

SECTOR ASSESSMENT (SUMMARY): URBAN¹

A. Sector Road Map

1. Sector Performance, Problems, and Opportunities

1. Low-carbon, resilient urban development in the People's Republic of China.

The People's Republic of China (PRC) has an urbanization rate of 59%, which is expected to reach 70% by 2035. A sustainable urban development strategy has appeared in the PRC's five-year plans since the Twelfth Five-Year Plan, 2011–2015. Climate change issues have become a part of the Government of the PRC's development agenda, and this is reflected in the Thirteenth Five-Year Plan, 2016–2020, which has prompted policies related to sustainable and low-carbon urban development that have been issued in connection with the plan's efforts to promote sustainable urban transport and energy systems, and to optimize urban layouts and a climate-resilient urban form. This is aligned with the PRC's international commitment to combat climate change as a part of Paris Agreement, targeting emission peaking by 2030. To accelerate low-carbon city development, the National Development and Reform Commission (NDRC) developed the Low-Carbon Cities Initiative (LCCI) to encourage cities to develop their own low-carbon models, share their experience, and replicate their success.² The Asian Development Bank (ADB) has supported low-carbon city development in the PRC in various ways, including through the provision of inputs on low-carbon city development for the preparation of the 13th and 14th five-year plans, and through a progress assessment on low-carbon resilient city development in the PRC in connection with the midterm review of the 13th plan. ADB has also provided support through the publication and dissemination of knowledge products, and through international capacity building events relevant to low-carbon and resilient development.³ Low-carbon, resilient, and environmentally sustainable growth is mainstreamed in ADB's country partnership strategy for the PRC, 2016–2020.⁴

2. The ADB studies show that PRC's low-carbon, resilient urban development is progressing, yet many challenges remain.⁵ Optimization of spatial planning remains challenging, as provincial and city government space management agencies have overlapping areas of responsibilities. Incoherency between city-wide planning and sector-specific development planning appears. Resilient urban development has been initiated but is constrained by insufficient funding, weak guidelines, and lack of classification and assessment indicators. Urban transport systems are suffering from a drastic increase in the number of passenger cars, and they lack appropriate infrastructure and a good public transport system to encourage a shift to public and nonmotorized transport systems. Green buildings accounted for 29% of newly built buildings in 2016 in the PRC, although this figure is based on green building labels achieved during the design stage; only 5% of green buildings obtained a green building label during the post-construction and operation stages. While clean and renewable sources are increasing in the PRC's energy systems, more

¹ This summary is based on several technical assistance reports, government reports, statistics yearbooks, and other secondary data and information.

² The LCCI started in 2010 and by 2018, 87 cities and provinces had registered.

³ ADB. 2018. *50 Climate Solutions from Cities in the People's Republic of China: Best Practices from Cities Taking Action on Climate Change*. Manila; and ADB. 2015. *Addressing Climate Change Risks, Disasters, and Adaptation in the People's Republic of China*. Manila.

⁴ ADB. 2016. *Country Partnership Strategy: Transforming Partnership—People's Republic of China and Asian Development Bank, 2016–2020*. Manila.

⁵ Several assessment studies have been carried out under ADB. 2017. *Technical Assistance for Promoting Low-Carbon Development in Central Asia Regional Economic Cooperation Program Cities*. Manila. These include Low-carbon and Climate Resilience Urban Development in the PRC, Accelerating Sustainable and Low-carbon Buildings, and others.

efforts and better incentive mechanisms are needed to accelerate low-carbon energy systems and the deployment of low-carbon advanced technologies (footnote 5).

