



FOR OFFICIAL USE ONLY

R135-19
13 November 2019

Proposed Loan
Jilin Yanji Low-Carbon Climate-Resilient Healthy
City Project
(People's Republic of China)

1. The Report and Recommendation of the President (RRP: PRC 50322-002) on the proposed loan to the People's Republic of China for the Jilin Yanji Low-Carbon Climate-Resilient Healthy City Project is circulated herewith.
2. This Report and Recommendation should be read with (i) *Country Partnership Strategy: Transforming Partnership: People's Republic of China and Asian Development Bank, 2016–2020 and Addendum 1*, which were circulated to the Board on 18 January 2018 and 8 February 2018, respectively (DOCS.Sec.M2-16 and Addendum 1); and (ii) *Country Operations Business Plan: People's Republic of China, 2018–2020*, which was circulated to the Board on 5 April 2018 (DOC.IN.63-18).
3. In the absence of any request for discussion and in the absence of a sufficient number of abstentions or oppositions (which should be communicated to The Secretary by the close of business on 4 December 2019), the recommendation in paragraph 42 of the paper will be deemed to have been approved, to be so recorded in the minutes of a subsequent Board meeting. Any notified abstentions or oppositions will also be recorded in the minutes.

For Inquiries: Stefan Rau, East Asia Department
(Ext. 5812)
Colin Gin, Office of the General Counsel
(Ext. 5483)



Report and Recommendation of the President to the Board of Directors

Project Number: 50322-002
November 2019

Proposed Loan People's Republic of China: Jilin Yanji Low-Carbon Climate-Resilient Healthy City Project

Distribution of this document is restricted until it has been approved by the Board of Directors. Following such approval, ADB will disclose the document to the public in accordance with ADB's Access to Information Policy.

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 29 October 2019)

Currency unit	–	yuan (CNY)		
CNY1.00	=	\$0.1415	or	€0.1275
\$1.00	=	CNY7.0679	or	€0.9009
€1.00	=	CNY7.8454	or	\$1.1100

ABBREVIATIONS

ADB	–	Asian Development Bank
BRT	–	bus rapid transit
EMP	–	environmental management plan
GDP	–	gross domestic product
GIS	–	geographic information system
HIA	–	health impact assessment
ICT	–	information and communication technology
IEE	–	initial environmental examination
km	–	kilometer
m ³	–	cubic meter
NMT	–	nonmotorized transport
NRW	–	nonrevenue water
PAM	–	project administration manual
PRC	–	People's Republic of China
SGAP	–	social and gender action plan
TOD	–	transit-oriented development
YCG	–	Yanji city government

NOTE

In this report, "\$" refers to United States dollars.

Vice-President	Ahmed M. Saeed, Operations 2
Director General	Amy S.P. Leung, East Asia Department (EARD)
Director	Sangay Penjor, Urban and Social Sectors Division, EARD
Team leaders	Stefan Rau, Senior Urban Development Specialist, EARD Lan Wang, Senior Project Officer (Urban Development), EARD
Team members	Stephane Bessadi, Senior Water Utility Specialist, Sustainable Development and Climate Change Department (SDCC) Francesca Cimacio, Operations Assistant, EARD Colin Gin, Assistant General Counsel, Office of the General Counsel Najibullah Habib, Health Specialist, EARD Aimee Hampel-Milagrosa, Economist, Economic Research and Regional Cooperation Department Paolo Manunta, Senior Infrastructure Specialist (Earth Observation), SDCC Marzia Mongiorgi-Lorenzo, Principal Country Specialist, EARD Masahiro Nishimura, Senior Rural Development Specialist, South Asia Department (SARD) Katherine Miriam Ozoa, Associate Project Analyst, EARD Arun Ramamurthy, Senior Information and Communication Technology Specialist (Innovations), EARD Viswanathan Ramasubramanian, Senior Safeguards Specialist (Resettlement), EARD Michael Rattinger, Senior Climate Change Specialist, SDCC Mark Robis, Senior Financial Management Officer, EARD Susann Roth, Principal Knowledge Sharing and Services Specialist, SDCC M. Shahadat Russell, Unit Head, Project Administration, SARD Shotaro Sasaki, Senior Environment Specialist, EARD Virinder Sharma, Senior Urban Development Specialist, SDCC Gohar Tadevosyan, Senior Social Development Specialist (Safeguards), EARD
Peer reviewers	Hiroko Uchimura Shiroishi, Senior Social Sector Specialist, EARD Ki-Joon Kim, Principal Transport Specialist, SDCC Neeta Pokhrel, Unit Head, Project Administration, SARD

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

CONTENTS

	Page
PROJECT AT A GLANCE	
MAP	
I. THE PROPOSAL	1
II. THE PROJECT	1
A. Rationale	1
B. Project Description	4
C. Value Added by ADB	5
D. Summary Cost Estimates and Financing Plan	6
E. Implementation Arrangements	7
III. DUE DILIGENCE	8
A. Technical	8
B. Economic and Financial Viability	8
C. Sustainability	9
D. Governance	9
E. Poverty, Social, and Gender	9
F. Safeguards	10
G. Summary of Risk Assessment and Risk Management Plan	12
IV. ASSURANCES	12
V. RECOMMENDATION	12
APPENDIXES	
1. Design and Monitoring Framework	13
2. List of Linked Documents	16

PROJECT AT A GLANCE

1. Basic Data		Project Number: 50322-002	
Project Name	Jilin Yanji Low-Carbon Climate-Resilient Healthy City Project	Department/Division	EARD/EASS
Country Borrower	China, People's Republic of PRC	Executing Agency	Yanji City Government
Country Economic Indicators Portfolio at a Glance	https://www.adb.org/Documents/LinkedDocs/?id=50322-002-CEI https://www.adb.org/Documents/LinkedDocs/?id=50322-002-PortAtaGlance		
2. Sector	Subsector(s)	ADB Financing (\$ million)	
✓ Water and other urban infrastructure and services	Urban flood protection	23.00	
	Urban sanitation	8.00	
	Urban water supply	30.00	
Transport	Urban public transport	49.00	
	Urban roads and traffic management	20.00	
		Total	130.00
3. Operational Priorities		Climate Change Information	
✓ Addressing remaining poverty and reducing inequalities		CO ₂ reduction (tons per annum)	60,708
✓ Accelerating progress in gender equality		Climate Change impact on the Project	Medium
✓ Tackling climate change, building climate and disaster resilience, and enhancing environmental sustainability			
✓ Making cities more livable		ADB Financing	
✓ Strengthening governance and institutional capacity		Adaptation (\$ million)	67.75
✓ Fostering regional cooperation and integration		Mitigation (\$ million)	37.89
Sustainable Development Goals		Gender Equity and Mainstreaming	
SDG 1.b		Effective gender mainstreaming (EGM)	✓
SDG 5.c			
SDG 6.3, 6.4			
SDG 10.2			
SDG 11.2, 11.b			
SDG 12.1			
SDG 13.a			
4. Risk Categorization:		Low	
5. Safeguard Categorization		Environment: B Involuntary Resettlement: B Indigenous Peoples: C	
6. Financing			
Modality and Sources		Amount (\$ million)	
ADB		130.00	
Sovereign Project (Regular Loan): Ordinary capital resources		130.00	
Cofinancing		0.00	
None		0.00	
Counterpart		129.79	
Government		129.79	
Total		259.79	
Currency of ADB Financing: Euro			

