

# GEF-6 China Sustainable Cities Integrated Approach Pilot Project Quarterly Newsletter

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## PROJECT PROGRESS (As of June 15, 2021)

### World Bank

The World Bank task team visited Tianjin (Apr 27), Shijiazhuang (Apr 28), Shenzhen (May 12-14), and Beijing (May 18) from April to May. The World Bank task team met with core members of the project management office (PMO) to discuss project progress. They visited sites and reached a consensus on follow-up arrangements and action plans for Tianjin Contract 2 (Jianchang Road Area), Shijiazhuang Contract 2 (Jiahua Depot), Shenzhen Contract 2 (Bainikeng Community), Beijing Contract 2 (Zhongguancun Life Science Park), and Beijing Contract 3 (Miyun North Railway Station).



Figure 1: World Bank team in Tianjin



Figure 2: World Bank team in Shijiazhuang

The Global Environment Facility (GEF) China Sustainable Cities Integrated Approach Pilot Project Annual National Workshop was held in Shenzhen from May 12-14, 2021. This workshop was chaired by Dr. Xiao Yuan, Urban Development Specialist and TTL at the World Bank. Wang Shaoliang, Director of the Major Project Coordination Office of the Development and Reform Commission of Shenzhen Municipality and Deputy Director of the Shenzhen Global Environment Facility Project Management Office (Shenzhen PMO), delivered the welcome speech as the host. The workshop was divided into three agendas. First, the Ministry of Housing and Urban-Rural Development (MOHURD) and seven pilot cities (Beijing, Tianjin, Shijiazhuang, Nanchang, Ningbo, Guiyang, and Shenzhen) reported the progress of their respective projects and exchanged technical achievements. The second section was about sharing and discussing the development and implementation experience regarding Shenzhen’s transit-oriented development (TOD). Third, experts from the World Bank task team provided technical guidance on procurement, environmental and social safeguards. The workshop also invited Dean Xia Haishan and Professor Zhang Chun from the School of Architecture and Arts of Beijing Jiaotong University, to provide expert opinions on the contents of the technical exchange report. Over 170 project managers and related consulting personnel attended the meeting. Shenzhen PMO provided strong support for the success of the workshop.



Figure 3: GEF China Sustainable Cities Integrated Approach Pilot Project Annual National Workshop in Shenzhen

## MOHURD

■ **GEMH-01A: *Development and Application of TOD Policies, Technical Standards, and Management Tools for Chinese Cities*** has completed detailed design plans for four modules of the TOD platform: diagnostics, planning, monitoring, and impact assessment modules. The plans passed expert review on March 25, 2021.

## Beijing

■ **GEBJ-1A: *Preparation and Implementation of City-Level Transit-Oriented Development (TOD) Strategy and Project Management Support for Beijing***: Beijing PMO is currently working on the TOD performance assessment standards and implementation plan for Task 5, Task 6: TOD Policy Framework Improvement, and creative activities for public engagement. Relevant operations are planned for completion and output reports will be submitted in August 2021.

■ **GEBJ-2: *Research on Optimization of Rail Transit Lines and Land-Use Based on TOD Concepts***: Beijing PMO has completed the relevant research for Task 2: Optimizing Functions and Layout of Lands along the Rail track. First draft of the output report passed the expert review on May 26, 2021. The report will be finalized and submitted to the World Bank by mid-June 2021.

■ **GEBJ-3: *“District-Level Application of TOD Strategy: Urban Regeneration of Life Science Park Near Jingzhang HSR and Changping Metro Line”***: PMO is currently carrying out the research on how to upgrade the comprehensive planning of the Task 2 area. Research will be completed, and the output report will be submitted to the World Bank by August 2021.

## Tianjin

■ **GEFTJ-1: *Preparation and Implementation of City-level Transit-Oriented Development (TOD) Strategy and Project Management Support for Tianjin***: Tasks 1-6 have been completed, while Tasks 8 and 10 have been partially completed. Tianjin PMO organized an online expert class for the public on June 3, 2021, and completed the relevant public engagement report on June 10th. PMO finished the first draft of Task 7 TOD strategy general report on June 10, 2021. Tianjin PMO plans to organize an expert review on June 15th and submit the report's final draft to the World Bank by the end of June 2021.

■ **GEFTJ-2: *Research on Tianjin Urban Rail Transit Project Financing under TOD Mode***: Tianjin PMO has completed on-site research, departmental research and interviews, collection, collation, and analysis of basic data such as urban rail transit construction, investment, financing, and land value capture. The constructions of Land Value Acquisition Monitoring and Evaluation System and Tianjin Urban Rail Transit PPP Project Social Capital Selection System were completed. The status database for Tianjin rail transit stations have been completed. The framework of the cost prediction and profit calculation models were refined, and the method of corridor-level passenger flow forecasting was defined. Collected data will provide a foundation for future TOD income calculation and financing applications analysis. Tianjin PMO plans to complete Tasks 1-4 in September 2021 and Tasks 5-6 in November 2021.

■ **GEFTJ-3: Tianjin Jianchang Road Area Rail Station - Planning and Design Research Project based on TOD Concept:** PMO received financial and technical proposals from three consulting departments on April 23, 2021. Due to the audit team stationed and provided opinions on the selection chosen by bid evaluation experts, Tianjin PMO communicated with the Municipal Finance Bureau, stating that the current government procurement platform cannot provide satisfying technical supports which fulfill bid evaluation experts' selection requirements. Based on the audit opinions and recommendations, Tianjin PMO has completed the Administrative Measures for the Management of Bid Evaluation Experts for the Technical Assistance Component of the Sustainable Cities Integrated Approach Pilot Project. Tianjin PMO plans to initiate the selection process for bid evaluation experts once the Administrative Measures are officially published after being reviewed by the Director's Office. Tianjin PMO currently plans to carry out bid evaluations in mid-June 2021 and complete the negotiation and signature of contracts by the end of June.

## Shijiazhuang

■ **GEFSJZ-1: Preparation and Implementation of City-Level Transit-Oriented Development (TOD) Strategy and Project Management Support for Shijiazhuang:** Shijiazhuang PMO has completed Tasks 1-5, and the revised output report was submitted to the World Bank at the end of April 2021. PMO is currently working on the research on TOD strategy and connecting transportations analysis along Shijiazhuang Railway for Task 5, study of improving traffic quality for walking and cycling in Shijiazhuang for Task 6, and the TOD action plan and operational manual for Tasks 6 and 7.

■ **GEFSJZ-2: Land Adjustment Plan for Shijiazhuang Urban Rail Transit Line 4:** Review of the inception report was completed on April 17, 2021. Shijiazhuang PMO is working on the land utilization analysis and the combing report of potential development of the land plot for Task 1 as well as the market analysis report for Task 3.

■ **GEFSJZ-3: Research on Planning and Design of the Area North of Metro Line 1 Shijiazhuang East Station based on TOD Concept:** The shortlist review and request for proposals were completed on May 7, 2021 and June 14, 2021 respectively. Proposal reviews will be completed on June 17, 2021, and contract finalizations are planned to be completed by the end of June 2021.

## Nanchang

■ **GENC-1A: Preparation and Implementation of City-Level Transit-Oriented Development (TOD) Strategy and Project Management Support for Nanchang:** The analysis report for the implementation of the safeguard mechanism for Task 6 was submitted to the World Bank on May 31, 2021. Nanchang PMO plans to conduct an expert review by the end of June 2021.

■ **GENC-2A: Study of TOD Planning and Design for Rail Transit:** Nanchang PMO is currently working on Tasks 3-5 and plans to complete the overall project program test and feedback report by July 2021.

■ **GENC-3B: Study of TOD-based Regional Planning around Rail Transit Stations:** The technical proposal review was completed on June 2, 2021. The contract is scheduled to be officially signed in July 2021.

## Ningbo

### ■ GENB-1: *Studies on TOD Development*

**Strategies in Ningbo:** Relevant work for diagnostic analysis and TOD type identification has been mostly completed. Ningbo PMO plans to carry out an expert review before the end of June 2021 and complete community seminars and other public engagement activities by July 2021.

