



1. Project Data

Project ID

P124978

Project Name

CN-Changzhi Urban Transport

Country

China

Practice Area(Lead)

Transport

L/C/TF Number(s)

IBRD-81300

Closing Date (Original)

31-Dec-2017

Total Project Cost (USD)

91,520,299.11

Bank Approval Date

22-Mar-2012

Closing Date (Actual)

31-Dec-2018

IBRD/IDA (USD)
Grants (USD)

Original Commitment

100,000,000.00

0.00

Revised Commitment

100,000,000.00

0.00

Actual

91,520,299.11

0.00

Prepared by

Elisabeth Goller

Reviewed by
J. W. van Holst
Pellekaan
ICR Review Coordinator

Victoria Alexeeva

Group

IEGSD (Unit 4)

2. Project Objectives and Components

a. Objectives

According to the Loan Agreement (LA - schedule 1, page 5), the objective of the project was to "improve transport mobility in the central city of Changzhi in a safe, efficient and energy-saving manner for all users". The project development objective (PDO) in the Project Appraisal Document (PAD) was identical.

This review will follow the approach used in the ICR and assess the achievement of the PDO separately for each of its four aspects of (i) improving transport mobility for all users, (ii) improving transport mobility safety,



(iii) improving transport mobility efficiency, and (iv) saving energy in transport operations in the central city of Changzhi.

The main indicators to measure the extent to which these objectives were achieved, as presented in the PAD (para 15), were (i) average annual traffic fatalities, (ii) average peak hour transit speeds in the project corridors for public transport, (iii) public user satisfaction, and (iv) energy saving in transport operations. At the 2016 restructuring an additional PDO indicator was added, namely “Length of Rehabilitated Non-Rural Roads”. This review has used “an improved multi-modal urban transport system” as an indicator of mobility.

b. Were the project objectives/key associated outcome targets revised during implementation?

Yes

Did the Board approve the revised objectives/key associated outcome targets?

No

c. Will a split evaluation be undertaken?

No

d. Components

The project was structured along the following four components:

Component 1: Integrated Corridor Improvement (cost at appraisal US\$124.22 million, cost at closing US\$113.81 million). This component had the following three subcomponents:

(i) Improvement of approximately 8 km of Yingxiong Road, 5 km of Chengxi Road, 8 km of Taihang Street, and 3 km of Fuhou Street corridors, including (a) construction of bus lanes, (b) rehabilitation or construction of road surface, road markings and signs, non-motorized transport (NMT) lanes and pedestrian walks, bus bays and stops, and exit and entrance access points, (c) junction channelization, (d) bridge reconstruction, (e) construction of protected, safe pedestrian overpasses and mid-block crossings, and (f) greening, lighting and associated public works.

(ii) Construction of two off-street parking facilities at the Jiahui Shopping Mall and Bayi Square, in accordance with the parking strategy and pricing policy to be developed under Component 4 of the project.

(iii) Improvements and provision of cycling facilities along the project corridors, including the carrying out of a small-scale publicly-shared bicycles demonstration program.

Changes to the activities under this component included (i) dropping the off-street parking facilities at Jiahui Shopping Mall because of a firefighter's regulation violation at that location and at Bayi Square because the city government built parking lots near the sites initially proposed for off-street parking and (ii) adding street lighting to the roads intersecting the four project corridors to improve road safety and night visibility for pedestrians and bicyclists.

Component 2: Intelligent Urban Transport Management System (cost at appraisal US\$27.34 million, cost at closing US\$24.50 million). This component had the following two subcomponents:



(i) Provision of area traffic control system and traffic command center equipment, provision of equipment for traffic enforcement and monitoring, provision of traffic information system, and junction channelization at selected signalized junctions.

(ii) Provision of vehicles, and equipment, including on-board GPS devices, road marking vehicles and high-reach maintenance vehicles.

Changes to the activities under this component included (i) adding pavement markings and traffic signs on streets in the central city and (ii) maintenance equipment.

Component 3: Public Transit Supporting Infrastructure (cost at appraisal US\$50.88 million, cost at closing US\$41.99 million). This component had the following two subcomponents:

(i) Construction of a transfer hub at Bayi Square, and two bus depots at the current local bus company headquarters at North Yingxiong Road, and at Mafangtou in the southern part of the Changzhi city.

(ii) Upgrading of the Changzhi-owned local bus company dispatching center and bus dispatch information management system, installation of monitoring equipment, and provision of a passenger real-time service information system.

Changes to the activities under this component included (i) removing the bus transfer hub because the city government developed a transfer hub outside the central city to reduce traffic and (i) purchasing 50 electric buses and 152 sets of charging equipment.

Component 4: Institutional Capacity Development (cost at appraisal US\$3.40 million, cost at closing US\$4.10 million). This component had the following three subcomponents:

(i) Carrying out of public consultation, and road user education program.

(ii) Carrying out of (a) a range of study tours and training activities for government officials and urban transport professionals and (b) thematic studies, including one on parking strategy and pricing policy.