JILIN YANJI LOW-CARBON CLIMATE-RESILIENT HEALTHY CITY PROJECT IN THE PEOPLE'S REPUBLIC OF CHINA



- Bus rapid transit (BRT) corridor and stations with 5- and 10-minute walking radii
- Transit-oriented development at BRT stations: high density, mixed use, pedestrian-friendly
- Health and/or education facilities with improved safe pedestrian connections to BRT stations
- Small roads with green, bicycle, and pedestrian lanes connecting to BRT and river greenway
- River greenway for pedestrians and bicycles, relaxation, and exercise

- Chaoyang River rehabilitation with bioengineering as ecosystem-based adaptation
- Catchment areas of creeks north of Buer-Hatong River
- Sponge city green infrastructure and creek rehabilitation improving resilience
- Sponge city green infrastructure and creek rehabilitation improving resilience (part of project master plan)
- Sponge city green infrastructure and green space contributing to stormwater management in residential urban areas
- Green public urban park

- New separate drainage pipes
- End of drainage pipe sponge city storm water cleansing
- Water supply system improvement area
- New separate wastewater pipes
- Interceptor pipes
- Wastewater treatment plant

This map was produced by the cartography unit of the Asian Development Bank. The boundaries, colors, denominations, and any other information shown on this map do not imply, on the part of the Asian Development Bank, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries, colors, denominations, or information.

I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on a proposed loan to the People's Republic of China (PRC) for the Jilin Yanji Low-Carbon Climate-Resilient Healthy City Project.

2. The project is located in Yanji city, which faces challenges of poor urban livability and traffic management, exposure to climate-related flood risk, and risks to water security and safety. The project will provide multiple cross-benefits from an integrated solution provided to improve the urban livability of a medium-sized city, which is timely and essential to lessen the migration to the coastal mega-urban regions and to provide a demonstration project for replication in the PRC. It will contribute to (i) regional public goods of health and improved air and water quality, and (ii) revitalizing the economically challenged northeast area of the PRC.

3. The project will support the first bus rapid transit (BRT) corridor in the northeast of the PRC and transform Yanji's urban geography. This will reinforce the east–west linear city arrangement through connecting key areas following principles of transit-oriented development (TOD) with higher density mixed-use and pedestrian-friendly center areas around the BRT stations. It will integrate nonmotorized transport (NMT) lanes and facilities along the corridor, and a series of small roads and river greenways will be provided to ensure safe and pleasant pedestrian and bicycle access to the BRT stations while promoting low-carbon urban mobility and physical activities that enhance public health. The project-supported greenways are designed as “sponge city” green infrastructure, enhancing climate resilience and urban livability.¹ The project will improve the water supply and wastewater management systems to ensure safe and climate-resilient access to water supply and improved water quality. Capacity development will contribute to the preparation of action plans to demonstrate Yanji as a low-carbon, climate-resilient, and healthy city, contributing to the implementation of the Healthy China 2030 program,² and lessons and knowledge will be shared with other developing member countries.

II. THE PROJECT

A. Rationale

4. Yanji city is part of the Yanbian Korean Autonomous Prefecture in the east of Jilin province, bordering the Democratic People's Republic of Korea to the southeast and the Russian Federation to the northeast. Yanji is an ancient city on the Buer Hatong River surrounded by hills, and its easternmost border is about 15 kilometers (km) from the sea. Yanji's total population was about 0.60 million in 2018 (about 0.48 million of whom are urban) with about 50.2% being ethnic Koreans, who are well-integrated and live in harmony with the Han Chinese.³ The total land area is 1,748 square kilometers.⁴ In 2017, the city's gross domestic product (GDP) was CNY33.6 billion and GDP per capita was CNY61,431. The contributions to the GDP by main sectors in 2017 were agriculture (1.4% of GDP in 2017), manufacturing (36.8%), and services industry (61.8%). Yanji is affected by the regional economic decline of the northeastern PRC, and the city relies mainly on tourism and associated services, processing of agricultural products, and logistics services.

¹ Sponge city is a concept of comprehensive urban water resources management, in which greenways, parks, and wetlands maximize ecosystem services, including storm water management, using ecosystem-based adaptation.

² Government of the PRC, State Council. 2016. *The Healthy China 2030*. Beijing.

³ Population information of 2018 was collected directly from all the districts, townships, and local communities.

⁴ Chaoyangchuan township, previously administered by Longjing city, was included under the administration of Yanji in 2008, thus contributing to the rural population increase.

5. **Key development challenges.** The city suffers from inadequate urban infrastructure and provision of basic services that cause inconvenience and disruptions to daily life, especially for women. This includes inefficient public transport, traffic congestion and poor parking management, urban and river flooding, and inefficient water supply and wastewater management.

6. Urban roads suffer from traffic congestion, especially during rush hours, and missing network links. Many elements of the road network and intersections pose safety problems for vehicles and people. There is a lack of safe bicycle lanes, sidewalks, and pedestrian crossings in many areas. Many cars are parked on sidewalks, creating obstacles for and safety risks to pedestrians. The increase of private cars leads to worsening traffic, increased air pollution and less healthy lifestyles with people walking less. In 2017 there were a total of 152,000 cars in Yanji, which is about 300 vehicles per 1,000 urban residents, and an increase from 96,000 units in 2012. Traffic management and signal control is outdated with suboptimal and unsafe intersections, especially in the congested urban core. The public transport system is inefficient, inconvenient, and unsafe; buses jam in bus stop areas and people get on and off on the streets. Further, there is an urgent need to upgrade and extend public transport into the periphery. Currently, 43 bus routes traverse six roads with a total route length of 490 km and a daily ridership of about 243,000 passengers. The public transport system does not match the needs of a growing population and may cause reduced ridership due to an increase in private vehicle use as people switch modes because of unreliable public transport service and bus shelters that lack weather protection.

7. Flooding is a significant problem during the rainy season in June–July, with flooding for about 5 days per year on average in recent years. River flooding, flash floods, and urban flooding endanger lives, property, and livelihoods, and pose disturbances to traffic and public life. The combined sewer and drainage pipe system is outdated, with a total network length of 326 km, comprising 110 km of sewers, 40 km of drainage pipes, and 176 km of combined sewer and drainage pipes. Only 11.6% of the pipe network meets the domestically required 1-in-3 year flood design standard, causing pluvial flooding during heavy summer rains. The Chaoyang River urban catchment area is currently exposed to flood risks of 1-in-20 year flood events.

8. Yanji city's water supply system is inefficient. It has two water reservoirs and two water treatment plants with a total combined treatment capacity of 210,000 cubic meters (m³) per day; 150,000 m³/day of treated water meets national water quality standards and is provided as continuous round-the-clock service to end users. The system covers about 98% of the urban area and population with 348 km of water distribution pipes, 91 booster pumps, and around 215,000 water meters. The key challenge is the high level of nonrevenue water (NRW) which was 46% in 2017, comprising 9% in commercial losses and 37% in physical water losses mainly because of aging pipes that were laid in the 1930s and 1970s. It is difficult to detect leaks in deeply buried pipes because of cold climate conditions and incomplete information on pipe locations because of missing and unreliable maps of the old pipe system and poor geographic information system (GIS) management. While the city benefitted from a previous Asian Development Bank (ADB) loan, the above challenges remain.⁵ Wastewater is collected and treated at two wastewater treatment plants with a combined capacity of 150,000 m³/day. Tariffs for domestic water users are CNY3.20/m³ for water supply and an additional CNY0.95/m³ for wastewater.

