in the past three years and there are big gaps among the budget line items involved. Related entities should identify the issues which impact the budget completion and take necessary actions to ensure the approved annual budget could be fully completed.

d. There is a conflict of interest for Yichang municipal transport bureau as the internal audit is conducted by financial staff. It is recommended that the full-time internal auditors should be recruited, or the function is outsourced to an accounting firm.

e. Government auditors did not audit the program funds and prepare the program audit report. The Bank will work with the Provincial Audit Office (PAO) to develop the terms of reference (TOR) for program auditing to ensure program funds could be audited in line with the Bank's policy. Trainings will be provided to strengthen the capacity of external auditors on program auditing.

23. **Major procurement risks.** Two risks are identified along with their mitigation measures:

a. Contracts may be awarded to firms or individuals which are debarred or under temporary suspension by the Bank or other multilateral development banks. The following mitigation measures have been proposed: (i) Upon the Program loan effectiveness, Yichang Finance Bureau shall issue an official letter to require Program implementation agencies to ensure that no contract will be awarded to ineligible firms or individuals; (ii) Procurement staff of each implementation agency to check the latest lists of the debarred and temporarily suspended firms and individuals each time before contract award; (iii) the TOR for annual external audit shall include the task of verifying whether such screening mechanism works and implementation agencies shall demonstrate such during audit.

b. The Bank may not be informed of fraud allegations and corruption issues during the implementation of the Program. The mitigation is that a Program manual shall require the client to inform the Bank of any credible and material allegations of fraud and any corruption issues as part of the semi-annual Program progress reports, as mandated in the loan agreement. In case there is no issues to be reported, the semi-annual Program progress report shall also include one paragraph to confirm.

Table A3.1 Program Fiduciary Systems Risks and Mitigation Measures

Risk	Mitigation action	Timing	Type of action (PAP, DLI, etc.)
The contracts may be awarded to firms or individuals which are debarred or under temporary suspension by the Bank or other multilateral development banks.	▪ Yichang Finance Bureau shall, upon project loan effectiveness, issue an official letter to implementation agencies to ensure that no contract will be awarded to ineligible firms or individuals. ▪ Procurement staff of each implementation agency will be required to check the latest lists of the debarred and suspended firms and individuals each time before contract award. ▪ the TOR for annual external audit shall include the task of verifying whether such screening mechanism works.	Implementation	PAP
	In the semi-annual Program progress report, Yichang to report actual procurement performance data to enable Bank to monitor whether procurement continues to perform as assessed	Implementation	PAP
The Bank may not be informed of any credible and material allegations of fraud and corruption during the implementation of the Program.	The Program manual will require the client to regularly inform the Bank of any credible and material allegations of fraud and corruption in the semi-annual Program progress report, as required in the loan agreement.	Implementation	PAP
Budget quota of upper-level transfer funds was distributed to the municipality in the middle of current year which prevents the municipal government from including the entire program funds in its annual budget	Provincial entities should revisit their budget quota distribution and take actions to ensure the budget quota could be distributed to the municipality in advance. Municipal government should include all program funds in its approved annual budget and one way to do this is to establish multi-year program budgeting to ensure program financing sources are reliable and predictable.	Implementation	PIP
'Program' is not a budget classification element in China and the required Program financial reporting can't be generated from government treasury system;	Select the budget lines associated with Program expenditures and report on them. In addition, as an alternative measures, a budget tagging mechanism which can trace Program expenditures from government existing integrated financial management system has been recommended and it is expected to be piloted during project implementation. This also creates fundamental basis for generating	Implementation	PIP

	Program financial reporting from government treasury system		
Budget execution rate is not stable in the past three years and there are big gaps among the budget line items involved.	Related entities should identify the issues which impact the budget completion and take necessary actions to ensure the approved annual budget could be fully completed.	Implementation	PIP
There is a conflict of interest for relevant Yichang municipal government bureaus' as the internal audit is conducted by financial staff.	It is recommended that the full-time internal auditors should be recruited, or the function is outsourced to an accounting firm.	Implementation	PIP
Government auditors did not audit the program funds and prepared the program audit report.	The Bank will work with the Provincial Audit Offices (PAO) to develop the TOR for Program auditing to ensure Program funds shall be audited in line with the Bank's policy. Trainings will be provided to strengthen the capacity of external auditors on Program auditing.	Implementation	PAP

24.   Taking into consideration the above-mentioned FM and procurement risks and the proposed mitigation measures, the overall fiduciary risk of the Program is rated as 'Moderate'.