(iii) Provision of project implementation advisory and supervision services and Project management support.

Changes to the activities under this component included adding an impact study of the publicly-shared bicycles program.

e. Comments on Project Cost, Financing, Borrower Contribution, and Dates **Project Cost**

The total actual project cost was US\$184.70 million (ICR, annex 3), which is 93 percent of the appraisal estimate of US\$199.67 million. The ICR (annex 3) explains that the lower project cost was mainly due to the appreciation of the US\$ against the RMB and bid prices that were below their cost estimates.



Financing

The project was financed through an IBRD loan of US\$91.52 million, which is 92 percent of the originally estimated financing of US\$100 million.

Borrower Contribution

The actual Borrower contribution was US\$93.10 million, which is 93 percent of the estimated Borrower contribution at appraisal of US\$99.67 million.

Dates and Project Restructurings

The project was approved on March 22, 2012, became effective on August 24, 2012, and was expected to close on December 31, 2017. The closing date was extended to December 31, 2018. The project was restructured twice.

The 2016 level 2 restructuring was necessary because the city government implemented the development of the Taihang Street and Yingxiong Road corridors together with the emergency natural gas pipeline repair works using counterpart funding. This freed up loan resources in the amount of US\$29.20 million, which were partially used to fully finance the remaining project activities with loan proceeds (an amount of US\$12 million was set aside to be allocated to new project activities in a second restructuring). The restructuring (i) increased the disbursement percentage for civil works, (ii) reallocated funds between disbursement categories, and (iii) made minor changes to the results framework. These changes included the addition of the core indicator of "length of rehabilitated non-rural roads" as a PDO indicator and the correction of the project end target date of the indicators because in the PAD this date was 2016 instead of 2017 (2016 Restructuring Paper (RP), page 6).

The 2017 level 2 restructuring was necessary to include new project activities to use the US\$12 million reserved during the 2016 restructuring. The 2017 restructuring mainly (i) changed some project activities and added new ones, as detailed in the component description above, (ii) adjusted the component costs accordingly, (iii) deleted the intermediate indicator of "number of public transport hubs built" because the associated project activity was also cancelled, (iv) revised the target value for the PDO indicator of "Public transit user satisfaction percentage" to make it slightly more ambitious, and (v) extended the loan closing date by one year from December 31, 2017 to December 31, 2018 to complete the new activities.

Considering that changes to the two project outcome targets did not lower the project's level of ambition significantly, no split rating is proposed.

3. Relevance of Objectives



Rationale

Country context. At appraisal, China underwent unprecedented rapid urbanization that challenged urban transport across cities. The share of the urban population increased from 26 percent in 1990 to 58 percent in 2017. It was expected to increase to 70 percent by 2030. This caused increasing motorization, a shift from public transport and NMT to cars, and increased air pollution and carbon emissions. Despite significant expansions of its urban road network prior to the project, Changzhi experienced worsening traffic congestion, increasing road accidents, and deteriorating air quality. Being a smaller city, Changzhi was in a unique position to proactively develop its urban transport system in a sustainable manner. This is because in mega and large cities, transport problems are much more complex and traffic is already deeply settled. Consequently, the PDO of improving transport mobility in a safe, efficient and energy-saving manner for all users is highly relevant.

Alignment with Government and Bank strategies. At appraisal, the high relevance of the project's objectives was confirmed by (i) the October 2005 State Council's Opinion #46, which declared urban public transport development a national priority, and (ii) the 12th 2011-2015 National Five-Year Plan, which highlighted the strategic importance of the development of public transport in Chinese cities. The PDO was also highly relevant to the third pillar of the Bank's 2006-2010 China Country Partnership Strategy (CPS) with the theme of "Managing Resource Scarcity and Environmental Challenges." Under this pillar, the CPS highlighted the need to promote urbanization and transportation options, including public transport that reduces pollution and fuel consumption.

The PDO remained highly relevant at project closing. According to the Bank task team, urbanization, car ownership, and air pollution have continued to increase in China's cities. The importance of sustainable urban transport to mitigate the consequences of this growth is reflected in the 2016-2020 13th National Five-Year Plan, which aims at accelerating the development of the central region, including Changzhi, and sets the promotion of safe, green, smart, and multimodal interconnected transport as main strategy for the transport sector. The PDO remained also highly relevant in the light of Changzhi's 2016-2020 13th Five-Year Plan, which sets a vision for a transport system that is "innovative, coordinated, green, open and multimodal". The PDO is fully in line with the Bank's 2013-2016 China CPS, which is the latest available country partnership document. This CPS laid out its urban transport priority under the Strategic Theme 1 of "Supporting Greener Growth", including outcomes on shifting to a more sustainable energy path, promoting low-carbon urban transport, demonstrating pollution management, and strengthening mechanisms for managing climate change.

Summary. The relevance of the project's objective to the country context as well as to the Government and Bank development policies and strategies is rated high by this review.