3. Low-carbon, resilient urban development in Xiangtan. Xiangtan, a prefecture-level city located 40 kilometers (km) south of Hunan's capital, Changsha, has an administrative area of 5,006 square kilometers and a population of about 3 million. Xiangtan is an old industrial city undergoing industrial transformation and rapid urbanization: its urbanization rate grew from 42% in 2005 to 62% in 2019, and it has been a low-carbon city under the NDRC's LCCI since 2018. Situated within the Changsha–Zhuzhou–Xiangtan city cluster, Xiangtan has been a key economic driver for Hunan province. Gross domestic product in Xiangtan increased from CNY313 billion in 2005 to CNY2.2 trillion (\$308 billion) in 2019, which coincided with an increase in greenhouse gas (GHG) emissions from 24.36 million metric tons of carbon dioxide equivalent in 2005 to 39.68 million metric tons of carbon dioxide equivalent in 2016. In 2016 energy processing accounted for 18% of total GHG emissions, industry for 52%, transport for 8%, building for 12%, agriculture for 10%, waste for 1%, and carbon sink from land-use change and forestry for 1%. In terms of GHG intensity per unit of gross domestic product, Xiangtan is much higher than the averages in Hunan province and the PRC.

4. Industry sector performance in Xiangtan. Past and ongoing industrial transformations have contributed to the improvement of local environmental quality as heavy polluting industrial plants have been shut down or relocated. The Xiangtan Municipal Government (XMG) has used significant public funds for site remediation and ecological rehabilitation, and also for the creation of three industrial zones with high-tech, information and communication technology, and research and development-driven industries that develop low-carbon materials and products. These are (i) Xiangtan National High-Tech Industrial Development Zone, (ii) Xiangtan Jiuhe Economic and Technology Development Zone, and (iii) Zhaoshan Demonstration Area. Energy- and resource-intensive industries remain the critical economic drivers in Xiangtan. In 2017 the top five revenue-generating industries in top-down order in Xiangtan were (i) ferrous metal processing, (ii) automotive manufacturing, (iii) special equipment manufacturing, (iv) food manufacturing, and (v) electrical machinery and equipment manufacturing. However, knowledge and technology-based industries are expected to grow.

5. Energy sector performance in Xiangtan. Xiangtan belongs to the Central China Grid operated by the State Grid Corporation of China, which has energy sources comprising hydro (52.3%), coal (44.6%), wind (2%), and solar (1.2%). The power supply from Xiangtan to the grid, on the other hand, is mainly from coal (96.2%), with renewable energy sources comprising the rest: wind (2.0%), solar (1.0%), small hydro (0.8%). At present, the XMG has approved renewable energy projects, including 260 megawatts of wind and 24 megawatts of solar photovoltaic projects. Large-scale solar and wind energy development in Xiangtan, however, is limited because of natural and social conditions, including the limited land availability and potential land-use conflicts with farm lands. But alternative sources (e.g., industrial waste heat recovery) show great potential to transform the urban energy systems into low-carbon energy systems in Xiangtan. District heating and cooling systems using geothermal and river water in Xiangtan are in operation, covering around 0.5 million square meters (m²) of floor area. Theoretically, such systems can be expanded over 50 million m² of floor area using mature heat pump technology, which means entire urban floor areas can be covered. However, financial viabilities to develop such systems need to be carefully examined.

6. Emissions from building in Xiangtan. Emissions from the energy use in buildings accounted for 12% in 2016, having grown by 330% during 2005–2016, reflecting rapid urbanization. During 2015–2017, the floor area increase in all buildings was about 400,000 m²

per annum. Aligning with the policy of the Government of the PRC, the XMG encourages green building, especially for new buildings in urban core areas, referencing the PRC's green building labeling scheme and its three-star points-based ratings system. The PRC's green building labeling scheme is considered a qualitative measure and is difficult to quantify the energy and resource savings, which can be issued based on the building design, but does not require post-construction confirmation to verify whether the building was constructed consistent to the green building design. The Excellence in Design for Greater Efficiencies (EDGE) certification developed by the International Finance Corporation (IFC) requires 20% savings each in energy, water, and energy embedded in building design and materials. As EDGE requires both design and post-construction certifications, the use of this quantifiable green building certification would contribute to substantial GHG emissions reduction.