### ■ GENB-2A: *Consultant Service regarding TOD Optimization for Kaiming Street (Yaoting Street – Zhongshan Road), New Street, and Shuangliang Community*

— An expert review of the inception report and a seminar on the project were held on May 26, 2021. Ningbo PMO is preparing the decision-making report for Task 2, and the first draft will be finalized by June 2021.

### ■ GENB-2B: *Research on Financing Methods of TOD Optimization for Kaiming Street (Yaoting Street – Zhongshan Road), New Street, and Shuangliang Community*

— An expert review of the inception report and a seminar on the project results were held on May 26, 2021. The revised output report will be submitted to the World Bank by June 2021.

### ■ GENB-3: *Study of TOD-based Regional Planning around Rail Transit Stations:*

Relevant works for Tasks 1-3 are mostly completed. A project output seminar and capacity building related activities for Task 2 were held in May 2021. The urban design of Kaiming Street corridor area for Task 4 is mostly been completed. The PMO plans to hold a seminar and expert review in conjunction with the completion of outputs for Task 3 in July 2021.

## Guiyang

### ■ GEFY-1: *Preparation and Implementation of City-Level Transit-Oriented Development (TOD) Strategy and Project Management Support for Guiyang:*

Output reports of Phase II (Special Report on the Application of Big Data in Guiyang TOD, Special Report on Policy Development on Parking, Diagnostic Report on Challenges, Opportunities, and Priorities of TOD, Special Report on TOD Classification & Mapping and the Feasibility of Land Development, Special Report on Low-Carbon Development, and Special Report on Real Estate Market Analysis), have been completed and passed expert review. They were submitted to the World Bank on June 15, 2021. Research work is currently being carried out in various districts of Guiyang to improve the top-level design plan for Guiyang TOD and formulate an implementation plan for Guiyang TOD.

### ■ GEFY-2: *Study on the TOD Comprehensive Development Planning for Areas Along the Rail Transit Line S1 Phase I and Line 3 Phase I Project in Guiyang City*

has completed the station's function positioning, land use plan, and urban design. Key contents of planning and design include detailed research and reconnaissance on Huaxi District along Line S1 and Line 3. PMO should carry forward the planning for important sites and the design scheme for conceptual cities. The site selection for the relocation of Huaxi Passenger Transport Station should take into the consideration of the planned location of Huaxi South Passenger Transport Hub. For the site selection and area planning of the Huaxi South Passenger Transport Hub, PMO and the Huaxi

Express Rail Project team should carry out joint design and plan discussions. Guiyang PMO is carrying out the planning and design for Shibao Town, Tianhetan, and other important stations along the Line S1. A proposal has been made to combine the construction and space development of Shubo Avenue, adding the planning ideas of Tianhetan Station and carry out corresponding planning and design.

■ **GEFGY-3: Study on the TOD Comprehensive Development Planning for Areas Along the Ring High-speed Railway in Guiyang City:** Functional positioning, land use plan, and transportation system for Mengguan Station and Huaxi South Station in Huaxi District have been completed. The urban design of Huaxi South Station (adjusted from Tianhetan Station in the task book) and Mengguan Station has been completed. Land use adjustment and transport integration of Tianhetan Station and Huaxi West Station has been completed.

■ **GEFGY-4:** As the content of contracts GEFY-2 and GEFY-3 triggered the World Bank's Strategic Environmental Assessment Safeguard Regulations, the newly added "**Strategic Environmental Assessment for Corridor-Level TOD Development Planning Study**" contract received technical and financial proposals on June 10, 2021. The PMO reported progress on contract procurement to the World Bank on June 15, 2021, and plans to complete the negotiation and formal signature of contracts by the end of June.

## Shenzhen

■ **GESZ-1: Preparation and Implementation of City-Level Transit-Oriented Development (TOD) Strategy and Project Management Support for Shenzhen:** Diagnostic analysis and TOD type identification for Task 4 has been completed. An expert review is planned by the end of June, 2021.

■ **GESZ-2A: Study on Sustainable Development Planning and Construction Management of the Bainikeng Community Based on the TOD Strategy:** Preliminary achievements for Tasks 1-5 have been completed. Site-level urban design studies for Task 6 have been initiated. Completing a semi-annual report and reviewing the progress for Tasks 1-5 is planned for completion by the end of June 2021.

## PROJECT IMPLEMENTATION PROGRESS (As of June 15, 2021)

PMO	Activity	Draft TOR	Final TOR	Bidding Announcement	Shortlist Review	Bid Evaluation	Contract Negotiation	Contract Signing	Inception Report	Inter-medary Output	Mid-term Report	Draft Final Report	Final Report
MoHURD	National TOD Platform												
Beijing	City-level TOD Strategy												
	Corridor and Station-level TOD Application												
	District-level TOD Application												
Tianjin	City-level TOD Strategy												
	Research on Private Sector Engagement in TOD Financing												
	District-level TOD Application												
Shijiazhuang	City-level TOD Strategy												
	Corridor-level TOD Application												
	District and Station-level TOD Application												
Nanchang	City-level TOD Strategy												
	Corridor-level TOD Application												
	Station-level TOD Application												
Ningbo	City-level TOD Strategy												
	District-level TOD Application												
	District-level TOD Application												
	Station-level TOD Application												
Guiyang	City-level TOD Strategy												
	Corridor-level TOD Application												
	Corridor-level TOD Application												
	Strategic Environmental Assessment for Corridor-level TOD Application												
Shenzhen	City-level TOD Strategy												
	District and Station-level TOD Application												

### LEGEND

Colored cells indicate the progress of each project. Green cells indicate progress from March 15, 2021 - June 15, 2021.

## KNOWLEDGE EVENTS

Under the guidance of MOHURD, the Ministry of Transport, and the Sichuan Provincial Government, hosted and supported by Chengdu Municipal Government and China Association of Metros (CAMET) respectively, the first Chengdu TOD Forum was held on March 2, 2021. The theme of the Forum was: Rail Transit leads Urban Development Patterns and TOD Remodels Urban Space. At the forum, Deputy Mayor of Chengdu released *TOD in Chengdu — Exploration of TOD Practices in Chengdu Based on the Park City Concept*, which provides an in-depth interpretation of Chengdu TOD Program and implementation experience for the development of global TOD. At the forum's signing ceremony, China Development Bank, China Construction Bank, Agricultural Bank of China, Bank of Chengdu, and ChengDu Rail Transit Group Co., Ltd. signed a cooperation agreement to support rail transit and transport-oriented development with a credit line of CNY 100 billion. ([Relevant Link](#))



Figure 4: Chengdu TOD Forum <sup>1</sup>

On May 14, 2021, the groundbreaking ceremony for the School of Urban Rail Transit of Southwest Jiaotong University was held in Chengdu. The School was built by the Chengdu Municipal Government in cooperation with Southwest Jiaotong University, and funded by ChengDu Rail Transit Group Co., Ltd. It is positioned as a new engineering science research academy and future technology campus serving the studies in smart cities and smart transportation. The college will offer majors specialized in smart construction, smart manufacturing engineering, smart transportation, urban design, urban operations, new energy sciences and engineering, and other related courses. This college and Southwest Jiaotong University will realize dual employment of professors in the latter's traditional preponderant disciplines, building new majors and sharing curriculums. These two schools will co-develop national platforms such as the National Center for the Innovation of Electrification and Automation of Rail Transit Technology and the National Engineering Laboratory for Integrated Traffic Big Data Applications. ([Relevant Link](#))

On May 17, 2021, Chengdu Rail Transit Group Co., Ltd. put the Erjiang Temple Station TOD Distributed Pavilion into display at Incubation Park Station of Line 1 and Dayuan Station of Line 5. It aims to promote the project and facilitate a more comprehensive public understanding of TOD. ([Relevant Link](#))

<sup>1</sup> Source: [https://www.chengdurail.com/sw\\_detail/7797.html](https://www.chengdurail.com/sw_detail/7797.html)