9. **Strategic fit.** The project will support urban livability of a medium-sized city, contributing to ADB's strategic support to the PRC's revitalization and strengthening of the northeast including

⁵ ADB. [People's Republic of China: Jilin Urban Environmental Improvement Project](#). The project supported water treatment plants, transmission pipes, wastewater treatment plant, and central heating system improvement.

four cities in East Heilongjiang, north of Yanji.⁶ Through its strategic and integrated approach, the project will support (i) the thirteenth five-year plans of Jilin province and Yanji city, 2016–2020; (ii) the PRC's National New-Type Urbanization Plan, 2014–2020, aligning with Yanji's investment program as one of the PRC's pilot cities;⁷ and (iii) Yanji's urban and economic development master plan (2009–2030) and transport master plan.⁸ The proposed project is included in ADB's country operations business plan for the PRC, 2018–2020 and is aligned with ADB's (i) country partnership strategy for the PRC, 2016–2020, supporting socially inclusive, environmentally sustainable, and economically competitive development; and (ii) ADB's Strategy 2030 operational priority on livable cities, and support to upper middle-income countries by (a) providing integrated solutions for a livable city demonstrating low-carbon climate-resilient healthy city development generating synergies and cobenefits, contributing to regional public goods, (b) enhancing resilience to climate change shocks and stresses including reducing flood risk and increasing water safety and security, (c) strengthening institutional knowledge and capacity building, and (d) sharing best practices and innovation experiences for south–south cooperation.⁹

10. **Lessons learned.** The project continues the more than 23 years of strategic partnership between Jilin province and ADB in areas of masterplanning, environmental improvement and urban infrastructure, among others. The project incorporates lessons from independent evaluation reports and similar ADB projects in Jilin province.¹⁰ It will support the sustainability of a previous ADB-financed project in Yanji (footnote 5) which supported (i) water supply system construction including a water treatment plant, raw water transmission pipes, water mains, and distribution pipes; and (ii) central heating improvements, which led to significant improvement in air quality and public health because of the closure of about 330 inefficient coal-fired boilers, which resulted in an increase in class II air quality standards from 285 days in 2006 to 334 days in 2012. The BRT component is expected to further improve air quality. Lessons were incorporated from sustainable urban transport projects, i.e., in Gansu Lanzhou, Hubei Yichang, and Shandong Jinan, including the benefits of (i) integration of BRT with NMT improvements on enhanced BRT use, and (ii) overall improved urban transport sustainability and livability from reduced air and noise pollution and enhanced traffic flow and safety.¹¹ Lessons from flood risk management projects, like in Jiangxi Pingxiang, include that green sponge city infrastructure yields multiple benefits such as effective flood defense and water infiltration and cleansing, increased biodiversity and enhanced recreation functions, and promotion of more walking and cycling.¹² Lessons are applied from technical assistance projects such as adequate water and wastewater tariffs for financial sustainability, effective urban storm water management, and urban climate change adaptation.¹³

⁶ ADB. [People's Republic of China: Heilongjiang Green Urban and Economic Revitalization Project](#).

⁷ Government of the PRC, State Council. 2014. *National New-Type Urbanization Plan, 2014–2020*. Beijing.

⁸ Yanji city government. 2009. *Yanji City General Urban Master Development Plan (2009–2030)*. Yanji city.

⁹ ADB. 2018. *Country Operations Business Plan: People's Republic of China, 2018–2020*. Manila; ADB. 2016. *Country Partnership Strategy: People's Republic of China, 2016–2020—Transforming Partnership: People's Republic of China and Asian Development Bank*. Manila; and ADB. 2018. *Strategy 2030: Achieving a Prosperous, Inclusive, Resilient, and Sustainable Asia and the Pacific*. Manila.

¹⁰ This is ADB's fifth urban project in Jilin province and, hence, a good number of lessons were applied to strengthen and improve the design of the proposed project, including lessons from ADB. [People's Republic of China: Songhua River Basin Water Pollution Control and Management Project](#).

¹¹ ADB. [People's Republic of China: Lanzhou Sustainable Urban Transport Project](#); ADB. [People's Republic of China: Hubei-Yichang Sustainable Urban Transport Project](#); and ADB. [People's Republic of China: Shandong Spring City Green Modern Trolley Bus Demonstration Project](#).

¹² ADB. [People's Republic of China: Jiangxi Pingxiang Integrated Rural–Urban Infrastructure Development Project](#).

¹³ ADB. 1997. *Technical Assistance to the People's Republic of China for Water Supply Tariff Study II*. Manila; and ADB. 2001. *Technical Assistance to the People's Republic of China for National Guidelines on Urban Wastewater Tariffs and Management Study*. Manila.

B. Project Description

11. The project is aligned with the following impact: inclusive, environmentally sustainable, and competitive development of Yanji city achieved (footnote 8). The project will have the following outcome: livability, low-carbon development, climate resilience, and health in Yanji city improved.¹⁴

12. The project will have four outputs that are integrated and expected to generate cobenefits and higher efficiencies. The project focus is on the first BRT line in the northeast and the city; NMT improvements and its integration with sponge city infrastructure and drainage; and water supply system safety and efficiency improvements. The project will support comprehensive, low-carbon, climate-resilient development parallel to and north of the Buer Hatong River, organized along a BRT corridor connecting the industrial park developments and job centers in the east and west of the urban area, and linking many residential districts with the city center, business and retail center, station for high-speed rail, government center, Yanbian University, schools, hospitals, and parks. The overall concept will follow the principles of TOD, focusing on higher density mixed-use and pedestrian-friendly center areas around the BRT stations promoting low-carbon urban mobility. New green spaces will (i) link station areas with project-supported riverfront greenways, creating a network of sponge city infrastructure enhancing climate resilience and urban livability; and (ii) enable more healthier lifestyles for residents and tourists, hence contributing to healthy and age-friendly city development, applying universal design principles. Knowledge from the demonstration features of integrating public transport, green infrastructure for flood risk management and healthy and age-friendly design will be shared across the region.

13. **Output 1: Low-carbon bus rapid transit line integrated with nonmotorized transport infrastructure constructed.** This output includes (i) planning and constructing a 20-km BRT corridor on Gongyuan Road and Renmin Road in an east–west direction, with about 25 stations, integrated with improved small road links with safe pedestrian and bicycle links to stations and including associated utility pipes, trees, and greening; (ii) procuring a fleet of 100 clean-energy buses and constructing a bus terminal and maintenance center; (iii) installing equipment for smart ticketing and a BRT control center with smart information and communication technology (ICT) monitoring and system-wide, real-time data of bus locations and operation; (iv) removing sidewalk parking, and adding landscaping of public spaces in five locations near BRT stations with installation of exercise equipment; and (v) installing mechanical parking structures for park-and-ride near selected BRT stations and implementing the parking management plan developed under output 4.