7. **Transport sector performance in Xiangtan.** Emissions from transport accounted for about 8% of total GHG emissions in Xiangtan in 2016 after increasing by 400% during 2005–2016. Passenger car ownership increased by 467% during 2008–2018, while total vehicle ownership only increased by 72% during the same period. Carbon-intensive mobility modes have been increasing, with surveys showing that the modal share of (i) walking decreased from 40% in 2010 to 36% in 2015 and 32% in 2019, (ii) cycling decreased from 11% to 3% and 2% in the same years, (iii) passenger cars increased from 5% to 16% and 18% in the same years, and (iv) buses increased from 14% to 17% and 19% in the same years. The road network in Xiangtan's core urban areas was 351 km (with a road density of 3.11 km per square kilometer) in 2016 and 408 km in 2018. In the same period, newly registered passenger cars amounted to about 20% of the total number of passenger cars each year. According to the XMG's plan, the urban road network will expand to 500 km by 2020. Without transforming people's mobility patterns, passenger car ownership will increase, and traffic congestion will become a major concern like in other PRC cities such as Beijing and Shanghai. Consequently, transport-related emissions would continue to rise as they are already experiencing.

8. **Climate resilience in Xiangtan.** Xiangtan has experienced flood events every year, resulting in significant economic loss, facility damage, and distress to affected residents. From 2011 to 2017, flood events caused direct economic losses totaling CNY4.5 billion (about \$640 million), affected almost 2.4 million people (including 143,791 who needed relocation), and caused the deaths of 13 people. Improving flood resilience should therefore be seriously considered.

2. Government's Sector Strategy

9. In 2015, ADB provided technical assistance (TA) to the PRC to create an inventory of Xiangtan GHG emissions and to assess challenges and opportunities in relation to low-carbon and resilient city development in Xiangtan.⁶ ADB's TA support assisted the XMG in preparing its low-carbon plan that was submitted as part of its application for the LCCI. The plan estimated carbon reduction potential and targeted carbon peaking in 2028 and described a framework to achieve this target and included four focus areas: (i) accelerating low-carbon industry development, (ii) changing the way of energy being used, (iii) promoting green and low-carbon transportation and buildings, and (iv) expanding carbon sink capacity. The plan laid out the need for institutional reform, low-carbon system innovation, low-carbon capacity building, low-carbon technology deployment, and low-carbon pilot demonstration. Two additional TA projects have been implemented in Xiangtan with the engagement of local experts and the Hunan Provincial

⁶ ADB. 2015. [*Technical Assistance to the People's Republic of China for Modeling Urban Low-Carbon Development in Xiangtan*](#). Manila.

Government (HPG), which helped increase participation of the XMG and its ownership of the activities implemented under the TA projects (para. 14).⁷

10. During 2017–2019, the XMG spent about CNY952 million for the low-carbon development initial works, with average annual spending of over CNY371 million. The top expenditure area (CNY573 million, or 55% of the total spending) was the deployment of electric vehicles and buses. Other key areas of low-carbon-related expenditure were the expansion of clean and renewable energy systems (16%), the promotion of low-carbon technologies and product innovations to support industrial transformation (11%), reforestation (7%), and wetland restoration (7%). There was more limited expenditure on developing a city low-carbon strategy (3%) and promoting green and low-carbon buildings (1%). The expenditure was distributed mainly through subsidies and/or grants. No official assessment was made on the effectiveness of the XMG's expenditure in GHG reduction impacts.

B. Major Development Partners: Strategic Foci and Key Activities

11. Diversified development assistance from multilateral and bilateral development partners was provided for sustainable and integrated urban development with multi-sector interventions. ADB and the World Bank have been the leading development agencies and have provided loans in these areas, with cofinancing provided by Agence Française de Développement, European Investment Bank, and German development cooperation through KfW. Other development partners that have provided TA and/or carried out capacity building trainings on low-carbon and resilient city development include Deutsche Gesellschaft für Internationale Zusammenarbeit, ICLEI – Local Governments for Sustainability, Institute for Sustainable Communities, the United Nations, the World Bank, and the World Resources Institute. All the support from international development partners is aligned with the Government of the PRC's Twelfth Five-Year Plan, 2011–2015 and its Thirteenth Five-Year Plan, 2016–2020. Key loan projects and programs are summarized in the table.