Figure 5: Erjiang Temple Station TOD Distributed Pavilion<sup>2</sup>

On May 17, 2021, the kick-off meeting for *the Technical Specifications for Urban High-Speed Rail (160-200km/h)* was held in Xiong'an New Area. *The Technical Specifications* are China's first series of urban rail system standards with a target of 200km/h and will guide the planning and design of rail transit with a maximum operating

speed of 200 km/h in Chinese metropolitan areas. The Specifications also help urban rails meet the development requirements of urban agglomerations and metropolitan areas such as Xiong'an New Area and Guangdong-Hong Kong-Macao Greater Bay Area. It aims to formulate standards based on the industry level, facilitate the high-quality development of urban high-speed rail, and accelerate the realization of Integration of Four Networks (high-speed rail, intercity rail, regional rapid rail, and urban rail). The Technical Specifications were the group standards jointly initiated and declared by CAMET and 18 participating organizations, including China Xiong'an Group, CAMET Experts & Academic Committee. They aim to fill the gap in urban high-speed rail (160-200km/h) standards and strengthen the influence and voice of Chinese standards in the field of rail transit construction. *(Relevant 1, 2)*

## INDUSTRY NEWS

### Strategic Partnerships

On March 26, 2021, China Railway Urban Investment Development (Wuhan) Co., Ltd. was officially established. The company was jointly established by Wuhan Urban Construction Investment & Development Group Co., Ltd. and China Railway Investment Co., Ltd. (China Railway Investment), a subsidiary of China State Railway Group Co., Ltd. (China Railway). Per the strategic partnership agreement signed by the

Wuhan Municipal People's Government and China Railway Investment, the joint venture will actively facilitate the establishment of the headquarter of Yangtze River Coast Railway Group Co., Ltd. It will also push forward the integrated development of urban and hub stations, such as Wuhan West Railway Station and Wuhan Tianhe Railway Station, to achieve the station-urban integration and develop a new type of urbanization.

*(Relevant Link)*

<sup>2</sup> Source: <https://p5.toutiaoimg.com/img/pgc-image/4814a966340c47d3b2e1ee3e1ec8325e~tplv-tt-shrink:640:0.image>

On April 9, 2021, Beijing Municipal People's Government and China Railway signed the *Framework Agreement of the Beijing Municipal People's Government and China Railway on Deepening Strategic Cooperation in the Railway Sector* to further deepen cooperation. This Agreement aims to efficiently integrate resources and improve the planning and construction of railway stations and urban micro-centers. It will further accelerate the construction of a facilitated and efficient railway system in the capital's urban(suburban) areas by pushing the development of Integration of Four Networks. The Agreement also help to advance the development of the Beijing–Tangshan intercity railway, phase I of the intercity rail line, the upgrade of Fengtai Railway Station, and Two Lines and One Hub sub-projects. [\(Relevant Link\)](#)

On April 13, 2021, Chongqing City Transportation Development & Investment Group Co., Ltd. and Longfor Group Holdings Limited signed a strategic partnership agreement to further Chongqing TOD integration and the creation of urban spaces. [\(Relevant Link\)](#)

On May 19, 2021, Minhang District People's Government and Shanghai Shentong Metro Group Co., Ltd. held a strategic partnership letter of intent signing ceremony. The letter of intent outlined the acceleration of the west extension for Rail Transit Line 13, the construction of Line 23, and other projects. Carrying forward the layout planning and construction of rail transit in key areas such as the West Area of Minhang Development Zone and Maqiao Artificial Intelligence Innovation Pilot Zone together was also mentioned in the letter of intent; Per the letter of intent, Minhang District People's Government and Shanghai Shentong Metro Group will advance the comprehensive systematization, cyberization, and smart construction in rail transit

and medium-capacity public transit businesses in the future. They will also actively explore various forms of mutually beneficial cooperation. [\(Relevant Link\)](#)

On May 25, 2021, Cifi Group and Chongqing West Railway Station Investment Development Co., Ltd. held a signing ceremony to mark the start of their partnership to develop the Chongqing West Railway Station TOD Project. The project features a gross floor area of roughly 220,000m<sup>2</sup> and will have an investment of CNY 2.7 billion. [\(Relevant Link\)](#)

On June 3, 2021, Nanchang Urban Rail Group and Vanke Shanghai Region held a strategic partnership framework agreement signing ceremony in Nanchang, Jiangxi Province. The partnership will thoroughly explore the TOD model and regard TOD integration as a key direction for future diversification and sustainable development. [\(Relevant Link\)](#)

## **TOD Integrated Development**

### ■ **TOD-related Land Transfers**

On March 29, 2021, the bid for a plot of land in Ningbo Life Science and Technology City was awarded to China Jinmao Holdings Group Limited (China Jinmao) with the price of CNY 241,758,500. The commercial plot covers an area of approximately 36,000m<sup>2</sup>, featuring a gross floor area of approximately 185,000m<sup>2</sup>, with a total investment over CNY 2 billion. China Jinmao aims to use Fangqiao Station on Line 3 to develop a landmark business complex with a 30-minute traffic circle that integrates a headquarters economy, industry clusters, and supporting services. [\(Relevant Link\)](#)

On April 27, 2021, Guangzhou placed 24 plots of land with a total area of 2,714,000m<sup>2</sup> for sale at a total starting price of CNY 49.89 billion. A total of 20 plots of land were sold for a total price of CNY 45.364 billion. Sun Hung Kai Properties (Guangzhou Xinyu Properties Co., Ltd.) won the bid for the core area in the TOD project of South Railway Station in Panyu District for a base price of CNY 7.082 billion (CNY 19,477 per m<sup>2</sup>). The site features a parcel area of 321,700m<sup>2</sup>, a buildable area of 261,000m<sup>2</sup>, and a transferred area of 257,400m<sup>2</sup>. Sun Hung Kai Properties plans to use the land to develop an integrated transport hub project with a gross floor area of 580,000m<sup>2</sup>. The developer owns 440,000m<sup>2</sup> of the land that it plans to use for the construction of shopping malls, hotels, and office buildings. The project features several phases and is planned to be completed in 2025. ([Relevant Link](#))

On May 24, 2021, the Hohhot Municipal Land Purchase, Reserve and Auction Center listed and sold 9 state-owned construction land usage rights and 2 state-owned construction land industrial usage rights. Two plots of the sold land, located at Entrance and Exit B2 and A of Jiangjunyashu Station on Line 1, were sold with TOD project design plans. These projects are the first attempt by Hohhot to develop business following the TOD model. They aim to construct businesses in formats such as community libraries and cafés. The city also plans to build the surrounding environment into a corner park. ([Relevant Link](#))

### ■ Comprehensive property development above the vehicle depot

On April 25, 2021, the Administrative Committee of Nanning Wuxiang New Area of China (Guangxi) Pilot Free Trade Zone completed the review and approval of Guangxi's first TOD urban complex project to utilize the space above the vehicle depot. The Nanning Municipal SASAC, Nanning Municipal Natural Resources Bureau, and Nanning Rail Transit Group Co., Ltd. signed the *Investment Contract for the State-Owned Construction Land Utilization Rights for Integrated Development of Urban Rail Transit for Xincun Village Parking Lot*, with a total value of CNY 4.517 billion. The contract marks the completion of land transfers for the Xincun Village Parking Lot Project of the Nanning Wuxiang New Area. Guangxi's first TOD urban complex will soon begin. ([Relevant Link](#))

On May 6, 2021, Feixi County (Hefei) Bureau of Natural Resources and Planning plans to use the Line 4 Huanancheng Depot as the pilot project for comprehensive property development. The entire project will implement TOD design concept. It plans to take the method of comprehensive planning and development of the above- and under-ground to avoid horizontal expansion of the urban space. The project plans to concentrate the construction of urban functions to create a vertical city, which leads to alleviating the urban fragmentation caused by the construction of rail and transportation yards. The pilot will develop an urban complex that integrates commercial, business, education, and residential functions to provide over 20,000m<sup>2</sup> of affordable housing. The space above the subway tracks will be reserved for the development of a public space designed to facilitate an integrated community-city-nature framework for the first TOD complex pilot in Hefei. ([Relevant Link](#))

On May 28, 2021, the main development of the commercial complex above Lianhua Road Station of Shanghai Metro Line 1 was completed. The complex is planned to be put into use in July 2021. The model project is the first in the country to focus on the urban complex renewal integrated with an already operating station. The project added overpasses, accessible elevators, escalators, and other features to the design. It improved transportation facilities and built corridors between the station and shopping mall. This project realizes the integration of bus and subway facilities with commercial complex indoor bus-rail integration to further improve the transportation integration of Lianhua Road Station. It also optimized operational services. As of current, over 200 stores have signed the preliminary agreement. [\(Relevant Link 1, 2\)](#)