Rating

High

4. Achievement of Objectives (Efficacy)



OBJECTIVE 1

Objective

To improve transport mobility for all users in the central city of Changzhi

Rationale

The **theory of change** for the first objective was that mobility in the city, namely the ability to move or be moved more freely and easily, be improved by (i) upgrading four corridors, including bus lanes, sidewalks with accessibility features, bicycle lanes, and improved junctions and mid-block crossings, (ii) using intelligent transport systems (ITS) to manage public transport and traffic more efficiently and enhance safety, (iii) operating a public bicycle sharing system mainly for first and last mile connectivity, (iv) upgrading public lighting, and (v) new and non-polluting electric buses would improve public transport and NMT mobility in the central city of Changzhi and lead to greater public transport user satisfaction. This, in turn, was expected to cause a shift from cars to public transport and NMT, freeing up road space, and improving transport mobility also for car users.

Outputs and Intermediate Results

The project produced the following outputs and intermediate results (ICR, paras 32 to 35 and annex 1):

- 22.51 km of existing corridors upgraded with improved non-motorized transport and accessibility facilities, in line with the outcome indicator target added during the 2016 restructuring. This included road upgrading, 50 km of sidewalks, 25 km in each direction, accessibility facilities on the four integrated corridors, such as mid-block and intersection curb cuts, and bicycle lanes along the corridors;
- 22.51 km of bus priority lanes built within the upgraded corridors, in line with the indicator target. This corresponded to 50 km of bus priority lanes, 25 km in each direction, and bus stop amenities with solar powered real-time passenger information panels;
- Clear road pavement markings, 291 street lights, and landscaping along the four upgraded corridors implemented;
- Intersection and mid-block traffic engineering, including traffic signals and police cameras and other safety enhancements, implemented and described under objective 2 below;
- Bus priority at intersections, advanced public transit system, and other efficiency enhancements for public transport and bicycle sharing implemented and mentioned under objective 3 below;
- 50 electric buses purchased. These buses offered greater riding comfort, produced limited noise, and had no local emissions;
- Publicly-shared bicycle program along the integrated corridors implemented, with 82 stations, 3,250 docks, and 2,500 bicycles, which were monitored through a control center;
- Study on parking strategies and feasibility study of a shared public bicycle program completed. The Bank task team noted that the feasibility study was used to implement the publicly-shared bicycle program. The local government used the study on parking strategies to implement the parking facilities with their own resources;



- Study for a citywide NMT plan completed. The Bank task team mentioned that the local government implemented some of the bicycle lanes identified in the study. The full implementation depends on the availability of the necessary budget resources; and
- Impact evaluation of the shared public bicycle program carried out. The Bank team noted that this study was carried out because a competing "dockless" bicycle sharing system took away passengers from the publicly-shared bicycle program under the program. The "dockless" bicycle sharing system was subsequently abandoned because the operator went bankrupt.

Outcomes

The objective of improving mobility for all users was substantially achieved for public transport and NMT users, but the ICR provides limited evidence on improvements for car users. Hence, the efficacy of the achievement of this objective is rated substantial. The planned project activities related to this objective were implemented.

For public transport users, improved mobility mainly meant reduced travel times in the project corridors (see objective 3 below), better first and last mile connectivity, and greater riding comfort due to new electric buses and more consistent speeds. The advanced public transport system mentioned under objective 3 below likely also helped enhance the regularity and reliability of public transport services, but the ICR does not comment on it nor provide any evidence.

For NMT users, the improvements meant safer and more comfortable walking and cycling through accessible sidewalks, bicycle lanes, traffic signaling, lights, and the bicycle sharing program. The bicycle sharing system was used more than 1.5 million times within two years from its launch in late 2016 (ICR, para 32).

The project interventions also increased the transport mobility options for all users. According to the ICR (para 36), the studies carried out and the knowledge and capacity gained under the project were expected to enable the city to scale up the transport mobility system.

The ICR provided evidence on the impact of transport mobility improvements. With respect to public transit, user satisfaction in the project corridors grew from 94 percent before the project to 98.7 percent in 2018 and exceeded the project end target of 95 percent (ICR, annex 1). At a citywide level, bus ridership in Changzhi increased from 108 million in 2012 to 123 million in 2018, and the bus modal share went up from 12 percent to 15 percent (ICR, para 32). This happened at a time when the registered vehicles increased from 215,800 at appraisal to 443,000 in 2017, and is a significant achievement. However, the ICR does not explain why and how ridership was increased. It also does not provide evidence on their attributability to the project, which carried out physical mobility improvements in only four corridors, while the ITS systems mentioned under objective 3 had a citywide application.

The ICR (para 32) also notes that the 2018 public consultation survey, involving 1,500 residents of the central city where the project interventions took place, showed that 67 percent of the people surveyed confirmed improvements in road operating conditions and 80 percent liked the real-time bus information at bus stops. In 2011, half of the people surveyed complained about mixed vehicular traffic and a lack of NMT, and 98 percent considered the bus service in need of improvements. The ICR (para 34) points out that in the 2018 public



consultation survey, 80 percent of the respondents indicated that travel was more convenient, and 43 percent noted reductions in travel times.