25.   **Program Implementation Support.** During Program implementation, the proposed fiduciary implementation support includes the following:

   a. Work with the team to review Program implementation progress, including the achievement of Program results and implementation of the PAP.
   b. Work with the team to assess timeliness and adequacy of Program fund appropriation as approved in the budget.
   c. Continuously assess and monitor the performance of the FM and procurement systems under the Program and provide suggestions for enhanced efficiency and effectiveness.
   d. Monitor application of the PforR Anti-corruption Guidelines.
   e. Monitor the performance of the fiduciary systems and the audit report, including the implementation of the PAP.
   f. Monitor the PforR financial statement reporting process and assist the client as necessary.
   g. Monitor the contracts implementation, including cost, time, and quality control.
   h. Help the client resolve implementation issues and carry out institutional capacity building.
   i. Assist CNAO and the audit offices at provincial and county level in strengthening audit arrangements as needed.
   j. Hold regular trainings for provincial and county audit offices, particularly with respect to procurement post audit to build capacity.
   k. Monitor changes in fiduciary risks of the Program and, as relevant, compliance with the fiduciary provisions of legal covenants.

ANNEX 4. SUMMARY ENVIRONMENTAL AND SOCIAL SYSTEMS ASSESSMENT

1.   **Background**. The proposed Program is to support a subset of activities under Yichang municipal transport programs to accelerate decarbonization of transport sector in Yichang. Implementation of these activities would have significant and broad positive environmental and social (E&S) effects in Yichang Municipality and Hubei Province. The Program implementation will rely on the existing applicable systems at the national, provincial, and local levels to manage the related E&S issues. An environmental and social systems assessment (ESSA) is under preparation to evaluate the soundness of the E&S systems and recommend actions that address identified gaps to enhance the E&S management performance during the Program implementation. At the stage of project appraisal, the ESSA has been completed.

2.   **ESSA Methodology.** The ESSA is carried out using the following methodology: (i) screening and assessment of potential E&S risks/impacts associated with the proposed Program activities; (ii) desk review of E&S laws, regulations, and procedures related to managing the E&S risks/impacts; (iii) visits to sites of typical activities in selected districts; and (iv) extensive meetings and interviews with key stakeholders including government authorities at the municipal and district levels, and typical enterprise and community representatives, etc.

3.   **E&S Exclusion.** A thorough E&S screening has been carried out on the proposed Program activities to exclude all activities with a high potential to cause significant adverse impacts on the environment and/or affected people (covering those involving high-risk linked/associated facilities), following the Bank Guidance on PforR ESSA (issued in September 2020). Based on the findings from the field visits and discussions with key stakeholders in Yichang, the ESSA established a specific exclusion list below which will be further reviewed and revised as needed along with the process of the Program preparation:

   a.   Activities that involve new or significant expansion of large-scale transport infrastructure, particularly those requiring large-scale land acquisition or resettlement or having significant environmental impacts during implementation, for example, construction or expansion of highways, expressways, urban metro systems, etc.
   b.   Activities that the site selection involves resettlement legacy issues.
   c.   Activities that involve heavy polluting processes or high safety risks, for example, scrappage and disassembly of old vessels, purchase, and use of hydrogen vehicles, etc.
   d.   Activities that involve acquisition of basic farmland.
   e.   Activities that require land use not compliant with the up-to-date overall national and local terrestrial and spatial planning.
   f.   Activities that have livelihood impacts arising from restriction of access or transfer of user rights.
   g.   Other activities with potential significant E&S impacts, particularly those subject to full environmental impact assessment (EIA) reports under China's existing EIA system, etc.

4.   **Program activities**. The proposed Program will support both physical infrastructure and non-physical activities. The physical activities include construction of BRT corridors, bus depots, bus terminals, bus lanes, bicycle lanes, pedestrian walkways, and related facilities (e.g., traffic signs, traffic navigation visualization system, etc.). The non-physical activities include promulgation and implementation of vehicle emissions, vehicle parking, and TOD policies, development of carbon accounting and evaluation mechanism and MRV system, and enhancement of institutional capacity, etc.