Figure 6: Urban complex renewal for Lianhua Road Station on Shanghai Metro Line 1<sup>3</sup>

### ■ Integrated Transportation Hub

On April 21, 2021, Beijing Municipal Development and Reform Commission announced that the *Feasibility Study Report for the Beijing Chaoyang Railway Station Transport Hub and Supporting Projects* had been approved. The project is

located on the west side of Beijing Chaoyang Railway Station and features a total land area of approximately 54,000m<sup>2</sup>. Designed to support Beijing Chaoyang Railway Station, the project will undertake the passenger flow distribution of Beijing–Shenyang High-Speed Railway and the Northeast Ring Line of Beijing Suburban Railway (BSR). It will also operate along with Line 3 and R4 to meet the transfer needs of other urban transportations such as buses and taxis. The project will also meet the transfer and connection needs of transportation modes such as national railways, suburban railways, subways, and buses. It will be the first large-scale urban transport hub in the east of Beijing. The purpose of this project is to improve the city’s integrated service capacity. [\(Relevant Link\)](#)

On May 9, 2021, sponsored by China Railway and Shenzhen Municipal People’s Government, Shenzhen Metro Group (SZMC) held a bid awarding conference for the global plan of the conceptual and primary architectural design of the Shenzhen Airport East Integrated Transport Hub. Located in the core of Guangdong-Hong Kong-Macau Greater Bay Area and the Guangzhou-Shenzhen-Hong Kong Economic Belt, the project is a key economic and urban development area in the west of Shenzhen. The project will create a seamless integration of rail transit with other modes of transport and further optimize the services in the area. [\(Relevant Link\)](#)

<sup>3</sup> Source: [https://3g.163.com/dy/article/GATHMCIQ055040N3.html?spss=adap\\_pc](https://3g.163.com/dy/article/GATHMCIQ055040N3.html?spss=adap_pc)

On May 11, 2021, the Hangzhou West Railway Station Transport Hub Canopy Superstructure Development Project plot was jointly awarded to Shanghai Railway Real Estate and the Hangzhou West Railway Station Transport Hub Corporation. The site is located on the four corners above the canopy of the east-west drop-off platform of Hangzhou West Railway Station. It is the first land lot for TOD development of the superstructure above new high-speed rail station in China and planned to construct a complex features hotels and HQ offices. On June 4, 2021, the *New Construction of the Hangzhou West Railway Station and Related Projects on the Huzhou–Hangzhou West to Hangzhou-Huangshan High Speed Railway Connection Line* project received three-star certification for national green construction. The Hangzhou West Railway Station Transport Hub will lower the barriers between railyards to urban transit and space through railyard expansion and elevation, and multi-dimensional transit integrated development strategy. It aims to balance the relationship between transit and space in railway passenger stations and enable a variety of entities to share in the economic and developmental benefits of urban three-dimensional space. People can travel from the roof to underground of the Hangzhou West Railway Station Transport Hub by foot,

which shows the achievement of multi-dimensional station-city and city-city integration.

*(Relevant Link 1, 2)*

On May 28, 2021, the main structure of Lize Business District Station on Line 14 (5th contract period) of the Beijing Subway was completed. Lize Business District Station will serve as a cross platform interchange for Lines 14 and 16. The station will be an important transport hub in the area and its location is close to many business centers and buildings. *(Relevant Link)*

## **Infrastructure Financing**

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On May 17, 2021, the *National Development and Reform Commission (NDRC) issued the Notice on the Registration of the Issuance of Corporate Bonds by Shenzhen Metro Group Co., Ltd.(SZMG)*, which approved the issuance of CNY 4 billion in corporate bonds by SZMG. CNY 2 billion of the corporate bonds will be invested in rail transit, integrated transport hub, and intercity railway projects in line with national industrial policies. The remaining CNY 2 billion will be used as supplement to the company's working capital. *(Relevant Link)*

## POLICY UPDATES

### The “14th Five-Year Plan” and Other Major Projects

#### ■ The “Outline of 14th Five-Year Plan” and Special Transit Projects

On March 25, 2021, Nanjing Municipal People’s Government issued the *14th Five-Year Plan for the National Economic and Social Development (Nanjing) and the Long-Range Objectives Through the Year 2035*. The document outlined that Nanjing would enhance the capacity level of integrated transport hubs, accelerate the cyberization of rail transit in metropolitan areas, construct intercity rail transit lines, develop a 1-hour commuting circle, and densify urban rail transit networks. The integrated development of conventional public transport and urban rail transit by using rail transit as a framework was encouraged. Connection between conventional bus routes and rail networks will be enhanced. The density of the bus routes along railway stations will be increased. The amount of microcirculation bus lines will be increased. A variety of “last-mile” connection methods will be provided.

[\(Relevant Link\)](#)

On April 27, 2021, the Development and Reform Commission of Wuhan Municipality issued the *14th Five-Year Plan for the National Economic and Social Development (Wuhan) and the Long-Range Objectives Through the Year 2035*. The document outlined that Wuhan would focus on building a

demonstration city to present the world that China is the world leader in transportation. For the period of the “14th Five-Year Plan,” Wuhan has planned around CNY 500 billion in fixed asset investments (including rail transit) and the facilitation of nearly 400 transit projects.

On May 31, 2021, the Dongguan Municipal People’s Government issued the *14th Five-Year Plan for the National Economic and Social Development (Dongguan) and the Long-Range Objectives Through the Year 2035*. Based on the concept of integration and symbiosis between rail transit and city, the Plan outlined the clustering of spatial resources along high-speed, intercity, and urban rail stations. Dongguan will accelerate the construction of key integrated TOD and TID areas and utilize underground spaces and constructions of superstructure above the subway networks to push forward the facilitation of station-city integration development. The Plan also outlined the exploration of the “rail transit + land development” model to carry out the construction of urban rail transit projects and actively promote major projects in the key areas to participate in the pilot projects of real estate investment trust (REIT) in the infrastructure sectors. Dongguan Government will also actively connect transportation integration projects of the Guangdong-Hong Kong-Macau Greater Bay Area, and facilitate high-speed rail (HSR), intercity rail, and urban subway construction. It aims to co-develop the rail infrastructures of the Shenzhen Metropolitan Area and Greater Bay Area.

On June 8, 2021, the Shanghai Municipal People's Government issued the 14th Five-Year Plan for Integrated Transport Development (Shanghai), which continues to enhance the construction of a “central, functional, networked, and smart and green” integrated megacity transportation system. The Plan also stated the continued facilitation of urban public transport development and the realization of a transportation network encompassing adjacent cities within a 60-minute radius of Central Shanghai and major cities in the Yangtze River Delta within a 120-minute radius of the primary transport hub. By 2025, the mileage of the city's rail transit operation will reach 960km, one of the longest in the country, and the coverage ratio of permanent residents and employment positions within a 600m radius of the central railway station will reach 55% and 61% respectively. Specific measures include accelerating the completion of several rail-transit projects, establishing an integrated station development mechanism, and implementing a station-city integration development model. ([Relevant Link](#))

On June 9, 2021, the Shenzhen Municipal People's Government issued the *14th Five-Year Plan for the National Economic and Social Development (Shenzhen) and the Long-Range Objectives Through the Year 2035*. It outlined the establishment of separate above-ground, surface, and underground land utilization rights, the formulation of a 3D underground space plan, and the guidance of the non-intrusive, underground, and integrated construction of municipal facilities. The Plan includes the standardization and orderly encouragement of public-private partnerships (PPPs), real estate investment trusts (REITs), and other infrastructure models and implementation of a priority development strategy for public transport. It also plans to strengthen the active transport demand management and facilitate the transition

from continuous expansion of traffic supply to improvement of traffic efficiency. The Plan intends to coordinate and encourage the construction of metropolitan area infrastructure, densify metropolitan area transport networks, construct a 30-minute commuting circle with surrounding cities and an innovative integrated development model oriented around “hub + community + industry.” It aims to construct a series of open and three-dimensional integrated passenger transport hubs.