14. **Output 2: Climate-resilient flood risk management and sponge city green infrastructure constructed.** This output includes (i) constructing sponge city green infrastructure in residential areas within the catchment of creeks, integrated with improved and separated drainage pipes (at least 43 km) and wastewater pipes (at least 40 km),¹⁵ using results from detailed hydraulic modeling and thereby significantly reducing climate-related pluvial and fluvial flood risks (according to the project’s hydraulic model up to 1-in-50 year flood events), and improving the water quality through construction of sedimentation tanks and reed-bed sand filters at the end of drainage pipes; and (ii) ecological river rehabilitation of the Chaoyang River, improving the flood protection standard from 1-in-20 year floods to 1-in-50 year flood events. Included is bio-engineering as in-stream solutions in the river bed and green embankments, and building pedestrian and bicycle paths with tree planting along this greenway.

¹⁴ The design and monitoring framework is in Appendix 1.

¹⁵ Civil works contracts under output 1 will integrate construction and installation of drainage and wastewater pipes.

15. **Output 3: Water supply system improved.** This output will improve the water supply system, including (i) installing about 330 flow meters for hydraulic zones and district metering area management, and installing about 4,000 smart water meters in older residential areas; and (ii) upgrading and replacing about 32 km of water supply pipes, including building up hydraulic zones. This follows two already completed phases of an improvement program of the water supply system wholly carried out by the city-owned water group company. This is expected to reduce NRW from the current 46% to 37% during project implementation, conserving about 4.8 million m³ of water resources each year as a result of the project, as part of the water group company's overall plan to reduce NRW to 20% by 2030. Further NRW reductions will be enabled through a capacity development and utility twinning program under output 4, and proposed further investments may be included in the contract packages of this output as appropriate.

16. **Output 4: Capacity in low-carbon, climate-resilient, healthy city planning, and infrastructure management developed.** This output will support project management and quality assurance; external safeguards monitoring; and capacity development for inclusive and gender-sensitive low-carbon, climate-resilient, and healthy city planning and implementation including smart-city ICT application to enhance the sustainability of the project. Activities will include support to and capacity development in (i) project implementation, management, and monitoring; (ii) low-carbon city and TOD planning; traffic impact assessment and evaluation; parking management planning; BRT operation capacity development and network planning; and pedestrian, bicycle system, and universal design masterplan preparation; (iii) urban climate change adaptation and sponge city action planning, open space planning, and hydraulic modeling and simulation; (iv) healthy and age-friendly city master planning and health monitoring, contributing to Healthy China 2030 (footnote 2); (v) water safety planning; NRW reduction and leakage identification and management; and development of an integrated water management system including smart systems using cloud data, supervisory control and data acquisition (SCADA), GIS, and asset management systems as part of smart-city applications; and (vi) GIS platform development and smart-city implementation action planning. Lessons and knowledge will be shared with other developing member countries in the form of guidelines for replication and knowledge-sharing events in Yanji and reports to international and domestic conferences.

C. Value Added by ADB

17. ADB provides an innovative, spatially integrated solution to low-carbon, climate-resilient, healthy city planning, and infrastructure investment prioritization and finance to optimize cobenefits across sectors aiming at urban livability. Specifically, ADB value addition includes (i) TOD-based integrated urban planning was introduced to enable higher density mixed-use, pedestrian-friendly areas, which reduces traffic demand and promotes the use of public transport through proximity and links of housing with commercial businesses, job centers, and public services, including health facilities and schools, which reduces air pollution and greenhouse gas emissions; (ii) best practices in BRT corridor and station planning and design were provided based on detailed surveys, which will be further enhanced by traffic impact assessment, traffic and parking management plans, and investment in intelligent transport system equipment; (iii) a detailed digital hydraulic model was developed for the project and piloted as an expert tool that simulates future storm scenarios and adaptation options integrating underground drainage pipe network improvements with at-grade sponge city green infrastructure. Improvements to drainage and flow capacity, combined with increased stormwater retention and infiltration capacity, were quantified, visualized, and evaluated to optimize flood risk reduction and investments and green space benefits; and (iv) water utility corporate governance and NRW reduction assessment and technology was introduced, and effective NRW will be implemented.

18. A health impact assessment (HIA) following the ADB Health Sector Group's guidance was prepared to assess and enhance expected health benefits of the project, e.g., water and air quality improvements; noise reductions; and healthier lifestyles enabled through more use of public transport, walking, cycling, and generally more physical activity from sponge city open spaces and river greenways. Health benefits were further facilitated by applying universal design principles to public spaces and facilities, benefitting especially elderly and physically impaired people, women, and children.¹⁶ A pilot healthy and age-friendly city action and monitoring plan will be prepared during project implementation to support the Healthy China 2030 program (footnote 2). Further, smart-city infrastructure using high-level ICT and a big data platform using the Internet of Things and artificial intelligence to integrate and manage data for the investment components and aiming at higher levels of cross-sector integration in Yanji was introduced, including intelligent transport system equipment, smart water metering, and using data to alert of unusual consumption patterns that may be related to changing health, especially of the elderly.

D. Summary Cost Estimates and Financing Plan

19. The project is estimated to cost €234.77 million (Table 1). Detailed cost estimates by expenditure category and by financier are included in the project administration manual (PAM).¹⁷

Table 1: Summary Cost Estimates
(€ million)

Item	Amount ^a
A. Base Cost^b	
1. Output 1: Low-carbon bus rapid transit line integrated with nonmotorized transport infrastructure constructed	167.62
2. Output 2: Climate-resilient flood risk management and sponge city green infrastructure constructed	34.25
3. Output 3: Water supply system improved	4.99
4. Output 4: Capacity in low-carbon, climate-resilient, healthy city planning, and infrastructure management developed	4.16
Subtotal (A)	211.02
B. Contingencies^c	20.88
C. Financial Charges During Implementation^d	2.87
Total (A+B+C)	234.77

^a Includes taxes and duties of €11.82 million, of which €5.52 million will be financed by the government through cash contribution and €6.30 million will be paid from the Asian Development Bank loan. Such amount does not represent an excessive share of the project cost.

^b In 2019 prices as of 21 March 2019.

^c Physical contingencies computed at 5% for civil works, and 5% for field research and development, training, surveys, and studies. Price contingencies computed at average of 1.59% on foreign exchange costs and 1.98% on local currency costs; includes provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.

^d Includes interest and commitment charges. Interest during construction for the ordinary capital resources loan has been computed at the 6-year Euro fixed swap rate plus an effective contractual spread of 0.5% and maturity premium of 0.1%. Commitment charges for the ordinary capital resources loan are 0.15% per year to be charged on the undisbursed loan amount.

Source: Asian Development Bank estimates.

20. The government has requested a regular loan of €117.48 million (\$130 million equivalent) from ADB's ordinary capital resources to help finance the project. The loan will have a 25.5-year term, including a grace period of 6 years; an annual interest rate determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility; a commitment charge of 0.15%

¹⁶ ADB. Forthcoming. *A Health Impact Assessment Framework for Healthy and Age Friendly Cities in the People's Republic of China*. Manila.