5.   **E&S impacts assessment and risk rating.** In general, the Program is expected to bring significant E&S benefits in Yichang by addressing the key challenges facing the GHG emission of transport sector and improving the quality of bus operations in terms of speed of service, frequency of service, reduced waiting time, and reduced transfers. By excluding large-scale and environmentally/socially sensitive investments, the negative E&S impacts associated with the Program are generally identifiable and controllable. The Program-related E&S risks have been screened following the approach defined

in Annex C of the Bank Guidance on PforR ESSA. As a result, the overall E&S risk is deemed Substantial. The risk rating might be revised as needed during appraisal.

6.   The *likely adverse E&S effects* of the proposed Program activities *is rated substantial*. The main negative E&S impacts include: (i) temporary construction-related and site-specific E&S impacts, such as dust, wastewater, noise, solid waste, limited land acquisition or use, and occupational health and safety (OHS) issues; (ii) impacts on local environment and communities resulting from the operation/implementation of the Program-supported facilities/activities, such as vehicle emission, traffic noise, scrapped vehicles, hazardous waste, road runoff, traffic accidents, occupational health and safety risks, etc.; and (iii) potential downstream E&S impacts of proposed policies promulgation and implementation such as solid waste from scrapping more vehicles, influence on owners of scrapped vehicles, etc. Meanwhile, it was also identified that the Program will involve different kinds of activities, and some activities such as construction of BRT corridors, bus depots, bus terminals, bus lanes may involve some land acquisition and resettlement, some other activities like researching and issuing of new transport policies, designing of new bus lanes are expected to affect the daily transportation and lives of people, especially vulnerable groups. These adverse E&S effects are neither significant nor irreversible, and they can usually be well identified and readily avoided, minimized, and mitigated through known and demonstrated technologies and good management practices; and based on the findings of sector investigation, they will be regulated under the existing national, provincial, and local E&S management systems with overall good management performance. However, given the nature and diversity of the proposed activities and the large coverage of affected people in Yichang over a span of five years, the *likely adverse E&S effects risk is considered substantial*.

7.   The *contextual risk is rated moderate*. The physical works of the Program will be undertaken in the three core urban districts of Yichang City (Xiling District, Yiling District and Wujiagang District), where no ethnic monitory counties, districts, communities/villages present. The locations are already disturbed by human activities and unlikely to be in vicinity of any legally protected or customarily recognized critical habitats or cultural heritage, but the vast urban residential areas, schools, hospitals, and office spaces etc. would be the receptors of vehicle emissions, traffic noise, and traffic accidents under the Programs.

8.   The *institutional risk is deemed substantial* since the Program is complex with multiple stakeholders and a need for coordination and consultation during preparation and implementation although the current performance of existing E&S system is deemed basically effective.

9.   The *political and reputational risk is thought to be low*. The Program activities are in line with laws, regulations, and procedures, so there is no political risk. They are designed to reduce GHG emissions of transport sector and improve the quality of bus service and operations and will benefit local people and therefore be widely supported by the public with no reputation risk.

10.   In addition, neither the OP/BP 7.50 (International Waterways) nor OM/BP 7.60 (Disputed Areas) will be triggered under the Program.

11.   **Environmental management systems (EMSs).** Since the first *Environmental Protection Law* promulgated in 1979, China has gradually developed comprehensive legal frameworks in environmental management. Various laws, regulations, guidelines, and standards have been or are being issued or updated by national and provincial governments, especially regarding environmental impact assessment (EIA), pollution control (air emissions, noise, wastewater, solid wastes, and hazardous substances etc.), natural habitat conservation, and safety management, etc. To enforce the legal regulations in practical work, diverse government authorities are designated to manage environmental, ecological, and safety issues following established mechanisms.

12.   Following government authorities are involved in the EMSs associated with the proposed Program. Ecology and environment bureaus (EEBs) develop vehicle emission policies and regulations; manage carbon accounting and evaluation;