### ■ Major Municipal Project Plans

On April 2, 2021, Nanchang Municipal People's Government issued the *Major Project Plans for 2021 (Nanchang)*, which outlined the development of urban transit railway traffic including the branching of Line 1, the extension of Lines 3, and the construction of Line 5, 6, 8, and Line 9. The projects stated in the 14th Five-Year Plan (Nanchang), including municipal rail transit and the Greater Nanchang Metropolitan Area rail transit projects, are included in the preliminary study. ([Relevant Link](#))

On May 21, 2021, the Development and Reform Commission of Zhejiang Province issued the *List of '14th Five-Year Plan' Major Projects in Zhejiang (Implementation) and the List of '14th Five-Year Plan' Major Projects in Zhejiang (Planning)*. It outlined that during the period of the 14th Five-Year Plan, Zhejiang will construct 1,800 km of railway and 700 km of urban rail transit to complete the majority of the Zhejiang rail infrastructure project. Then, it will focus on the facilitation of the railway and rail transit projects, such as the Nantong-Suzhou-Jiaxing-Ningbo, Ningbo-Zhoushan, Shanghai-Jiaxing-Hangzhou HSRs, the Xiaoshan International Airport Station Hub and Connection Project, and the Wenzhou-Fuzhou Railway.

On May 27, 2021, the Development and Reform Commission of Shenzhen Municipality issued the *Major Project Plans for 2021 (Shenzhen)*. It outlined a total of 536 projects, of which over 30 projects were built by SZMG, including Phase II of the Shenzhen Metro Line 7 project, the Chegongmiao Integrated Transport Hub Project, the Qianhai Integrated Transport Hub Project, and the Shenzhen to Shenzhen-Shanwei Special Cooperation Zone Rail Project,. ([Relevant Link](#))

## Territorial Spatial Planning

### ■ National Level

On May 28, 2021, the Ministry of Natural Resources released the *Urban Design Guidelines for Territorial Spatial Planning (Draft) (the “Guidelines”)* for comments, approval, and implementation. The Guidelines emphasized the needs for the diverse, efficient, and flexible use of land for functional areas with special or key characteristics such as transport hubs; systematic construction and spatial development of public spaces in core areas should be emphasized; integrated above- and below-ground development and design should be encouraged; the organization of the connection and flow of external and internal traffic should be enhanced. The appendix of the Guidelines also outlined the improvement of transfer efficiency, facilitation of station-city integration, and enhancement of the city’s image as the primary goals of transport hub areas. The appendix also included the encouragement of public transportation and pedestrian prioritization,

the integration of under- and above-ground spaces, logical organization of traffic flow and transit facilities, a compact layout of blocks and communities around hubs, the establishment of normative requirements to encourage mixed-use and mixed-space utilization, and the introduction of control and guiding requirements for single building of hub structures, spaces in front of railway stations, and corridors within lines. ([Relevant Link](#))

### ■ Municipal Level

On May 27, 2021, Chongqing Municipal Commission of Planning and Natural Resources issued the *Territorial Spatial Master Plan for Chongqing Municipality(2021-2035)* (the Plan). It outlined a plan for constructing a multi-level rail transit network to build a “major metropolitan on rail.” The Plan also stated that the Four Network Integration of mainline rails, intercity rails, urban (suburban) rails (metropolitan express lines), and urban transit rails should be realized, and the 1-hour commuting circle around the central city that provides close connections to surrounding areas should be developed.

On May 31, 2021, Hangzhou Municipal Commission of Planning and Natural Resources issued the *Territorial Spatial Master Plan for Hangzhou Municipality (2021-2035)* (the Plan). It outlined the expansion, development, and utilization of underground spaces, implementation of zoning management, and exploration of layered utilization.

On June 11, 2021, Shenzhen Municipal Commission of Planning and Natural Resources issued the *Territorial Spatial Master Plan for Shenzhen (2021-2035)* (the Plan). It outlined the adherence to the three-dimensional development and the utilization of territorial space, delineation of density zoning, encouragement of multi-use of urban space, active revitalization of existing space, and facilitation of integrated development and utilization of underground spaces. The Plan drives the three-dimensional development of transport hubs and its surrounding areas based on TOD model for above-ground spaces and facilitates the three-dimensional development of underground spaces relying on rail transit hub and key urban development areas for underground spaces. The Plan aims to make Shenzhen the global model of three-dimensional city. The Plan will establish an urban public transport system designed around rail transit, facilitated by transport hubs, and complemented by other public transportations. It also plans to construct a subway network with a mileage of over 1,000 km to ensure the commuting time between the core area and peripheral urban function centers is within 45 minutes.

### ■ District Level

On May 8, 2021, Minhang District Commission of Planning and Natural Resources released the *Minhang District Territorial Spatial Plan in the Near Future (2021-2025) (Request for Comments)* (the Plan) for public comments. The Plan plans to densify rail networks to guide the development of areas with key functions. The 600m coverage of rail transit stations should be improved from 15% to over 40%; the development on TOD model should be promoted, and the adjustment and secondary development of existing spaces should be actively guided. During the 14th Five-Year Plan period, the Plan focuses on enhancing the construction

of rail transit, fully adopting the TOD model of railway stations, improving the economic value of surrounding land, and improving the efficiency, intensity, and quality of land use.

## Metropolitan Area and Urbanization Development Policies

On March 29, 2021, the General Office of the State Council forwarded the *Notice on Opinions on Furthering Railway Planning and Construction* (the Opinions) by NDRC and other departments. The Opinions called for increased guidance and restraint of the planning. It emphasized its principle that no new parallel lines should be built when the capacity rate of the existing high-speed railway is below 80%. New railway projects must be implemented strictly following the plans approved by the state. The functional positioning, construction schedule, and construction standards of planned projects must not be adjusted in any arbitrary manner, and in principle, projects that are not included in any plan should not be initiated. The Opinions outlines that primary high-speed railway lines should run through provincial capitals and megacities, achieve a two-way passenger flow of at least 25 million trips/year, have medium- and long-distance passenger flow account for over 70% of total passenger flow, and adopt the 350km/h standard. High-speed Rail lines should run through major cities above the prefecture level, achieve a two-way passenger flow of at least 20 million trips/year, focus on rail network functionality, and adopt the standard speed of 350km/h (preliminary). High-speed rail regional connection lines should achieve a two-way passenger flow of at least 15 million trips/year and adopt the standard speed of 250km/h. Intercity railway lines should, in principle, adopt the standard speed of 200km/h (or lower).

On April 8, 2021, the NDRC issued the *Key Tasks for New Urbanization and Urban-Rural Integrated Development (2021)* (the Tasks). It outlined the construction of urban clusters and metropolitan areas along rail networks. The layout of integrated transport hubs should be optimized; comprehensive passenger transport hubs and highly efficient comprehensive freight transport hubs should be constructed and seamlessly connect and facilitated transfer between multiple ways of transportation. Along with the optimization of urban transport service systems and in-depth construction of public transport city, the Tasks include the exploration of new models combining industrial land supply, layered development, three-dimensional development, and transit-oriented development (TOD).

On April 9, 2021, the Development and Reform Commission of Henan Province issued the *Zhengzhou Metropolitan Area Transport Integration Development Plan (2020-2035)*. It proposed the gradual formation of a public transport model based on rail transit and the construction of metropolitan on the rail. Zhengzhou will advance the comprehensive development of hub stations - city based on TOD concept. The Plan also explores ways to establish a long-term hub stations - city comprehensive development and operation mechanism, actively introduce investment and operation enterprises, and eventually realize a virtuous cycle of rail transit construction and operation through the utilization of land value appreciation feedback mechanisms.

On April 16, 2021, the “*Nanjing Metropolitan Area Development Plan*” was issued after being approved by NDRC. The Plan outlined the cooperative development of an integrated transport system to facilitate the construction of metropolitan on the rail.

On April 17, 2021, the Development and Reform Commission of Hebei Province, Hebei Provincial Department of Natural Resources, Hebei Provincial Department of Transport, and Hebei Provincial Department of Housing and Urban Rural Development jointly issued the *Implementation Opinions on Accelerating Development of Urban(Suburban) Railways in Metropolitan Areas* to strengthen the connection between the planning of urban (suburban) railways and the planning of coordinated development and transportation integration of Beijing-Tianjin-Hebei, as well as the integrated transportation system across the province, urban territorial space, and urban rail transit. The Opinions also called for the intensification of the land development along urban (suburban) railways and surrounding railway stations. The above- and under-ground space must be utilized; space-saving technologies and models such as underground space development and comprehensive development of superstructural properties on rail transit should be actively encouraged; The Outlines emphasized the expansion of railyard functionality, improvement of land resource development efficiency, and development of a station-city integration complex. The Opinions further calls for the enhancement of cooperation in rail and land development and changes on land-use, and the effective revitalization of existing railway stations and their surrounding developable rail land assets.