The ICR (para 36) mentions that the project interventions improved traffic flows, but the evidence on improved transport mobility for car users is limited to the perception of improved road conditions after the project of 67 percent by the surveyed city residents.

Rating

Substantial

OBJECTIVE 2

Objective

To improve transport mobility safety in the central city of Changzhi

Rationale

The **theory of change** for the second objective was that street lights, street markings, signaling of junctions and mid-blocks, public transport and NMT facilities, installing e-police cameras, managing traffic through a control center, and traffic enforcement would enhance transport mobility safety in the central city of Changzhi.

Outputs and Intermediate Results

The project produced the following outputs and intermediate results (ICR, para 33 and annex 1):

- 123 signals installed, including eight mid-block crossing signals, which significantly exceeds the project end target of 32 upgraded signalized junctions and mid-block signalized crossings. This was possible because the price of the equipment had decreased since appraisal;
- 97 e-police cameras installed, which is again significantly higher than the project end target of 5 cameras because of a reduction in the price of the equipment
- Equipment for the traffic control center installed. By August 2018, this system enabled real time monitoring of road operations, dynamic management of signalized intersections, and enforcement of traffic violations;
- Vehicles for traffic policing purchased;
- High-reach maintenance vehicles, which according to the Bank task team are used by the traffic policy to repair equipment, such as traffic light, cameras, and the surveillance antenna.
- Pavement marking on roads intersecting with the project corridors applied and vehicles for road marking purchased;
- Street lighting in the corridors installed;
- Urban traffic management study, which included safety recommendations to (i) optimize 14 hot spot intersections, (ii) manage parking and prevent vehicle encroachments on sidewalks and bike lanes, and (iii) to carry out public education on road safety. The task team pointed out that the city government implemented some of the intersection identified in the study;
- Public transport and NMT facilities mentioned under objective 1; and



- According to the Bank task team, road safety campaigns on TV and radio carried out by the traffic police in collaboration with the project management center (PMC) of the project.

Outcomes

The project's achievements exceeded the second objective; the efficacy of the achievement of the second objective is therefore rated high. All planned project activities expected to contribute to the achievement of this objective were carried out and the output indicator targets were exceeded. The outcome indicator related to this objective measured the average annual number of traffic accident fatalities in the project corridors over a rolling three-year period. These fatalities were reduced by 50 percent, from 9 in 2011 to 4.3 in 2018, thus considerably exceeding the project end target value of 7.65 fatalities. The ICR (para 33) attributed this achievement largely to the use of ITS and to the safety campaigns carried out by the police with their own funds. Segregated bus lanes and NMT facilities, better street markings, enhanced lighting, and improved enforcement were other factors that likely contributed to increased transport mobility safety measured through the reduced incidence of fatalities.

Rating
High

OBJECTIVE 3

Objective

To improve transport mobility efficiency in the central city of Changzhi

Rationale

The **theory of change** for the third objective was that the (i) management and control of public transport operations through an advanced public transport system, (ii) bus priority lanes, (iii) ITS to provide priority to buses, (iv) enhanced traffic management, (v) the enforcement of bus rights of way and illegal parking, (vi) the real time passenger information system, (vii) additional bus depots, and (viii) the use of a travel generation model for public transport planning would increase the efficiency of public transport. This, in turn, was expected to reduce public transport travel times and vehicle operating costs. Efficiency gains for car users were expected to derive from the ITS for traffic management and a shift from cars to public transport.

Outputs and Intermediate Results

The project produced the following outputs and intermediate results (ICR, para 34 and annex 1):

- Advanced public transport system in the bus control center, which became operational in May 2017. According to the Bank task team this included (i) a bus scheduling and dispatching system, (ii) GPSs on buses to monitor their locations, (iii) data collection with smart cards and phones, and (iv) a passenger information system;
- ITS for traffic management described under objective 2 above;



- Travel demand model completed and staff trained in its use, in line with the intermediate results indicator target;
- Equipment for bicycle share control center installed and made operational;
- Real-time bus information at bus stops;
- Two bus depots constructed, in line with the intermediate results indicator target. These depots enabled reduction of the empty kilometers driven by distributing the buses in two different locations;
- Public transit operations and maintenance study completed. According to the Bank task team, this was basically on asset management for bus operators. The team pointed out that the bus company adopted the study, but its actual use is not known; and
- Urban traffic management study completed and described under objective 2 above.

Outcomes

The project's achievements for public transport were exceeded, but the ICR does not provide evidence on efficiency improvements for cars. Hence, the efficacy of the achievement of this project's objective is rated substantial. The planned project activities related to this objective were carried out. With an average morning peak-hour public transit travel speed in project corridors of 17.6 km per hour, the outcome indicator target value of 16.6 km per hour was exceeded by 28 percent. The ICR (para 24) notes that the benefits of enhanced bus operation efficiency went beyond the project corridors because through the advanced public transport system, the citywide daily bus on-time performance (defined as within a three-minute deviation from the schedule at major stops) increased from 85 percent to 89 percent.