¹⁷ Project Administration Manual (accessible from the list of linked documents in Appendix 2).

per year; and such other terms and conditions set forth in the draft loan and project agreements. Based on the straight-line method, the average maturity is 16 years, and the maturity premium payable to ADB is 0.10% per year. The implementation period will be 7 years from 1 April 2020 to 31 March 2027.

21. The summary financing plan is in Table 2. ADB will finance the expenditures in relation to works, equipment, and consulting services. The government will provide counterpart funds from its budget resources and finance interest and other charges during construction.

Table 2: Summary Financing Plan

Source	Amount (€ million)	Share of Total (%)
Asian Development Bank		
Ordinary capital resources (regular loan)	117.48	50.04
Government	117.29	49.96
Total	234.77	100.00

Source: Asian Development Bank estimates.

22. Climate mitigation is estimated to cost \$82.22 million equivalent and climate adaptation is estimated to cost \$147.09 million equivalent. ADB will finance 46.08% of mitigation costs (\$37.89 million equivalent) and 46.06% of adaptation costs (\$67.75 million equivalent). The total annual carbon dioxide emission reduction is about 60,707.82 tons, mainly from modal shift from private vehicles to public transport, replacing diesel buses with clean-energy buses, and tree planting.

E. Implementation Arrangements

23. The Yanji city government (YCG) is the executing agency for the project. The implementing agencies will be the administrative bureaus in charge of the respective components, including Yanji city's transport bureau, housing and construction bureau, traffic police, Chaoyangchuan township government, and Yanji Water Group Company Limited. A project leading group has been formally established under the leadership of the Yanji city mayor involving other concerned administrative bureaus and agencies such as the health bureau, water affairs bureau, natural resources bureau, and environmental protection bureau, facilitating coordination and cooperation to ensure that synergies and cobenefits for all components will be achieved. A project management office has been formally established under the Yanji City Development and Reform Commission. The implementation arrangements are summarized in Table 3 and described in detail in the PAM including audit, reporting, and monitoring and evaluation.

Table 3: Implementation Arrangements

Table of Implementation Arrangements			
Aspects	Arrangements		
Implementation period	April 2020–March 2027		
Estimated completion date	30 September 2026		
Estimated loan closing date	31 March 2027		
Management			
(i) Oversight body	Yanji City Project Leading Group Mayor (chair), executive vice-mayor (deputy chair) Director of Yanji City Development and Reform Commission; directors of implementing agencies and other administrative bureaus of Yanji city government		
(ii) Executing agency	Yanji city government		
(iii) Key implementing agencies	Yanji city transport bureau, Yanji city housing and construction bureau, Yanji city traffic police, Chaoyangchuan township government, and Yanji Water Group Company Limited		
(iv) Implementation unit	Yanji City Development and Reform Commission, 8 staff		
Procurement	OCB (internationally advertised)	2 contracts	\$26.58 million

Aspects	Arrangements		
	open competitive bidding (nationally advertised)	13 contracts	\$139.51 million
Consulting services	quality- and cost-based selection	362 person-months	\$3.35 million
	consultants qualifications selection	42 person-months	\$0.30 million
	individual consultant selection	82 person-months	\$0.95 million
Retroactive financing and advance contracting	Advance contracting includes one goods package to procure smart meters for the water supply system and 10 consulting services packages. Retroactive financing will apply up to 20% of the loan amount for costs incurred prior to loan effectiveness but not earlier than 12 months prior to the signing of the loan agreement.		
Disbursement	The loan proceeds will be disbursed following ADB's <i>Loan Disbursement Handbook</i> (2017, as amended from time to time) and detailed arrangements agreed between the government and ADB.		

ADB = Asian Development Bank.

Sources: Asian Development Bank and Yanji city government.

III. DUE DILIGENCE

A. Technical

24. The project is technically feasible and complies with PRC and international engineering standards, local regulations and conditions, and strategic and sector priorities. Design options were compared and the best possible technologies with the lowest cost, environmental, and social impacts were selected. Baseline data was collected and proposed climate change adaptation measures specialists were incorporated, including (i) structural measures like drainage pipe system layout improvements, sponge city green infrastructure, and increasing the flow capacity of project rivers and creeks; and (ii) nonstructural measures. The proposed capacity development is based on a needs assessment for the successful implementation and sustainable operation of the project and to support Yanji to become a model low-carbon, climate-resilient, healthy city.

B. Economic and Financial Viability

25. An economic analysis for the project was prepared following ADB guidelines.¹⁸ Economic viability of the project was confirmed under various sensitivity scenarios. Benefits considered include (i) improved public transport, reduced carbon emissions from modal switch from cars to public transport and from clean-energy bus use, increased savings in vehicle operating costs and travel time, reduced road traffic accidents, and health benefits; (ii) improved flood protection and avoided damage; improved surface water quality; increased carbon sequestration; improved and expanded urban green spaces, tree planting, and landscaping; and reduced wastewater treatment costs; and (iii) improved water supply and water use efficiency, and reduced water leakage. The economic internal rate of return for the overall project was calculated at 27.1%, which is well above the 9.0% economic opportunity cost of capital. It drops to 25.4% if capital and operating costs increase by 10.0%, to 25.2% if benefits decrease by 10.0%, to 23.6% if the two assumptions are combined, to 24.4% with a 1-year delay in the benefits, and to 21.4% if the 1-year delay in benefits is combined with a 10% cost increase and 10% benefit decrease.

26. The financial analysis is conducted to assess the financial viability and sustainability of the proposed project in accordance with ADB guidelines.¹⁹ The financial evaluation of the BRT as the revenue-generating component results in a financial internal rate of return of 7.31%, exceeding

¹⁸ ADB. 2017. *Guidelines for the Economic Analysis of Projects*. Manila; and ADB. 1999. *Handbook for the Economic Analysis of Water Supply Projects*. Manila.

¹⁹ ADB. 2005. *Financial Management and Analysis of Projects*. Manila; and ADB. 2009. *Financial Due Diligence: A Methodology Note*. Manila.

the average weighted cost of capital of 5.25%, and the sensitivity analysis indicated that it remains financially viable under all considered scenarios. The financial statements analyses demonstrate that the project implementation unit of the BRT has adequate financial capacity to cover the incremental recurrent costs for operation and maintenance. The financial sustainability analysis indicated that the YCG (the end borrower) has sufficient financial resources to cover the recurrent cost and debt repayment. Therefore, the project is considered financially sustainable.

C. Sustainability

27. Project outcomes and outputs will be maintained over the project's economic life, and mitigation of potential risks, i.e., suboptimal BRT operation and financial management, will be through comprehensive capacity building and institutional strengthening provided by output 4. The YCG's suitable local government arrangement, with the development and reform commission leading the project management office, and its strength coordinating projects across departments will be further strengthened. The healthy and green infrastructure will likely contribute to medium- and long-term sustainability of natural resources, reduced pollution, and enhanced biodiversity.

D. Governance

28. **Financial management.** The financial management premitigation risk is rated *moderate* based on the assessed internal control environment, experience in implementing development projects, supervisory procedures, and technical capability. The financial management assessment conducted for the YCG, transport bureau, housing and construction bureau, traffic police department, Chaoyangchuan township government, and Yanji Water Group Company was in accordance with ADB's Financial Management Technical Guidance Note,²⁰ and covered funds flow arrangements, staffing, accounting and financial reporting systems, internal and external auditing arrangements, and financial information systems. Risk mitigation measures include training on financial management and disbursement for executing and implementing agency staff.