On May 30, 2021, the CPC Huizhou Municipal Committee and the Municipal People's Government issued the Huizhou Action Plan to Seize on Opportunities of building the Guangdong-Hong Kong-Macao Greater Bay Area and the Shenzhen Pilot Demonstration Zone and Deepen Integration into the Shenzhen Metropolitan Area (2021-2023) (the Plan). It accelerates all-round connection with Shenzhen and provides key supports for the construction of a world-class bay area and urban cluster. The Plan clearly calls for the acceleration of preliminary work for the Shenzhen–Huizhou intercity railway project. The Plan also pushes the construction of the Xiaojinkou-Huizhou North Section of the Dongguan–Huizhou intercity railway to start. The extension of Shenzhen urban rail transit to the areas adjacent to Shenzhen should be facilitated. The objective of the Plan is coordinating and accelerating the construction of the Ganzhou-Shenzhen high-speed rail, Shenzhen-Shanwei high-speed rail, and the Guangzhou–Shanwei high-speed rail to further the rail transit development of the Guangdong-Hong Kong-Macao Greater Bay Area. *(Relevant Link)*

### **Integrated Development of Rail Transit Section (Field), Property development above vehicle depot, and Surrounding Land**

On April 28, 2021, the General Office of Zhengzhou Municipal People's Government issued the *Notice on Rules for the Preparation of Regulatory Detailed Planning for the Integrated Development of Upper Cover Property of Rail Transit Section(Field) Station in Zhenzhou*. it outlined that

i) superstructure property development projects should realize the hierarchical segmentation of planned land by clarifying the different elevations of the functional interface, and that a hierarchical segmentation planning method should be used in the Preparation of Regulatory Detailed Planning to clarify relevant indicators such as land usage, plot ratio, building density, green space ratio, gross floor area, elevation, supporting facilities, building height, and more. ii) If the mezzanine between the upper floor and slab ground is used as a supporting garage or equipment room for the development above the vehicle depot, it shall be included in the gross floor area and will not be included in the plot ratio, building density, nor the population density calculations. If the mezzanine is used as functional buildings such as commercial and support facilities which are required in the calculation of plot ratio and building density calculations, then access roads and vertical traffic cores that connect the space above the vehicle depot with the ground development area will not be included in the plot ratio and building density calculations. iii) Property development above the vehicle depot: comprehensive development projects should encourage subway-oriented public transportation, and parking quotas can be reduced by 20% in accordance with the standards for supporting construction in Technical Regulations for Urban Planning and Management of Zhengzhou Municipality (Trial).

On May 7, 2021, the General Office of Nantong Municipal People’s Government issued the *Implementation Opinions on Facilitating the Integrated Development of Railway Stations and Surrounding Land*, which implemented a transit-oriented development (TOD) concept. Based on the principles of marketization and intensification, Nantong shall facilitate the comprehensive development and the utilization of railway stations and their surrounding lands, establish a comprehensive rail transit development mechanism in line with urban realities, and actively introduce development revenue feedback mechanisms for the construction and operation of rail transit to promote sustainable development. The Opinions clarifies that the land for comprehensive rail transit development can be hierarchically established for usufructuary rights, can support the separate development of under- and above-ground space based on different functions, and clarify the distribution of development returns.

### **Special TOD Planning**

On April 8, 2021, Chongqing Municipal Commission of Planning and Natural Resources, together with other relevant departments and units, including Chongqing Municipal Commission of Housing and Urban-Rural Development, Chongqing Development and Reform Commission, Chongqing Municipal Finance Bureau, Chongqing City Transportation Development & Investment

Group Co., Ltd., jointly formulated the Special TOD Plan for the Integrated Development of Urban Rail Transit in Primary Metropolitan Area. It clarifies the development of a central urban station classification system from grading, demarcation, qualitative, and quantitative aspects. In terms of grading, railway stations shall be divided into city, group, district, and community levels to formulate an comprehensive TOD classification system. In terms of demarcation, an integrated development zone with intensive, compact, and complex functionality will be constructed based on a 600m station radius in accordance with a comfortable 10-minute walking distance and Chongqing’s mountainous terrain. A “1368” comprehensive development circle-layer structure will be formulated around the stations in which the 100m radius of the stations will serve as a comprehensive development polar-core area, the 300m radius will serve as a comprehensive development core area, and the comprehensive development area on flat area can be extended to an 800m radius of the stations. In qualitative terms, railway stations shall be divided into commercial-use, hubs, public service, industry, and residential-use to formulate an comprehensive TOD classification system. In quantitative terms, the comprehensive development functions and the development capacity of railway stations shall be scientifically determined based on planning, urban design and planning optimization, as well as the “one strategy per case” policy.

*(Relevant Link)*

# Special Topics

## TOD and Low Carbon City Development



## 1. CARBON PEAKING AND CARBON NEUTRAL TWIN GOALS

On the 7th Session of the UN General Assembly held on September 2020, China announced that it aims to reach peak CO<sub>2</sub> emissions before 2030 and achieve carbon neutrality before 2060.

China has clearly outlined the national strategy targeting climate change on numerous occasions, including the UN Climate Ambition Summit 2020, the National “Two Sessions” 2021, and the 9th Meeting of the Central Committee for Financial and Economic Affairs. The strategy aims to establish a modern economic system guided and driven by green, low-carbon, and sustainable development<sup>1</sup>.

## 2. KEY STARTING POINTS FOR LOCAL ACTION

National goals must be translated into local actions to effectively ensure the realization of objectives. In China, cities are the primary strategy implementers for the implementation of policy actions. Incorporating the goals of reaching peak emissions before 2030 and carbon neutrality before 2060 into urban strategies with binding targets further drives the compact city development model, providing a framework for mid- and long-term urban strategies.

Transportation, buildings and energy are key elements for cities to tackle climate change as well as reaching peak emissions and carbon neutrality goals. From the supply side, in new urban development, the effective utilization of land, the facilitation of the development of public transport and slow traffic systems, the green design, construction, and operation of infrastructure and housing base on full life-cycle, the promotion of green and near-zero energy buildings, and the improvement of building’s energy efficiency through retrofitting old facilities in the process of urban regeneration, either way will achieve the reduction of both embodied and operational carbon emissions. From the demand side, people-oriented low-carbon operations will facilitate both green and low-carbon urban transformation.



Figure 7: Embodied and operational carbon illustration<sup>2</sup>

<sup>1</sup> Reference: “The Fundamental Path to Peak Emissions and Carbon Neutrality” [http:// www. xinhuanet. com](http://www.xinhuanet.com), March 16, 2021)

<sup>2</sup> Source: <https://www.usa.skanska.com/who-we-are/media/press-releases/238250/Skanska-Conceives-Solution-for-Calculating-Embodied-Carbon-in-Construction-Materials%2C-Announces-Transition-to-OpenSource-Tool>

### 3. TOD IS THE EPITOME OF LOW-CARBON URBAN DEVELOPMENT

TOD strategies at the city-level limit the carbon footprint base on the urban development model; TOD applications at the corridor- and district-level, which focusing on public transportation and low/zero-carbon communities, can reduce individual carbon footprints to a certain extent; at the site-level, TOD application can integrate transportation, construction, and energy to provide a model for the transformation of low-carbon urban.

### 4. ENCOURAGING GREEN, LOW-CARBON, HEALTHY, AND EFFICIENT TOD THROUGH A RATING SYSTEM AND CERTIFICATION STANDARDS

#### **A.** **LEED RATING SYSTEM FOR PUBLIC TRANSIT INFRASTRUCTURE** (LEED BD+C: TRANSIT; LEED O+M: TRANSIT)

The development of LEED rating system for public transit infrastructure is based on the rating system of LEED for Building Design and Construction (LEED BD+C) and LEED for Operations and Maintenance (LEED O+M) integrating global public transit station case studies (including Delhi, India and Shanghai, China) and the comprehensive consideration of construction and public transit development. The rating for the operations and maintenance stage requires using the *Arc* Platform to monitor and evaluate the data on energy, water, waste, transportation, and human experience of operating facilities. Using the Platform aims to achieve evidence-based decision-making in optimizing green performance and the sustainable operation of public transit infrastructures.