The ICR also points out that in the 2018 public consultation survey, 43 percent of the people surveyed noted reductions in travel time. The ICR does not provide evidence on reduction in travel speeds for cars.

Rating

Substantial

OBJECTIVE 4

Objective

To save energy in transport operations in the central city of Changzhi

Rationale

The **theory of change** for the fourth objective was that the comprehensive public transport and NMT improvements in the four project corridors in the central city would lead to a modal shift from cars to public transport and NMT, and this, in turn, would contribute to the reduction in transport-generated fuel use.

Outputs and Intermediate Results



The project produced the following outputs and intermediate results (ICR, para 35 and annex 1):

- Corridor and other public transport improvements completed and mentioned under objective 1 above;
- ITS for traffic and public transport system management completed and mentioned under objective 2 and 3 above, and
- Bicycle sharing system operational and mentioned under objective 1 above.

Outcomes

The project's achievements exceeded the target for this objective; the efficacy of the achievement of this objective is rated high. The project activities expected to contribute to the achievement of this objective were carried out. The average fuel consumption per passenger-km on project corridors was reduced from 52 grams of standard coal equivalent at appraisal to 46.9 gram in 2018. This is a 10 percent reduction in transport-related fossil fuel consumption. It exceeds the project target of 49 gram, which corresponded to a 6 percent reduction. This was the only outcome indicator designed to measure the achievement of this objective.

According to the ICR (para 53), the fuel saving calculations captured corridor-specific vehicle types, passenger occupancy, and fuel efficiency data from the project interventions. The ICR (para 35) also points out that the vehicle types and occupancy were surveyed at 15 locations during morning peak hours and that the fuel efficiency data came from the local bus company and the World Resource Institute Greenhouse Gas Protocol Mobile Guide.

Rating

High

OVERALL EFFICACY

Rationale

The target values for all outcome indicators were exceeded. The project improved transport mobility in the central city by enhancing its multi-modal urban transport system, but the ICR contains insufficient evidence on the mobility improvements for car users. The project also enhanced transport mobility safety, mobility efficiency, and mobility energy saving. Therefore, the **overall efficacy of the project is rated substantial**.

Overall Efficacy Rating

Substantial



5. Efficiency

Economic Efficiency

At appraisal, a cost benefit analysis (CBA) was carried out for the physical investment components of the projects, using "with project" and "without project" scenarios. The benefits quantified included (i) passenger travel time savings, (ii) vehicle operating cost savings of public and private vehicles, and (iii) reduced accident costs. The costs included construction, operations, and maintenance. The CBA used an analysis timeframe of 20 years and a discount rate of 12 percent. The analysis yielded a net present value (NPV) of US\$154 million and an economic internal rate of return (EIRR) of 19.20 percent. The sensitivity analysis showed an EIRR above the 12 percent discount rate for all scenarios tested.

The CBA for the 2017 restructuring covered the new activities for an estimated cost of US\$12 million. The benefits considered included (i) vehicle operating cost savings, (ii) reduced accident costs, and (iii) [local] emission reductions because of the clean energy buses. The CBA used a discount rate of 12 percent. The analysis showed a NPV of US\$10.29 million and an EIRR of 10.64 percent. The sensitivity analysis showed an EIRR of about 8 percent discount rate for all scenarios tested.

At project closing, the CBA, using "with project" and "without project" scenarios, was repeated taking into account (i) the changes in project activities that happened during the restructurings, (ii) the different asset life cycles of the various activities, and (iii) current travel and demographic features. The benefits quantified included (i) passenger travel time savings, (ii) vehicle operating cost savings of public and private vehicles, (iii) reduced accident costs, and (iv) avoided carbon emissions. Like in the appraisal CBA, the costs included construction, operations and maintenance. The CBA used an analysis timeframe of 20 years for the integrated corridors, 13 years for the electric buses, and 8 years for the bicycles. According to the ICR, the discount rate used was 12 percent. The analysis yielded a NPV of US\$154 million and an EIRR of 21.58 percent (ICR, Annex 4, Table 7). The sensitivity analysis showed rate of returns well over the 12 percent discount rate for all scenarios tested (ICR, Annex 4, Table 7).

Although the assumptions of the CBA appear sound and the analysis was well done, the results are not fully comparable with the ones at appraisal and restructuring given the differences in project scope, analytical timeframe, and benefits considered.

Administrative Efficiency

Initially, the project suffered delays because of changing needs on the ground and an indecision of the city on how to move forward. Once the city was again decisive and the project restructured, the activities were implemented with remarkable efficiency and speed (ICR, para 38). The overall project implementation period was slightly over six years, which included the one-year extension of the original loan closing date. The bid prices were lower than the original cost estimates, which together with a favorable exchange rate, led to a seven percent lower project cost than estimated at appraisal. The ICR (para 40) points out that the project improved the operational efficiency of the city's road network and public transport system. Efficiency gains also derived from carrying out the road rehabilitation for bus corridors jointly with the utility works.