29. **Procurement.** The overall assessment of the project procurement risk is *moderate*. The executing and implementing agencies bring significant experience of national procurement. However, none of the agencies have previously been involved in procurement of projects funded by foreign entities such as by ADB. Proposed mitigation measures include training of staff of the implementing agencies and other stakeholders during project implementation.

30. ADB's Anticorruption Policy (1998, as amended to date) was explained to and discussed with the government, the YCG, and the implementing agencies. The specific policy requirements and supplementary measures are described in the PAM (footnote 17).

E. Poverty, Social, and Gender

31. In 2018, the project population in the six subdistricts and three towns of Yanji, where investments are located, was about 0.59 million, of which 0.48 million or 81.4% were urban inhabitants, 0.11 million or 18.6% were rural inhabitants, 0.30 million or 50.9% were women, and 0.31 million or 52.5% were ethnic minorities. According to the poverty and social analysis, the main cause of poverty is unemployment and underemployment because of insufficient new job opportunities created by unbalanced and inadequate industrial and agricultural development in Yanji. A total of 13,137 poor and low-income people living in the project areas will benefit from the project.

²⁰ ADB. 2015. *Financial Management Technical Guidance Note: Financial Management Assessment*. Manila.

32. The project will benefit about 0.59 million people through improved (i) urban mobility with BRT and NMT systems; (ii) road safety through traffic management; (iii) public health, environment, pollution (water, air, and noise), flood risk, sponge city greening, and water supply and wastewater management; and (iv) employment, with about 1,683 new jobs during project implementation, comprising about 508 management and technically skilled positions and about 1,175 unskilled positions. The project directly responds to issues raised by the poverty and social assessment through designs that are sensitive to issues of gender and disabled people, especially in the BRT and NMT systems. The project will further enhance social inclusiveness, with improved public facilities and environment benefitting all Yanji residents and tourists. A public awareness and education program is included in the social and gender action plan (SGAP),²¹ particularly to address risks and needs of vulnerable groups such as poor people and women.

33. **Gender benefits.** The project is categorized as *effective gender mainstreaming* and will have significant benefits for women, who are primarily burdened with household and family responsibilities. Women are more concerned with water supply and sanitation quality, and also use public transport more often than men as a result of their responsibilities, combining household work with travel to a workplace. Women consider improvements in traffic safety, better public transport, and NMT as important benefits to enhance accessibility, safety, and comfort of public transport. The majority of female respondents support the project as it will enhance their quality of life through improved urban environment and generation of job opportunities for themselves and family members. The SGAP will help ensure women's participation in public hearings; awareness raising; and economic, social, and decision-making activities related to the project, including (i) job opportunities during construction of 20% (of which 25% are skilled and managerial positions) and operation of 30% (of which 30% are skilled and managerial positions); (ii) gender-responsive physical design; (iii) awareness raising and project-related public consultations on environmental protection, road safety, and flood risk management (50%); (iv) capacity building of government staff (40%); and (v) inclusive and gender-sensitive action plans on a low-carbon, climate-resilient healthy city. SGAP implementation will be ensured by an assurance in the project agreement, through a social and gender development specialist to be engaged under output 4, and SGAP monitoring will be carried out twice a year by an external agency.

F. Safeguards

34. In compliance with ADB's Safeguard Policy Statement (SPS, 2009), the project's safeguard categories are as follows.²²

35. **Environment (category B).** An initial environmental examination (IEE) including environmental management plan (EMP) was prepared in accordance with the SPS on the basis of three domestic environmental impact assessment reports, a feasibility study report, site survey findings, and technical due diligence and studies by ADB. The project is expected to have positive impacts on the environment and reduce emissions and flood risk, while creating a more livable city. Anticipated impacts during construction include short episodes of increased noise and dust pollution during earthworks, site preparation, access road upgrade, and concrete mixing. Traffic management during construction may lead to short-term disturbance and increased noise and air pollution. Other potential impacts during construction include soil erosion, surface water contamination, and potential occupational health and safety risks to workers. Construction-related impacts are expected to be temporary and will be minimized by stringent site management and procedural provisions in the EMP. Environmental protection clauses will be included in works

²¹ Social and Gender Action Plan (accessible from the list of linked documents in Appendix 2).

²² ADB. [Safeguard Categories](#).

contracts to ensure that works contractors are aware of and committed to implementing requirements as specified in the EMP. Potential impacts from operation are mainly air pollution, noise, wastewater, and waste which are considered in the IEE, and mitigation measures and monitoring are included in the EMP. The government will recruit consultants to assist implementation and compliance and conduct external monitoring. Meaningful consultations were conducted during project preparation with all relevant stakeholders and the findings were incorporated in the project. Consultation will continue throughout implementation. Environmental complaints or disputes will be handled through a grievance redress mechanism established for the project. The IEE and EMP were disclosed on the ADB website in May 2019.

36. **Involuntary resettlement (category B).** The project will permanently acquire 50.68 *mu* of land, comprising 28.64 *mu* of village collective cultivated land, 3.23 *mu* of an unused village-owned fish pond, and 18.81 *mu* of unused village collective land.²³ Structure demolition impacts will be limited to 200 square meters of an abandoned nonresidential structure owned by the village collective of Yilan town. The project will affect 80 households with 268 people and not involve demolition of houses, shops, enterprises, or institutions. Agriculture is not the source of livelihood of affected people losing collective cultivated lands, and the impacts on household incomes is less than 5% for all 80 affected households. A draft resettlement plan was prepared following the laws and regulations of the PRC, Jilin province, Yanji city, and the SPS. The local government will be responsible for compensation and provision of support and assistance prior to land acquisition activities. Due diligence of land acquisition and compensation confirmed that there are no past or present concerns related to impacts on involuntary resettlement for an area of the BRT corridor where land acquisition was completed by the YCG in 2018. During implementation, training on ADB's involuntary resettlement policy and procedures will be provided to the project management office and resettlement management staff. An external agency will be engaged for semiannual external monitoring and evaluation.

37. **Indigenous peoples (category C).** In the six subdistricts and three towns where investments are located, there are 308,902 ethnic minority people, accounting for 52.4% of total project area population, among which 50.9% are Korean minorities. The poverty and social analysis identified that ethnic Koreans are socially and economically not vulnerable. The project will be implemented mostly in urban areas, where all minority groups are well integrated with the Han population. All ethnic minorities and groups will benefit equally from the project and no adverse impacts are envisaged.

38. **Health impact assessment.** A rapid HIA of the project was carried out according to ADB's framework (footnote 16). Cardiovascular diseases, hypertension, and diabetes are currently prevalent health burdens in Yanji, as well as injuries and casualties from traffic accidents. During consultations, residents' concerns were lack of open and green spaces, poor pavements, and sidewalks with parked cars causing lack of opportunities for physical activity. The HIA confirmed that the project addresses key health concerns of residents and its contribution to improved public health. The BRT, NMT, and sponge city facilities will enable more physical exercise and walking, including for vulnerable groups, as they will provide a safer and more attractive environment for pedestrians and cyclists. The project will reduce traffic accidents and exposure to air and water pollution. Sponge city green infrastructure will provide attractive open space for exercise and improved livability, improved microclimate, and reduced risk of flooding. Capacity building to prepare a healthy city masterplan under output 4 will contribute to making Yanji a pilot healthy and age-friendly city with broad positive impacts.