review and approve domestic EIAs of transport infrastructure projects; supervise the compliance of environmental management regulations in project implementation; monitor the quality of surface water, ambient air, and acoustic environment, etc.; approve and management pollutant discharge licensing; oversee the discharge of pollutants and disposal of hazardous waste; oversee vehicle emission inspection activities, etc. Transport bureaus (TBs) manage decarbonization of transport sector; oversee the safe operation of vehicles, bus hubs and terminals, and other transport facilities, and supervise vehicle maintenance activities, etc. Urban management bureaus (UMBs) are responsible for urban roads maintenance to provide safe and quiet driving conditions and managing on-site environmental issues (e.g., noise and solid waste) in road construction/rehabilitation. Forestry and gardens bureaus (FGBs) approve greenbelts acquisition by transport infrastructure projects and supervise greenbelts replanting. Traffic police teams (TPTs) direct urban traffic, manage traffic accidence, assist in checking high-emission vehicles, and process vehicles scrappage and cancellation procedures, etc. Emergency management bureaus (EMBs) provide overall coordination in safe production and significant traffic accidence. Bureaus of commerce (BoCs) manage scrapped vehicles disassembly facilities.

13. The findings of environmental due diligence demonstrated the fundamental effectiveness of existing EMSs, in terms of their legal frameworks, implementation arrangements, and institutional capacity, which are generally consistent with the Bank's requirements for the PforR operations and Environment Health and Safety (EHS) management; and the EMSs are substantially acceptable for addressing the potential environmental and safety risks/impacts related to the Program activities.

14. **Social management systems.** The E&S assessment concluded that China has formulated a series of laws and policies at the national and provincial levels and has established appropriate management agencies and mechanisms to govern social risks in relation to the Program activities. The social system assessment focused on the social impacts and risk assessment and management system, cultural heritage protection, occupational health and community safety, land acquisition and resettlement, public participation, ethnic minorities, and vulnerable groups. The social systems are deemed comprehensive and are consistent with the Bank's PforR Policy and Directive.

15. Yichang has established management agencies with clear responsibilities and dedicated staff for managing corresponding social risks and impacts at the provincial, municipal, and district/county levels. Under the social systems assessment, the Bank team reviewed the organizational setup of the relevant agencies against the principles and elements set out in World Bank guidance. For example, China has established a functioning mechanism of Social Stability Risk Assessment (SSRA), which is used by project implementation agencies; and managed through the committees of provincial and district/county political and legislative affairs. For projects without mandatory SSRA requirements, social risks assessment and management is normally undertaken through other documents like project feasibility studies or project design reports. The labor authorities have established a tripartite mechanism on labor relations with trade unions and enterprises to solve relevant labor issues. The cultural departments are responsible for managing adverse impacts on the heritage of physical cultural relics. The Natural Resource Bureaus enforce land acquisition, compensation, and resettlement with support from and coordination with township governments and village committees. The ethnic and religious affairs bureaus develop the related development plans as required by the jurisdictional governments, protecting the lawful rights and interests of minority residents. Other line bureaus, such as social security bureaus and women's federations, are also involved in livelihood restoration for project-affected persons. China has also established various competent authorities to manage and support vulnerable groups. For example, poverty reduction offices or county-level rural revitalization bureaus are mainly responsible for poverty reduction, the federation of people with disabilities for assistance to disabled people, civil affairs bureaus for support to older people and children who are left behind, and women's federations for assistance to women.

16. Engagement with various stakeholders from both the provincial and district/county levels and the due diligence of previous implementation of the Program concluded that the social management systems are basically well functioning.

However, consultation and public participation for the activities with minor social impacts that are exempt from SSRA and/or Feasibility Study according to Chinese regulations need to be implemented or improved.

17.   **Overall assessment of the E&S systems.** The ESSA concludes that China has established comprehensive systems to manage the Program-related E&S impacts/risks at the national, provincial, municipal, and local levels. The performance of the E&S systems associated with the current Program proposal is found basically effective, with sound regulatory frameworks, management procedures and institutional arrangements in place for managing EIA, SSRA, pollution prevention and control, traffic safety, land acquisition and resettlement, management of labor and working conditions, and community health and safety, etc. The system provides a solid basis for addressing the potential E&S issues related to the Program activities.

18.   **Gaps and recommendations.** The ESSA also identified some gaps where Yichang could improve the E&S management performance under the Program. (i) Some activities especially those with minor E&S impacts and exempt from EIA, SSRA, and/or Feasibility Study as per Chinese regulations didn't go through sufficient public consultation and participation in the project cycle. For instance, in developing new public transportation policies or designing/optimizing bus routes and affiliated facilities, there were no meaningful public consultation and participation undertaken during the project preparation and implementation to understand and incorporate the needs (e.g., for travel convenience and safety) of different groups of people, especially the vulnerable groups; or public participation activities were carried out but lacked corresponding records and documentation. (ii) Planning and implementation of non-physical activities in the existing regulatory framework lack adequate considerations of potential downstream E&S risks/impacts and lack sufficient stakeholder engagement as well.