Overall Efficiency

Considering the high economic return at project closing (though it cannot be compared with the estimates at appraisal and restructuring), and the substantial administrative efficiency, **this review assessed the overall efficiency of the project as substantial.**

Note: The ICR (annex 4) mentions that the CBA was carried out for 97 percent of the total project investment. The PAD does not mention the CBA coverage at appraisal and the Bank task team did not have this information.

Efficiency Rating

Substantial

a. If available, enter the Economic Rate of Return (ERR) and/or Financial Rate of Return (FRR) at appraisal and the re-estimated value at evaluation:

	Rate Available?	Point value (%)	*Coverage/Scope (%)
Appraisal	✓	19.20	0 <input checked="" type="checkbox"/> Not Applicable
ICR Estimate	✓	21.58	97.00 <input type="checkbox"/> Not Applicable

* Refers to percent of total project cost for which ERR/FRR was calculated.

6. Outcome

Considering the high relevance of the project's objective at the time of appraisal and at project closing, the substantial achievements in terms of efficacy, and the substantial efficiency, the project had minor shortcomings and its **overall outcome is rated satisfactory.**

a. Outcome Rating

Satisfactory

7. Risk to Development Outcome

The main risks to the development outcome include the following:

Government ownership. The Changzhi municipal government successfully implemented the project and achieved some impressive results, especially in terms of modal shift from cars to public transport and NMT. In addition, the city's 2016-2020 Five-Year Plan calls for actions to apply bus priority to other corridors,



expand the shared public bicycle program to 5,000 bicycles, and continue ITS applications for traffic and transit. These were signs of the city's strong ownership and commitment, which led to the success of the project interventions.

Local capacity. The project helped local agencies enhance their capacity, including improved technical knowledge on urban transport planning, management and business development skills, and improved collaboration between various sector stakeholders. Several project activities have been extended beyond the project area. For instance, the ICR (para 76) mentions that the traffic police "proactively applied traffic management to other parts of the city, and the bus company engages in active monitoring of real-time bus operations" at a citywide level and not only in the center, where the project interventions took place.

Sustainability. To improve the knowledge on the long-term sustainability, the Bank team organized a workshop on public transport asset management. The Bank team also advised the city on the importance of enforcement of traffic regulation to ensure long-term sustainability of the project outcomes. The ICR (para 78) confirms that the city includes O&M funding for the public transport and traffic management system in the annual budgets.

Technical. Given the rapid pace of technology changes, some ITS application might get quickly outdated.

8. Assessment of Bank Performance

a. Quality-at-Entry

The Bank's performance at entry is rated satisfactory. The Bank team grounded the project design in the GEF funded study on "Strategic Planning for Sustainable Development of Urban Transport in Changzhi City", which set the foundation for the project interventions. The Bank team laid out realistic and highly relevant project objectives aligned with existing government and Bank priorities.

According to the ICR (para 68), the Bank team provided guidance on project design, based on lessons learned from previous projects and international best practice, and ensured that project interventions were appropriate for the scale and nature of urban transport in Changzhi. The Bank team also introduced interventions from projects in comparable Chinese cities, such as the integrated corridor improvements, bus priority lanes, and area traffic control system implemented in the Anhui Medium Cities Urban Transport and the Liaoning Urban Transport projects.

The Bank team supported the city in project preparation and facilitated the selection of project activities. The Bank team assisted in the design of the institutional and fiduciary arrangements and the economic and financial analysis to justify the project in economic terms. The Bank team also assessed the safeguards capacity and ensured compliance with the respective requirements at appraisal.

The Bank team provided an introduction for local government agencies to the Bank's project implementation requirements, policies, and procedures. The Bank team also provided extensive training and technical support to the PMC. However, in hindsight, the initial introduction and trainings were not sufficient because the 2016 RP (page 6) points out that the lack of PMC's familiarity with Bank



procedures, insufficient project management efforts, and PMC's inadequate coordination with local government agencies were responsible for the slow project implementation start.

The risk assessment at appraisal and the respective mitigation measures were adequate. On the other hand, the M&E design had some shortcomings (see section 9).

Quality-at-Entry Rating

Satisfactory

b. Quality of supervision

The Bank performance during supervision was satisfactory. According the ICR (para 71), the Bank team carried out regular supervision missions to support the client in project implementation. The Bank team organized training events and workshops, carried out review meetings, consultations, and discussions with experts and consultants. The Bank team included an appropriate mix of expertise and experience. The task team leader and some core safeguards members remained unchanged throughout project implementation, which benefited project supervision.

During the early years of implementation, when the project was negatively affected by weak capacity and uncertainties about technical design issues, the Bank team demonstrated proactivity and agility in responding to the city's concerns and changing circumstances. The Bank team involved management and strongly intensified supervision mission. The Bank team assessed the proposed technical changes and carried out two restructurings to adapt the project to the changing circumstances.

The Bank team adequately monitored the fiduciary and safeguards compliance on an on-going basis and provided guidance to address issues identified (ICR, para 75).