²³ A *mu* is a Chinese unit of measurement (1 *mu* = 666.67 square meters).

G. Summary of Risk Assessment and Risk Management Plan

39. Significant risks and mitigating measures are summarized in Table 4 and described in detail in the risk assessment and risk management plan.²⁴

Table 4: Summary of Risks and Mitigating Measures

Risks	Mitigation Measures
Delay in optimal bus rapid transit system operation and effective parking management because of lack of capacity of the operator and limited willingness to enforce parking policies.	The YCG will ensure adequate staff and budget resources per the loan covenants. The project will provide capacity development to improve monitoring and management of bus rapid transit, flood risk, sponge city infrastructure, water supply, drainage, and rivers. It will also provide institutional support for prudent operational practices and training.
PMO and PIU staff lack experience in implementing ADB-financed projects, especially on procurement and financial management.	The JPG and YCG implementing agencies have committed to fulfilling ADB's requirements for procurement and financial management. The tendering agency and project implementation consultants will provide capacity development on procurement and financial management.
PMOs and PIUs experience frequent turnover of trained staff.	Project implementation consultants will provide training on ADB requirements at regular intervals.
About 50% of YCG revenue comes from the JPG. While fund transfers for project-related costs are predictable, this reliance on JPG support may be a general risk to the financial sustainability of YCG.	A budget law from 2014 and ensuing regulations on local government financial management, and debt management and debt ceiling policies, have been passed. Over the past 3 years, regulations were further strengthened, and implementation has been monitored and enforced closely by the JPG and the Ministry of Finance.

ADB = Asian Development Bank, JPG = Jilin provincial government, PIU = project implementation unit, PMO = project management office, YCG = Yanji city government.

Source: Asian Development Bank.

IV. ASSURANCES

40. The government and the YCG have assured ADB that implementation of the project shall conform to all applicable ADB requirements, including those concerning anticorruption measures, safeguards, gender, procurement, consulting services, financial management, and disbursement as described in detail in the PAM and loan documents.

41. The government and the YCG have agreed with ADB on certain covenants for the project, which are set forth in the draft loan agreement and project agreement.

V. RECOMMENDATION

42. I am satisfied that the proposed loan would comply with the Articles of Agreement of the Asian Development Bank (ADB) and recommend that the Board approve the loan of €117,480,000 to the People's Republic of China for the Jilin Yanji Low-Carbon Climate-Resilient Healthy City Project, from ADB's ordinary capital resources, in regular terms, with interest to be determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility; for a term of 25.5 years, including a grace period of 6 years; and such other terms and conditions as are substantially in accordance with those set forth in the draft loan and project agreements presented to the Board.

Takehiko Nakao
President

13 November 2019

²⁴ Risk Assessment and Risk Management Plan (accessible from the list of linked documents in Appendix 2).

DESIGN AND MONITORING FRAMEWORK

Impact the Project is Aligned with Inclusive, environmentally sustainable, and competitive development of Yanji city achieved (Yanji City General Urban Master Development Plan) ^a			
Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
Outcome Livability, low-carbon development, climate resilience, and health in Yanji city improved	By 2028: a. Greenhouse gas emissions in Yanji city from transport sector reduced by 60,000 tCO ₂ per year (2017 baseline: 0) (RFI A) b. Mode share of public transport increased by 8% (2017 baseline: 44%) (RFI B) c. Flood risk in urban catchment area of Chaoyang River reduced to 1-in-50 years (2017 baseline: 1-in-20 years) d. Annual conservation of 4.8 million tons of drinking water achieved (2017 baseline: 0)	a. Yanji statistical yearbook b. Yanji city transport bureau annual report c. Yanji statistical yearbook, water affairs bureau annual report d. Water affairs bureau annual report, Yanji Water Group Company annual report	Change of government priorities away from sustainable urban planning and management
Outputs 1. Low-carbon bus rapid transit line integrated with nonmotorized transport infrastructure constructed	By 2027: 1a. BRT line of about 20 km and at least 25 stations constructed and equipped with wheelchair access, alarm buttons for women, priority seating, and safe lighting, especially for women (2019 baseline: 0) (RFI C) 1b. Fleet of at least 100 clean-energy BRT buses procured and bus terminal building constructed (2019 baseline: 0) (RFI C) 1c. At least 30 km of pedestrian links to BRT stations provided, including safe crossings and routes to schools and hospitals following universal design principles, and with lighting to ensure safety for women (2019 baseline: 0) (RFI B) 1d. At least five plazas with landscaping and exercise equipment for all ages provided near BRT stations (2019 baseline: 0) (RFI C) 1e. Sidewalk parking removed in at least six locations along the BRT corridor and 100 new parking spaces provided near BRT stations (2019 baseline: 0) (RFI C) 1f. At least 30 km of bicycle lanes along BRT corridor provided, linking to BRT stations and parking facilities at BRT stations (2019 baseline: 0) (RFI C) 1g. Priority seating for people with special needs (pregnant women, elderly, and disabled) in BRT buses installed (2019 baseline: 0) 1h. At least one ITS command center established providing information services to operator users (2019 baseline: 0) 1i. At least 880 jobs created during project implementation, and 350 jobs created during operation, at least 20% for local poor people and at least 20% for women during implementation and 30% for women during operation; (2017 baseline: 17.00% poor and 11.42% women in construction, and 25.00% women in operation)	1a–i. PMO semiannual progress reports	Delay in optimal BRT system operation and effective parking management because of lack of capacity of the operator and limited willingness to enforce parking policies

2. Climate-resilient flood risk management and sponge city green infrastructure constructed	<p>2a. At least 4 km of river with improved flood risk, green embankments, and ecological low-water level in-stream channel design and bicycle and pedestrian paths (2019 baseline: 0)</p> <p>2b. At least 8,000 square meters of sponge city stormwater retention green space integrating physical activity areas for all ages and at least 43 km of drainage pipes and 40 km of wastewater pipes built (2019 baseline: 0) (RFI C)</p> <p>2c. At least two end-of-storm-water pipe sedimentation tanks and reed-bed sand filters to clean first flush stormwater constructed (2019 baseline: 0)</p> <p>2d. At least 320 jobs created during project implementation, and 120 jobs created during operation, with at least 20% for local poor people and 20% for women during implementation and 30% for women during operation; (2017 baseline: 17.00% poor and 11.42% women in construction, and 11.00% women in operation)</p>	2a–d. PMO semiannual progress reports	
3. Water supply system improved	<p>3a. At least 330 flow meters and 4,000 smart meters procured and installed (2019 baseline: 0)</p> <p>3b. At least 32 km of leaking water supply pipes replaced (2019 baseline: 0) (RFI C)</p> <p>3c. 483 jobs created during project implementation, and 30 jobs created during operation, with at least 20% for poor people and 20% for women during implementation, and 30% for women during operation; (2017 baseline: 17.00% poor, and 11.42% women in construction and 25.00% women in operation)</p>	3a–c. PMO semiannual progress reports	
4. Capacity in low-carbon, climate-resilient, healthy city planning, and infrastructure management, developed	<p>4a. Action plans and guidelines which are inclusive and gender sensitive prepared on low-carbon, transport-oriented development; pedestrian and bicycle networks; urban climate change adaptation; citywide hydraulic model with sponge city green infrastructure; open space systems; and healthy city; and are accepted by Yanji city government and shared with other cities in the People's Republic of China and other developing member countries (2019 baseline: 0) (RFI D)</p> <p>4b. At least 50 staff (of which 40% are women) report improved knowledge on low-carbon city planning and lifestyles, transport-oriented development, parking management, BRT advanced operations, urban climate change adaptation and community resilience, sponge city green infrastructure, healthy city, water safety, and NRW management (2019 baseline: not applicable) (RFI E)</p> <p>4c. At least 30 government staff report improved capacity to assess water safety, develop effective mechanisms to reduce NRW, and operate geographic information systems and smart city solutions in Yanji (2019 baseline: not applicable) (RFI E)</p>	<p>4a. PMO semiannual consolidated progress reports</p> <p>4b–c. Post-training participant feedback surveys</p>	