19.   **The ESSA recommends that the Program be taken as an opportunity to enhance the E&S management capacity and efficiency in Yichang.** This could be achieved by implementing the PAPs, including (a) to carry out meaningful public consultation and information disclosure during the preparation and implementation stages of the activities under the PforR, especially those with minor E&S impacts and exempt from EIA, SSRA, and/or feasibility study as per Chinese regulations, in diverse channels and at proper time and location, identify and assess potential E&S impacts and risks, understand the needs (e.g., for travel convenience and safety) of different groups of people, especially vulnerable groups and directly affected people, incorporate mitigation measures and public opinions in subproject planning, design and implementation, and record and document the process of public consultations and information disclosures and grievance redressing; and b) to incorporate E&S considerations in non-physical activities planning (ToR development) and implementation (control of the quality of results) through E&S risk screening and stakeholder engagement to avoid or mitigate the potential downstream E&S impacts/risks associated with the targeted deliverables.

20.   **Stakeholder engagements.** During the ESSA's preparation since July 2023, meaningful engagements were carried out with various stakeholders including government authorities, local communities and residents, and enterprise representatives by means of face-to-face meetings and field visits. Comprehensive discussions have been undertaken with relevant Yichang municipal bureaus (e.g., ecology and environment, transport, traffic police, forestry and gardens, urban management, commerce, culture and tourism, civil affairs, ethnic and religious affairs, women's federation, etc.) and the corresponding district-level authorities of the three districts (Xiling, Yiling and Wujiagang) to understand the Program-related E&S issues and management practices. The draft ESSA of Chinese version was disclosed on the website of Yichang Transport Bureau on September 19, 2023, and public consultation for the ESSA was carried out on September 26, 2023. The ESSA is now finalized, and this PAD summarizes that assessment.

21.   **Grievance redress.** Communities and individuals who believe that they are adversely affected because of a Bank supported PforR operation, as defined by the applicable policy and procedures, may submit complaints to the existing program grievance mechanism or the Bank's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed to address pertinent concerns. Project affected communities and individuals may submit their

complaint to the Bank's independent Accountability Mechanism (AM). The AM houses the Inspection Panel, which determines whether harm occurred, or could occur, because of Bank non-compliance with its policies and procedures, and the Dispute Resolution Service, which provides communities and borrowers with the opportunity to address complaints through dispute resolution. Complaints may be submitted at any time after concerns have been brought directly to the Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the Bank's Grievance Redress Service (GRS), please visit http://www.worldbank.org/GRS. For information on how to submit complaints to the Bank's Accountability Mechanism, please visit https://accountability.worldbank.org.

22.   In parallel, the affected communities and individuals may also submit complaints through the existing Grievance Redress Mechanism (GRM) at the community and enterprise levels. In general, the community-level GRMs are sophisticated, and basically, grievances can be solved effectively at the community level, with very few solved through civil litigation. For grievances not resolved and replied promptly by local community committees, there are standard procedures for receiving, transmitting, investigating, resolving, and replying established for grievances reported to the subdistrict level, district level or through the district head's hotline/mailbox, etc.

23.   **Monitoring and management**. The mechanisms for E&S performance monitoring and management have been established to support the Program implementation, including the monitoring of implementation progress, evaluation of performance indicators, and performing of relevant commitments as per the legal documents, including the PAPs. Such responsibilities necessitate that the Borrowers keep the E&S management systems effective, implement monitoring plans, and identify and solve issues in a timely and effective manner. In detail, the Borrower should: i) prepare and implement the E&S risk management manual; ii) implement the agreed E&S actions as per the PAP and maintain the E&S management systems and the implementation capacity as recommended by the ESSA; iii) submit semi-annual monitoring reports on the PAP implementation to prove continuous compliance with the applicable E&S management mechanisms. Monitoring reports should reflect implementation of the E&S risk identification, screening, management, documentation etc.; iv) evaluate and audit the system performance regularly as necessary; v) review the performance of GRMs (both at the village level and enterprise level), procedures, and results regularly, and include specific grievance cases in the progress reports; and vi) consult the Bank for any change to the E&S systems during implementation. Concurrently, the Bank is to provide support to the implementation of the Program and oversee the E&S management performance against the ESSA requirements, especially the PAP. The Bank will monitor the Borrower's compliance commitment to the E&S risk management, including actions to strengthen institutional capacity. The Bank will evaluate the Program performance based on the risk assessment conducted at the preparation stage, and therefore help the Borrower handle expected and unexpected E&S risks and offer recommendations to manage them. The Bank will also conduct field visits and provide support to the PMOs and stakeholders, and review audit and progress reports. The Bank team will submit memoranda to the Bank management group to report the Program implementation performance regularly, by the way of document review, consultation with the PMOs and stakeholders, and field visits, etc.