Major Development Partners			
Development Partner	Project Name	Duration	Amount (million)
Multisector Interventions in Urban Development			
ADB	Hubei Huangshi Urban Pollution Control and Environmental Management Project	2012–2020	\$100
ADB	Integrated Development of Key Townships in Central Liaoning	2012–2019	\$150
ADB	Guangxi Baise Integrated Urban Environment Rehabilitation Project	2013–2021	\$80
ADB	Gansu Jiuquan Integrated Urban Environment Improvement Project	2013–2020	\$100
ADB	Yunnan Chuxiong Urban Environment Improvement Project	2014–2020	\$150
ADB	Jilin Urban Development Project	2014–2022	\$150
ADB	Gansu Baiyin Integrated Urban Development Project	2014–2020	\$100
ADB	Xinjiang Akesu Integrated Urban Development and Environment Improvement Project	2015–2021	\$150
ADB	Xinjiang Tacheng Border Cities and Counties Development Project	2015–2021	\$150
ADB	Beijing–Tianjin–Hebei Air Quality Improvement–Hebei Policy Reforms Program	2015–2016	\$300
ADB	Qinghai Haidong Urban-Rural Eco Development Project	2016–2022	\$150

⁷ One of these was the following: ADB. 2017. [Promoting Low-Carbon Development in Central Asia Regional Economic Cooperation Program Cities](#). Manila. This TA project included Xiangtan as a TA pilot city and has carried out in-depth assessment and customized technical training and capacity building on integrated city planning as well as innovative measures that can be applied to sectors.

Development Partner	Project Name	Duration	Amount (million)
ADB	Air Quality Improvement in the Greater Beijing–Tianjin–Hebei Region—China National Investment and Guaranty Corporation's Green Financing Platform Project	2016–2022	€458
ADB	Heilongjiang Green Urban and Economic Revitalization Project	2017–2023	\$310
ADB	Air Quality Improvement in the Greater Beijing–Tianjin–Hebei Region—Regional Emission-Reduction and Pollution-Control Facility	2017–2023	\$465
ADB	Sichuan Ziyang Inclusive Green Development Project	2018–2025	\$200
ADB	Jilin Yanji Low-Carbon Climate-Resilient Healthy City Project	2019–2027	\$130
ADB	Shandong Green Development Fund Project	2019–2027	€88.73
ADB	Heilongjiang Green Urban and Economic Revitalization Project (Additional Financing)	2019–2023	\$150
AFD (cofinancier)	Shandong Green Development Fund Project	2019–2027	€75
KfW (cofinancier)	Shandong Green Development Fund Project	2019–2027	€100
KfW (cofinancier)	Beijing–Tianjin–Hebei Quality Improvement–Hebei Policy Reforms Program	2015–2016	€150
KfW (cofinancier)	Green Urban Financing and Innovation Project	2019–2025	€150
KfW (cofinancier)	Shaanxi Sustainable Towns Development Project	2019–2025	\$50
World Bank	Gansu Qingyang Urban Infrastructure Improvement Project	2012–2019	\$100
World Bank	Integrated Economic Development of Small Towns Project	2012–2018	\$150
World Bank	Jiangxi Poyang Lake Basin and Ecological Economic Zone Small Town Development Project	2013–2019	\$150
World Bank	Liaoning Coastal Economic Zone Urban Infrastructure and Environmental Management Project	2013–2019	\$150
World Bank	Shaanxi Small Towns Infrastructure Project of China	2014–2020	\$150
World Bank	Sichuan Chongqing Cooperation: Guangan Demonstration Area Infrastructure Development Project	2015–2020	\$100
World Bank (cofinancier)	Beijing–Tianjin–Hebei Quality Improvement–Hebei Policy Reforms Program	2015–2016	\$200
World Bank	Hebei Air Pollution Prevention and Control Program	2016–2020	\$500
World Bank	Ningbo Sustainable Urbanization Project	2016–2021	\$150
World Bank	Green Urban Financing and Innovation Project	2019–2025	\$200
World Bank	Shaanxi Sustainable Towns Development Project	2019–2025	\$100
Sustainable Fiscal Management Relevant to Sustainable City			
World Bank	Hunan Fiscal Sustainability Development Policy Financing	2017	\$200

ADB = Asian Development Bank, AFD = Agence Française de Développement, EIB = European Investment Bank, KfW = German development cooperation through KfW.