Rating System	Buildings	Stations	Routes
LEED BD+C	✓		
LEED BD+C: Transit		✓	
LEED O+M	✓		
LEED O+M: Transit		✓	
LEED for Transit Line			TBD



Figure 8: Overview of the LEED Rating System for Public Transit Infrastructure

When the basic rating dimensions are standardized, differences between the design & construction and operations & maintenance phases will be reflected in the setting of specific scoring items.

Figure 9: List of LEED rating projects for public transit infrastructure in the design and construction phase<sup>3</sup>

<sup>3</sup>Detailed Table: <https://www.usgbc.org/resources/leed-v4-bdc-transit-project-checklist>

LEED v4 for Operations & Maintenance: Existing Buildings				Project Checklist				Project Name:	
				Date:					
0	0	0	15	0	0	0	17		
<b>Location and Transportation</b>				<b>Indoor Environmental Quality</b>					
0	0	0	15	0	0	0	17		
0	0	0	15	0	0	0	17		
<b>Sustainable Sites</b>				<b>Energy and Atmosphere</b>					
0	0	0	10	0	0	0	38		
0	0	0	10	0	0	0	38		
<b>Water Efficiency</b>				<b>Materials and Resources</b>					
0	0	0	12	0	0	0	8		
0	0	0	12	0	0	0	8		
<b>Innovation</b>				<b>Regional Priority</b>					
0	0	0	5	0	0	0	4		
0	0	0	5	0	0	0	4		
<b>TOTALS</b>				<b>TOTALS</b>					
Certified: 48-49 points, Silver: 50-59 points, Gold: 60-79 points, Platinum: 80+ points				Possible Points: 110					

Figure 10: List of scoring items for the operations and maintenance phase<sup>4</sup>



## Case Study: Zhuguang Road Station on Shanghai Metro Line 17

Zhuguang Road Station on Shanghai Metro Line 17 is the first railway station in Asia to receive LEED Silver certification. How the Station uses green energy efficiently during the entire life cycle is shown as below:

**Sourcing local and energy-efficient construction materials to reduce pollution and energy consumption during transportation and construction which led to the cuts down of embodied carbon:**

70% of construction materials used for Zhuguang Road Station were locally (within 800km) sourced.

<sup>4</sup> Details: <https://www.usgbc.org/sites/default/files/leed-om-transit.pdf>

**A Comprehensive project plan solved problems produced during the construction process, such as waste, noise pollution, and dust:**

- During the construction of Zhuguang Road Station, muck was recycled through various channels such as backfilling and planting and reused for roads and foundations repair;
- The recycling rate of construction waste exceeded 90%. Scrap rebars were recycled by professional organizations and scrap concrete was used for on-site road hardening and repair;
- Reused to clean construction vehicles. To mitigate the buildup of dust in the air during the cleaning process, a wrapping washing method was used<sup>5</sup>.



Figure 11: Zhuguang Road Station lighting and ventilation system<sup>6</sup>

**Optimized designs for station lighting and ventilation systems:**

- Zhuguang Road Station adopted a large atrium design for its public area. This design improved underground lightning efficiency by incorporating natural lightning. It also utilized energy-efficient LED lamps and smart lightning control systems to reduce energy consumption and light pollution. and adopted high-reflectivity, high thermal insulation glass to prevent heat island effect;
- The station adopted a high-efficiency water-cooled and wind-cool HVAC system to realize dynamic balancing through heat exchange to reduce air-conditioning energy consumption. This design enhances the green energy efficiency of the station.

<sup>5</sup> Reference: <http://sh.eastday.com/m/20180905/u1a14212868.html>

<sup>6</sup> Source: <http://sh.eastday.com/m/20180905/u1a14212868.html>

## B. EVALUATION CRITERIA FOR CHINESE GREEN URBAN RAIL TRANSIT B1. THE ASSESSMENT STANDARD FOR GREEN URBAN RAIL TRANSIT BUILDINGS (T/CECS 724-2020)

The Assessment Standard for Green Urban Rail Transit Buildings was prepared by the Shanghai Research Institute of Building Sciences Group Co., Ltd., the Technology Center of Shentong Metro Group, and other entities. The document was published by the China Association for Engineering Construction Standardization (CECS), and became effective from January 1, 2021<sup>7</sup>.

### Objects of Evaluation:

Urban rail transit buildings, including railway station and railyard buildings.

### Evaluation Criteria:

The criteria mainly assess the overall management and control of rail transit planning, design, construction, and operation during the process. Performance, safety, and economic factors of the buildings are also under assessment. Indicator system consists of five categories: Safety and Durability, Environmental Health, Resource Efficiency, Construction Management and Operation Services. Each category includes controlled item (control group) and score items.

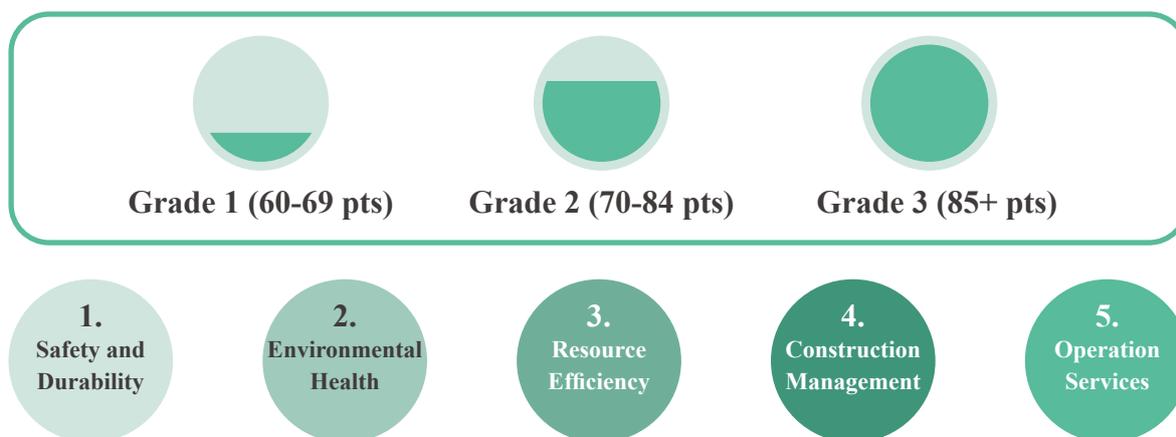


Figure 12: Criteria

<sup>7</sup> Reference: “Announcement on the Issuance of the ‘Evaluation Standards for Green Urban Rail Transit Buildings’” (CECS Website, July 20, 2020, <http://www.cecs.org.cn/xhzbz/fbgg/11246.html>)

## Case Study: Shanghai Metro Line 14(Entire Line)<sup>8</sup>

Shanghai Metro Line 14 is the first green rail transit line in China, which was designed and built in accordance with Grade 3 of the *Assessment Standard for Green Urban Rail Transit Buildings*. Made up of 31 railway stations and railyards, the entire line achieved green certification.



Figure 13: Map of Shanghai Metro Line 14<sup>9</sup>

How the Station uses green energy efficiently during the entire life cycle is shown as below:

### Green assessment considers both railway stations and railyards:

The certified projects were representative projects of Shanghai Metro Line 14, including Yuyuan Garden (transfer station), East Jinxiu Road (standard station), and Fengbang Station (depot). The scope of accreditation covered all railway stations and railyards.