The Borrower, in its comments on the ICR (annex 5), recognized the Bank team's support in project restructuring and praised it for its technical and fiduciary support and for the fiduciary and safeguards trainings.

Quality of Supervision Rating

Satisfactory

Overall Bank Performance Rating

Satisfactory

9. M&E Design, Implementation, & Utilization



a. M&E Design

The M&E design was largely adequate to measure the achievements of the project. The project had four straightforward outcome indicators, one for each aspect of the PDO. The outcome indicators were outcome-focused. However, additional outcome indicators would have been helpful to fully capture the project's impacts.

For instance, there was no indicator to measure improved transport mobility for cars although the PDO aimed at mobility improvements for all users. An indicator measuring car speeds in the corridors or car users' satisfaction could have been added. Similarly, the efficiency in transport mobility improvements is only measured for public transport. An indicator measuring car speeds could also have provided insights on efficiency increases for car users. The four outcome indicators focused on the four corridors implemented under the project and did not capture the citywide impacts of ITS. In this respect, additional indicators capturing traffic accident deaths and public transport improvements due to improved ITS systems at a citywide level could have been added.

The core indicator of "length of rehabilitated non-rural roads" added as so-called outcome indicator by the 2017 restructuring is an output indicator by nature and did not add additional value.

The eight intermediate outcome indicators were clear. All indicators had baselines and end targets. The project end targets were adequate, except for the one regarding the user satisfaction survey, for which the end target was lower than the baseline. This was corrected with the 2017 restructuring.

Data collection and monitoring was to be carried out by the PMC and project management consultants.

b. M&E Implementation

The PMC collected the M&E data on an annual basis. This effort was done thoroughly and in a well-organized way. As an example, the ICR (para 57) mentions that the PDO level indicator on fuel consumption not only required data collection, but also calculating the indicator by accounting for the changing local bus fleet types in the corridors as more electric buses entered service. The intermediate indicators for Integrated Corridor Improvement component documented detailed breakdowns on the gradual completion of road rehabilitation, bus lanes, and NMT facilities.

The M&E data was included in the project progress reports, which were submitted on a regular basis and on time. The ICR (para 56) points out that the PMC informed the clients, the public, and the Bank team of the incremental progress in project implementation and toward achieving the PDO.

At project closing, the PMC provided thoughtful explanations for the achievement of indicators, including the attribution to the project and the impact of external factors (ICR, para 57).

c. M&E Utilization

The ICR (para 58) explains that the M&E data was used to track performance and support correction when issues arose. The PDO indicators on safety, public transit efficiency, and energy efficiency were especially effective in revealing the positive impact of the project on users and the city. For instance, the



M&E data showed that the reductions in bus travel speeds in 2014 were clearly correlated with the ongoing construction on the Taihang Street and Yingxiong Road corridors and reflected temporary impacts of the construction activities on users and bus operations.

The intermediate indicators were used to track the implementation progress, especially the lengths of bus lanes and road rehabilitation completed. The ICR (para 59) also explains that the significant cost reduction for traffic signals and cameras was highlighted in the M&E reports and enabled the city to increase these quantities.

M&E Quality Rating

Substantial

10. Other Issues

a. Safeguards

The project was classified as category B for environmental assessment purposes at appraisal. The following safeguards policies were triggered: Environmental Assessment OP/BP4.01 and Involuntary Resettlement OP/BP4.12. The environmental risk was substantial due to environmental issues associated with the construction of integrated corridors and depots and the operation of the depots. The following safeguards documents were prepared: (i) environment impact assessment, environment management plan, and resettlement policy framework (RFP).

The project was not reclassified during restructuring and no new safeguards policy was triggered.

The environmental supervision and performance were satisfactory. The PMC had a liaison person, who worked with the environmental specialist of the project management consulting firm. The PMC also conducted its own supervision. The city was proactive in environmental protection. It carried out daily inspections of construction sites, used dust control mesh nets to cover open construction sites, and fenced construction sites. The city twice shut down the construction of a bus depot as a precautionary measure when adverse winter conditions triggered high levels of pollution. The city's Environment Protection Bureau placed an air quality monitor at the bus depot site for real-time monitoring of particulates and noise.

The Bank consistently concluded that the project performed satisfactorily on environmental issues. At project closure, the environmental performance was satisfactory. There were minor issues, such as not consistent wearing of helmets and safety belts by those working on structures, which were corrected.

In social terms, at appraisal the RFP was prepared in anticipation of a small amount of land requisition. A due diligence review was carried out on the residual impacts of the acquisition of about 2.5 hectares of land in Mafangtou Village prior to project identification. The review found that the involuntary resettlement completed in 2010 affected 28 households (87 individuals), who were satisfactorily compensated. The project was in compliance with the Bank's social safeguards policy throughout implementation.



b. Fiduciary Compliance

Financial management. The project's financial management performance was satisfactory. The project had an adequate project financial management system that provided, with reasonable assurance, accurate and timely information on the use of loan proceeds for the intended purposes. The project accounting and financial reports were in line with the regulations of the Ministry of Finance and the requirements in the LA. The PMC resolved weaknesses raised during financial management supervision missions in a timely way. The financial audit reports had unqualified audit opinions. However, Changzhi's internal approvals for withdrawal were complex.