Sources: ADB and World Bank.

12. In Hunan province, ADB and the World Bank are the two main development partners, with loans across various sectors. Total lending from ADB to Hunan province during 2010–2019 was \$1.2 billion while that of World Bank was \$1.35 billion in all sectors, with sector assistance focused on transport, solid waste management, energy, urban development, environmental improvement, urban–rural infrastructure development, ecosystem and water management, capacity building, and public sector management. The Xiangtan Low-Carbon Transformation Sector Development Program (XSDP) is the result of ADB's past and ongoing coordination and cooperation with development partners and other organizations, including German development cooperation through KfW, ICLEI – Local Governments for Sustainability, IFC, the United Nations, and the World Bank. Collaborative trainings conducted by ADB and IFC as a part of the XSDP preparation have led to two green building demonstrations with EDGE-certification and the XMG's commitment to promoting an effective green building certification tool like EDGE. Through coordination with ICLEI – Local Governments for Sustainability and the United Nations, ADB introduced a green procurement policy; the XMG has committed to adopting two green procurement policy actions under the XSDP. Supported by the Hunan Provincial Government and the World Bank, the ADB program team conducted additional due diligence on Xiangtan's fiscal

management sustainability as a part of the XSDP preparation.

C. Institutional Arrangements and Processes for Development Coordination

13. The Government of the PRC through the Ministry of Finance, the NDRC, and the Ministry of Environment and Ecology are the main development coordinators. ADB's PRC Resident Mission plays a key role in harnessing lessons learned in project and/or program design and implementation as well as sharing these with the government and other development partners through regular exchanges. The HPG's Department of Finance (DOF) and Development and Reform Commission (DRC) coordinate development partners while prioritizing the requests for development assistance from local governments. The HPG's DOF and DRC originated and submitted a low-carbon city development proposal in 2017, which became the XSDP. A program management office was established at the XMG, which is the executing and implementing agency, with the support from HPG's DOF and DRC. The program team continued frequent communication with the Hunan DOF and DRC during the XSDP preparation. Led by the secretary-general of the XMG, the program management office has representatives from a number of XMG bureaus and will be responsible for day-to-day management and implementation of the XSDP.

D. ADB Experience and Assistance Program

14. ADB started lending to urban development activities in the PRC in 1992. By December 2018, ADB's had approved 61 loans totaling \$7.7 billion and 100 TA projects totaling \$65.3 million.⁸ Especially after the PRC's National New-Type Urbanization Plan 2014–2020, the ADB's support focused on livable, green, and socially inclusive small and medium-sized cities in the less-developed regions of the PRC.⁹ The TA projects have contributed to knowledge and policy development for livable, green, low-carbon, resilient, and socially inclusive urban development, addressing issues of urban poverty reduction, urbanization strategies, small city and town development, land use efficiency, urban–rural integration, and public participation. ADB has provided three TA projects supporting Xiangtan.¹⁰ Lessons from previous urban development, low-carbon energy, sustainable urban transport, and climate-resilient city projects were incorporated in the XSDP design. The XSDP, the first sector development program in the PRC with integrated and multisector urban solutions, will accelerate the transformation toward a low-carbon, resilient, inclusive, sustainable, and livable city.

⁸ Includes urban development sector loans and TA projects implemented by ADB's East Asia Department.

⁹ The State Council, the Government of the PRC. [China unveils landmark urbanization plan](#). (accessed 20 March 2020)

¹⁰ ADB. 2015. [Technical Assistance to the People's Republic of China for Modeling Urban Low-Carbon Development in Xiangtan](#). Manila; ADB. 2017. [Promoting Low-Carbon Development in Central Asia Regional Economic Cooperation Program Cities](#). Manila; and ADB. 2017. *Technical Assistance to the People's Republic of China for Supporting Project Preparation*. Manila.

Problem Tree for Urban