<sup>8</sup> Reference: "Metro Line 14 Obtains the First National Green Rail Transit Project Certification" (Shentong Metro Group WeChat Official Account, May 24, 2021)

<sup>9</sup> Source: <https://www.shpt.gov.cn/shpt/jiaotong/jtfw/dt14hx.html>

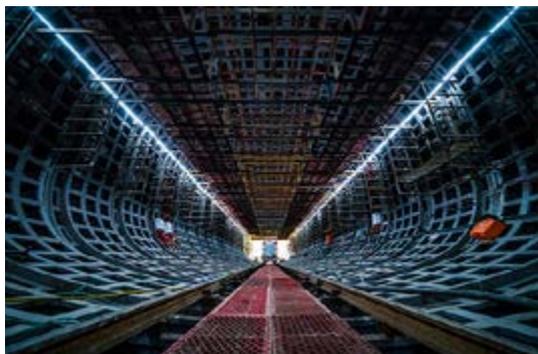


Figure 14: Shanghai Metro Line 14 trenchless construction site<sup>10</sup>

**Innovative technologies mitigate the impact of construction:**

During construction, both ends of the station were tunneled with cut-and-cover method, and the middle section is connected with trenchless top pipe technology to reduce the frequency of level crossings. This technology can not only ensure the traffic capacity of ground trunk roads, but also reduce impacts of construction on surrounding buildings and underground pipelines.

**Technology Empowers the Realization of Green Performance in Operations:**

A large variety of green technologies were adopted to achieve the green performance of safety, durability, environmental health, and resource efficiency during the design, use, and operation phases. These technologies are included but not limited to high-efficiency HVAC units, muffler with partition array, passenger flow simulation, AC sterilization and disinfection, integrated optimization of depot wind and solar environments, solar photovoltaic (PV) systems, integrated utilization of solar water heating system, natural lighting, and adjustable shading.



Figure 15: Typical railway station green technology system on Shanghai Metro Line 14<sup>11</sup>

**The setting of binding targets drives implementation of green standards:**

Health Indicator increased by 20%-50%, Safety Indicator increased by 10%-20%, and operational energy consumption decreased by 10%-20%.

<sup>10</sup> Source: <https://finance.sina.com.cn/tech/2021-05-27/doc-ikmyaawc7908509.shtml>

<sup>11</sup> Source: <https://mp.weixin.qq.com/s/6TPFUbJue-2YrAqg-fCjJA>

## B. EVALUATION CRITERIA FOR CHINESE GREEN URBAN RAIL TRANSIT

### B2. ASSESSMENT STANDARD FOR GREEN URBAN RAIL TRANSIT STATIONS (T/CAMET 02001-2019, T/CABEE 002-2019)

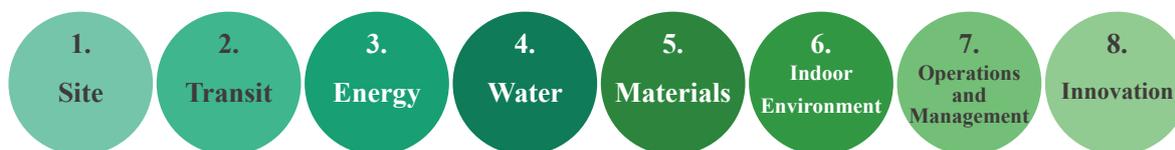
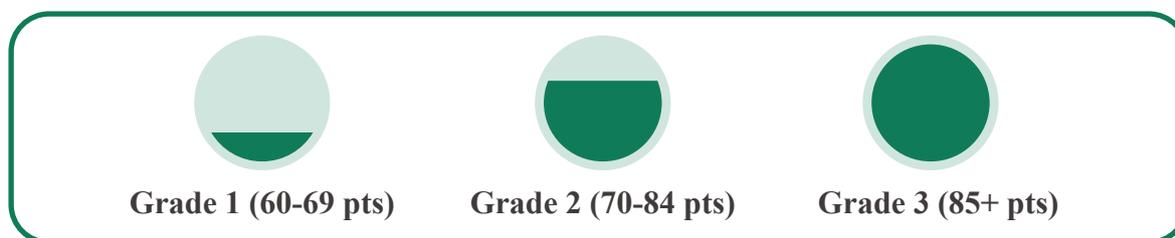
The Assessment Standard for Green Urban Rail Transit Stations was prepared by CAMET and the China Association of Building Energy Efficiency (CABEE), which became effective from October 1, 2019.

#### Objects of Evaluation:

Metro system, light rail system, and regional rapid transit system stations.

#### Evaluation Criteria:

Both planning & design and operations & management were taken into consideration. Three green construction grades were set up following the green construction evaluation criteria to deeply explore the characteristics of rail transit and focus on practicability<sup>12</sup>.



0.20	0.20	0.20	0.10	0.14	0.16	-	Planning and Design Phase Evaluation
0.12	0.16	0.16	0.10	0.10	0.16	0.20	Operations and Management Phase Evaluation

**Table 1: Weight of green station evaluation indicators**

<sup>12</sup> Reference: “Introduction to the Implementation Status of the Evaluation Standards for Green Urban Rail Transit Stations” (Wang Yiran, Beijing Urban Construction Design & Development, <http://m.mepconsultants.net/nd.jsp?id=4804>)

## Case Study: Jinkeng Station on Guangzhou Metro Line 21



Figure 16: Appearance of Jinkeng Station on Guangzhou Metro Line 21<sup>13</sup>



Figure 17: Lighting and energy system of Jinkeng Station on Guangzhou Metro Line 21<sup>15</sup>

**Use green and recycled materials to reduce the production of embodied carbon and improve the green efficiency of the station:**

During the construction process, Jinkeng Station only used high-strength rebars (above grade 3) and recyclable materials.

**Green technology empowerment and informatized operation & management reduces the generation of operational carbon, improves passenger experiences, and provides station personnel with a healthy and comfortable working environment:**

- BIM technology achieves efficient and green design;
- Through utilizing energy-saving facilities, such as solar photovoltaic power generation, high-efficiency refrigeration and air conditioning, comprehensive rainwater utilization systems, and sponge ecological facilities, to monitor carbon dioxide and indoor pollutant concentrations; informatizing management can improve the efficiency of future operation and maintenance of the station, which will provide evidence for the increase of green efficiency. According to preliminary estimates, roughly CNY 3.5 million in operating costs can be saved per year<sup>14</sup>.

<sup>13</sup> Source: [http://stdaily.com/index/kejixinwen/2019-12/17/content\\_844115.shtml](http://stdaily.com/index/kejixinwen/2019-12/17/content_844115.shtml)

<sup>14</sup> Reference: “The First National Grade 3 Green Certification Subway Station is Commissioned on Guangzhou Metro Line 21” (CSTNET, December 17, 2019, [http://stdaily.com/index/kejixinwen/2019-12/17/content\\_844115.shtml](http://stdaily.com/index/kejixinwen/2019-12/17/content_844115.shtml))

<sup>15</sup> Source: [https://www.gdadri.com/news/school\\_3422.html](https://www.gdadri.com/news/school_3422.html)

### **Integrated green evaluation takes both stations and public infrastructure into account:**

■ The glass curtain wall design of Jinkeng Station controls the reflection distance of visible light and reduces light pollution. The refined control of landscape lighting is realized through smart systems, which can reduce the impacts of lights on pedestrians, motor vehicles, animals, and plants both inside and outside of the station. Energy consumption is reduced by 53.35%<sup>16</sup>;

■ Jinkeng Station features a green area of 5,798m<sup>2</sup> ( with a greening rate of 36.87%). Green planning of the station emphasizes the integrated planning of the station and its surrounding environments, mitigates the heat island effect, and improves both the station's and surrounding environments.

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<sup>16</sup> Source: [http://gzw.gz.gov.cn/qy/qydt/content/post\\_2782385.html](http://gzw.gz.gov.cn/qy/qydt/content/post_2782385.html)

## **5. DEVELOPMENT OUTLOOK**

In terms of the current state of green certification in China, China's green building standards are widely adopted under the guidance of policies. LEED becomes a common choice for commercial operations and dual certifications (LEED BD+C and LEED O+M).

LEED BD+C certification is more commonly adopted comparing to LEED O+M certification, which will provide a potential for low-carbon operation for the built-up areas in cities.

## REPORT SHARING

### Technical Exchange Reports for “GEF China Sustainable Cities Integrated Approach Pilot Project Support Conference”

*(Relevant Link, Code)*

## UPCOMING TOD RELATED EVENTS

### 2021 Beijing International Urban Rail Transit Exhibition & Summit Forum

August 18-20, Beijing, China

*(Relevant Link)*

### 2021 China International Railway Conference for Urban & Intercity Transit (CIRC)

October 17-19, Shanghai, China

*(Relevant Link)*

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