ANNEX 5. PROGRAM ACTION PLAN

Action Description	Source	DLI#	Responsibility	Timing		Completion Measurement
Carry out meaningful public consultation and information disclosure during the PforR preparation and implementation	Environmental and Social Systems	NA	PMO	Recurrent	Semi-Annually	Contents of public consultation and information disclosure should be included in subproject assessment or design documents with consideration of the needs of different groups; information should be properly recorded and documented.
Check the latest lists of the debarred and temporarily suspended firms and individuals each time before contract award	Fiduciary Systems	NA	PMO, MTB, CB, MEEB, MNRP, UMC, Bus Group	Recurrent	Continuous	No contract is awarded to ineligible firm or individual.
Conduct studies to design the Parking Demand Management Strategy and the Implementation Plan	Technical	NA	MUMC, MNRP, DRC, MHCB, Traffic Police	Due Date	31-Dec-2025	(i) review good practice TDM policy tools and levers (ie. price, supply); (ii) survey and assess parking supply & demand in Yichang; (iii) design customized policy options and recommendations;

						(iv) develop a parking action plan
Develop 10 year public transport special plan for Yichang (urban core) involving reimagining the public transport system	Technical	NA	Municipal Transport Bureau	Due Date	30-Jun-2025	i) Analysis of existing public transport system; (ii) Identify potential service improvements (route, corridor, new area); (iii) Package improvements into integrated network plan reflecting financial constraints; (iv) Develop capital improvements etc
Develop and issue revised or new municipal technical standards, guidelines, and administrative documents reflecting demand management principles	Technical	NA	MUMC, Planning Bureau, DRC	Due Date	30-Jun-2026	For a) building parking allocations [set ceiling & further limit around BRT stn, introduce new building classification and zoning], and (b) on street parking [prohibit new parking on sidewalk, limit on street parking around BRT stn]
Develop scientific modeling tool for carbon emissions	Technical	NA	MTB, MEEB	Due Date	31-Dec-2025	(i) Develop modeling tools to simulate the impact of various policy and investment interventions used to achieve carbon

						peaking and other targets;
Develop the terms of reference (TOR) for program auditing to ensure program funds shall be audited in in accordance with consistently applied auditing standards acceptable to the Bank.	Fiduciary Systems	NA	PAO, PMO	Recurrent	Yearly	Audit TOR completed. Trainings are conducted to ensure program funds shall be audited in line with the Bank's policy.
Develop the TOR for annual external audit to include the task of verifying whether such screening mechanism works and to demonstrate to audit office such compliance	Fiduciary Systems	NA	PAO, Implementing agency	Recurrent	Yearly	TOR for annual external audit is agreed with the World Bank team each year
Improve the public transport operator subsidy framework	Technical	NA	MTB, Finance Bureau, Bus Group	Due Date	31-Dec-2026	(i) Develop & issue new public transport operating subsidy regulations covering decarbonization incentives (ie. operational efficiency & service effectiveness); (ii) and corresponding new evaluation

						method for PT operational performance.
Incorporate climate adaptation principles and road safety inspection results into last mile walking access to transit stops and cycling network improvement designs	Technical	NA	MHCB, MRMC, MFLB	Recurrent	Yearly	Develop designs and plans for walking and cycling that incorporate climate adaptation principles and input from road safety inspections
Incorporate E&S considerations in non-physical activities planning and implementation (see ESSA for details)	Environmental and Social Systems	NA	PMO, implementing agencies	Recurrent	Semi-Annually	For the non-physical activities involving potential downstream E&S risks, the PMO should develop the TORs to include terms and conditions on E&S impact screening & assessment and stakeholder engagement; and submit to the Bank for review
Issue a high-level official letter to implementation agencies to ensure that no contract will be awarded to ineligible firms or individuals	Fiduciary Systems	NA	Yichang Finance Bureau	Other	On project loan effectiveness	High-level official letter to implementation agencies to ensure that no contract will be awarded to ineligible firms or individuals is issued and incorporated in the Program