Procurement. The procurement performance was also satisfactory. According to the ICR (para 65), the PMC established a reasonable contract management system. The PMC and the related implementing agencies monitored and supervised contract implementation and variations. The PMC employed a project management consultant to support procurement when necessary. The project also implemented a filing system of construction documents, which was introduced by the Bank in other Chinese cities. The project procurement processes complied with the Bank's procurement policies and procedures and China's procurement laws and regulations.

c. Unintended impacts (Positive or Negative)

d. Other

11. Ratings

Ratings	ICR	IEG	Reason for Disagreements/Comment
Outcome	Satisfactory	Satisfactory	
Bank Performance	Satisfactory	Satisfactory	
Quality of M&E	Substantial	Substantial	
Quality of ICR	---	Substantial	

12. Lessons

The following four lessons have been selected from the ICR because of their potential relevance for future urban transport projects financed by the Bank, other aid institutions or donors. IEG has modified some of the language in the ICR:

- **In secondary cities, expensive mass transit systems might not be necessary to increase public transport modal share and enhance urban mobility.** The package of



interventions implemented under the project in Changzhi revealed successful to incentivize public transport use. The package included low-cost bus priority lanes and complementary measures, integrated road development, and intelligent traffic and bus management. It was appropriate for the levels of demand, capacity, and fiscal affordability in this secondary city, which was ramping up its urban transport system. Even large cities may not have the demand and financial support for BRT, commuter rail, or metro. Therefore, bus priority lanes and the other measures can be a cost-efficient alternative for other secondary cities to satisfy the current public transport demand and mitigate greenhouse gas emissions while setting the stage for later interventions when conditions are ready.

- **The design of bus priority lanes needs to fit into the city's context, traffic, road conditions, and passenger demand.** The bus priority lanes and stops in the first corridor - Chengxi Road - were placed in the median, ignoring the conditions of a narrow four-lane road with a high-level of vehicular and NMT traffic. Therefore, the corridor did not fully achieve the benefits of a multimodal corridor. It also resulted in hesitation on the part of the city government as to whether or not continue with the remaining corridors. After Chengxi Road, the city modified the original cross-section concept and implemented curbside bus lanes in the remaining three corridors. These were much better accepted by the public.
- **Public consultation is key to good urban transport investment outcomes.** As a result of the detailed planning of public consultations and active engagement of the city government and the Bank team, the three rounds of public consultations were well attended by residents and road users. In these public consultations attention was paid to the needs of the different demographic and income groups through a good representation of women, poor people, people with disabilities, and elderly residents. The public provided constructive feedback on expected/achieved benefits and proposed refinements in public transport operations.
- **The success of urban transport projects depends on adaptability to changes in transport preferences and proactivity to such changes.** Nearly all urban transport projects will face changes during implementation, including changes in client leadership and institutions, the fiscal capability, national and city policies, and development priorities. This project was no exception. It experienced many challenges, including weak implementation capacity, concerns with median bus lanes, and a late request for a right of way expansion from the city of Changzhi. The key to the project's turn-around after the slow start was the ability of the city of Changzhi and the Bank team to engage in a dialogue to adapt to the changing priorities of the city and proactively address issues as they arose. The implementation experience of this project is a good example of successfully implementing an urban transport project despite such challenges.

13. Assessment Recommended?

Yes

Please Explain

This was a very successful urban transport project that used low cost infrastructure and technology to increase the public transport modal share and enhance the mobility conditions in a medium-sized city below one million



inhabitants. The type of interventions carried out are of interest to other cities and an in-depth review and the dissemination of the results seem useful.

14. Comments on Quality of ICR

This is a concise, yet comprehensive ICR. It is well written and relatively clear. The project experience is presented in a candid way. The theory of change is laid out graphically, and it is followed in the assessment of the project outcomes. This assessment provided several complementary pieces of evidence to show the achievement of the project objectives. This included, for instance, the growth rate in public transport ridership and the use of the bicycle sharing system. However, it fails to clearly explain why public transport ridership increased. Given the focus of the PDO on all users of the transport mobility system, additional evidence on the impact of the project on car travel should have been included.

The CBA methodology is sound, but the description of how it was applied would have benefitted from more clarity. Some assumptions used are not fully in line with the data in the main text. The task team explained that instead of using the actual figures for modal share and travel speed, in the CBA these figures were obtained through simulations. Although the figures used were somewhat more conservative, the CBA should have been based on actual figures as much as possible.

The ICR offers a candid critique to the design of the M&E system. The safeguards and fiduciary performance is adequately reported. The project included several important lessons. The formulation of these lessons does, however, not fully follow the ICR guidelines. For instance, in several cases, the titles of the so-called lessons do not include an actual lesson. The lesson on maintenance and operation does not stem from the project experience.

a. Quality of ICR Rating Substantial