<p>Key Activities with Milestones</p> <p>1. Low-carbon bus rapid transit line integrated with nonmotorized transport infrastructure constructed</p> <p>1.1 Prepare preliminary and detailed design for BRT system and nonmotorized transport links and network (Q2 2022–Q4 2024).</p> <p>1.2 Procure BRT stations and pilot route of BRT in west part of BRT corridor (Q2 2023–Q1 2025).</p> <p>1.3 Construct pilot route of BRT and associated pilot stations in west part of BRT corridor (Q2 2024–Q4 2025).</p> <p>1.4 Construct remaining BRT route, stations, terminal building, pedestrian links and pathways, bicycle lanes, and bicycle parking facilities at stations (Q1 2024–Q4 2025).</p> <p>1.5 Install BRT station equipment, traffic signals, ITS equipment, traffic safety equipment, signals, landscaping, and lighting (Q3 2024–Q4 2025).</p> <p>1.6 Conduct trial operation of BRT, including testing of ITS and command center components (Q1 2026–Q3 2026).</p> <p>1.7 Implement and enforce parking management plan (Q3 2025–Q3 2026).</p> <p>2. Climate-resilient flood risk management and sponge city green infrastructure constructed</p> <p>2.1 Prepare preliminary and detailed design and update of resettlement plan (Q2 2019–Q3 2020).</p> <p>2.2 Implement resettlement plan (Q4 2020–Q1 2021).</p> <p>2.3 Procure and award contract (Q4 2020–Q1 2021).</p> <p>2.4 Construct and install drainage pipes and sponge city green infrastructure, including end-of-pipe facilities (Q2 2021–Q3 2022).</p> <p>2.5 Construct green river embankment, in-stream bio-engineering, and landscaping (Q2 2022–Q4 2022).</p> <p>2.6 Produce knowledge products on innovations in sponge city interventions (Q2 2022).</p> <p>3. Water supply system improved</p> <p>3.1 Prepare preliminary and detailed design and procurement of advance procurement package for goods contract (Q2 2019–Q1 2020), and (Q3 2020).</p> <p>3.2 Install flow meters and smart meters (Q2 2020–Q3 2020).</p> <p>3.3 Replace water supply pipes (Q2 2021–Q4 2021).</p> <p>4. Capacity in low-carbon, climate-resilient, healthy city planning, and infrastructure management developed</p> <p>4.1 Project implementation consultants support PMO with management, design review, bid document preparation, contract management, site supervision, monitoring and evaluation, report preparation, and preparation and implementation of training and study tour plan (Q2 2020–Q1 2027).</p> <p>4.2 Conduct capacity development, awareness raising, and knowledge sharing on low-carbon city planning, traffic impact assessment and BRT operation planning, and pedestrian and bicycle master planning applying universal design (Q3 2022–Q4 2026).</p> <p>4.3 Conduct capacity development, awareness raising, and knowledge sharing on urban climate change adaptation action planning, hydraulic modeling, and sponge city and open space master planning (Q2 2020–Q4 2026).</p> <p>4.4 Conduct capacity development, awareness raising, and knowledge sharing on healthy city planning, monitoring, and awareness raising (Q2 2020–Q4 2026).</p> <p>4.5 Conduct capacity development, awareness raising, and knowledge sharing on water safety planning and NRW reduction (Q2 2020–Q4 2026).</p> <p>4.6 Conduct capacity development, awareness raising, and knowledge sharing on integrated digital solutions improvements for Yanji project areas (Q4 2026).</p>
<p>Project Management Activities</p> <p>Engage project start-up consultants; and low-carbon, transport, and parking consultants (Q3 2019–Q4 2019).</p> <p>Engage project implementation consultants; climate adaptation, sponge city and hydrology, health, NRW, and water safety consultants. (Q4 2019–Q2 2020).</p>
<p>Inputs</p> <p>Asian Development Bank: €117.48 million (loan)</p> <p>Government: €117.29 million</p>
<p>Assumptions for Partner Financing</p> <p>Not applicable</p>

BRT = bus rapid transit, tCO₂ = ton of carbon dioxide, ITS = intelligent transport system, km = kilometer, NRW = nonrevenue water, PMO = project management office, RFI = results framework indicators, Q = quarter.

^a Yanji city government. 2009. *Yanji City General Urban Master Development Plan (2009–2030)*. Yanji city.

Contribution to the Asian Development Bank Results Framework:

RFI A: Total annual greenhouse gas emissions reduction (tCO₂ equivalent/year). Expected: 60,000.

RFI B: People benefitting from improved services in urban areas. Expected: about 0.59 million.

RFI C: Urban infrastructure assets established or improved. Expected: 10 (20 km BRT corridor; 30 km bicycle lanes; 30 km pedestrian pathways and sidewalks; 5 plazas; 100 new parking spaces; 100 clean-energy buses; 4 km of sponge city river greenways, 43 km drainage pipes; 40 km wastewater pipes, 32 km of leaking water supply pipes replaced).

RFI D: Measures to improve regulatory, legal, and institutional environment for better planning supported in implementation. Expected: 5 (action plans developed and accepted by the Yanji city government).

RFI E: Urban climate and disaster resilience capacity development initiatives implemented. Expected: 1 (urban climate change adaptation action plan and training).

Source: Asian Development Bank.

LIST OF LINKED DOCUMENTS

<http://www.adb.org/Documents/RRPs/?id=50322-002-3>

1. Loan Agreement
2. Project Agreement
3. Sector Assessment (Summary): Urban and Urban-Rural Development
4. Project Administration Manual
5. Financial Analysis
6. Economic Analysis
7. Summary Poverty Reduction and Social Strategy
8. Risk Assessment and Risk Management Plan
9. Climate Change Assessment
10. Social and Gender Action Plan
11. Initial Environmental Examination
12. Resettlement Plan

Supplementary Documents

13. Detailed Financial Management Assessment
14. Detailed Economic Analysis
15. Climate Risk and Adaptation Options Assessment
16. Health Impact Assessment