and incorporate in the Program Implementation Plan.						Implementation Plan
Regularly inform the Bank of any credible and material allegations of fraud and corruption in the semi-annual Program progress report.	Fiduciary Systems	NA	Implementation agency	Recurrent	Semi-Annually	Information of credible and material allegation of fraud and corruption is provided in semi-annual program progress report.
Report actual procurement performance data as part of the semi-annual program progress report, to enable Bank to monitor whether procurement continues to perform as assessed	Fiduciary Systems	NA	Implementation agency	Recurrent	Semi-Annually	Actual procurement performance data is provided in the semi-annual program progress report.

ANNEX 6. IMPLEMENTATION SUPPORT PLAN

1.   Support for implementation of the PforR will require close attention and continuous support from the World Bank team. The PforR instrument is new to most of the government teams involved in the Program. This annex outlines the key activities to address risks identified by the risk assessment and provides the TA needed to improve the quality of Program implementation. Emphasis is placed on (a) supporting early-stage implementation and building institutional capacity; (b) reviewing implementation progress (including that of the PAP) and achievement of Program results and DLIs; (c) providing support to resolve emerging implementation issues; (d) monitoring the adequacy of systems performance and monitoring compliance with Legal Agreements; and (e) supporting the Government in monitoring changes in risks.

2.   The strategy and approach for implementation support includes an emphasis on the technical, fiduciary, and E&S support needed during implementation. The World Bank team provided technical expertise during preparation and will continue to provide technical support during implementation, as well as guidance to the agencies on Fiduciary and E&S aspects to ensure completion of the actions agreed in the PAP. Implementation support from the procurement and FM team will focus on reviewing and monitoring compliance with the Government's own systems and the actions defined in the PAP.

3.   Given the cross-sectoral characteristics of the Program, the support will be ensured through leadership and close contributions from team members in the China Country Office, located in Beijing, with additional support and leadership from international technical specialists. This combination will leverage the World Bank's global knowledge and local expertise to enable timely and effective responses to the needs of the borrowers. Formal implementation support missions and field visits covering all aspects of implementation will be conducted periodically during implementation. Tables 6.1 and 6.2 outline the estimated inputs from different specialists and resources required at different stages of Program implementation.

Table 6.1. Focus of Implementation Support

Time	Focus	Skills Needed	Resources Estimate (staff weeks)
First 12 months	- Implementation of Program management systems - Setting up coordination mechanism - Staff capacity building, on-the-job training on E&S and fiduciary - Procurement process and training - E&S training, support to implementation of policy requirements - Technical support to activities and implementation - FM training and capacity building	- Core team, particularly technical, FM, procurement, E&S experts - Bus sector experts - NMT and parking expert - ETS expert	50
12–60 months	- Technical support to implementation - Continued improvements in project management systems including fiduciary and safeguards - Program Midterm Review	- Core team, particularly technical, FM, procurement, E&S expert - Bus sector experts - NMT and parking expert - ETS expert	90

Time	Focus	Skills Needed	Resources Estimate (staff weeks)
Other	• Completion of activities • Capacity building and facilitate knowledge exchange and events • Support technical and financial analysis of Program investments • End-term evaluation and client ICR	• Core team, particularly technical, FM, procurement, E&S experts	42

Table 6.2. Task Team Skills Mix Requirements for Implementation Support

Skills Needed	Number of Staff Weeks	Number of Trips
Task team leader(s)/Program management	14 annually	Three in the first year, two thereafter
Transport specialist	4–6 annually	Three in the first year, two thereafter
Procurement specialist	3–6 annually	Two per year
Financial management specialist	3–4 annually	Two per year
Environmental specialist	3–4 annually	Two per year
Social specialist	3–4 annually	Two per year
Monitoring and evaluation specialist	4–6 annually	Two per year
Bus sector expert	2–4 annually	Two per year
NMT and parking expert	2–4 annually	Two per year
ETS expert	2–4 annually	Two per year
Program assistant	2–4 annually	