

STA 2024 Spotlight: Tianjin, China

From Changing Streets to
Systematic Change: Transforming
Urban Mobility in Tianjin



Tianjin, the largest port city in Northern China with a population of around 15 million, was once celebrated as the “Kingdom of Bicycles,” thanks to the dominance of cycling in the 1980s and the presence of the renowned Flying Pigeon bicycle factory. As recently as 2003, over half of the city’s trips (51%) were made by bicycle.

However, with the rapid economic development and expansion of the automobile industry, car ownership surged, transforming Tianjin into the second most congested city in China.

This shift led to increased pollution, traffic fatalities, and a dramatic decline in walking and biking. Between 1993 and 2011, private vehicle trips rose from 2.4% to 13.4%, and by 2014, car ownership had reached 2.4 million vehicles.

In response to these challenges, Tianjin worked on aligning with China’s national Five Year Plans emphasizing sustainable transportation as one of the ways to mitigate carbon dioxide emissions. One of the first strategies was the Congestion Mitigation Plan in 2013 to promote public transport, cycling and walking while discouraging private car use.

✔ Cyclists and pedestrians reclaim Tianjin’s streets as the city shifted towards active transport and sustainable urban living. Credit: The World Bank.



Concurrently, significant investments were made in a metro system, with four lines spanning 135 km completed by 2013 and nine additional lines planned. Despite these efforts, metro ridership remained below expectations due to poor accessibility and inadequate bicycle parking near stations.

To address these gaps, Tianjin launched the World Bank-funded [Urban Transport Improvement Project](#) in 2015. This initiative aimed to enhance metro accessibility through active mobility and bus network expansion while improving urban livability to attract young professionals and tourists, essential for supporting the city's growing finance, research, and development sectors.

Between 2015 and 2022, the project succeeded in making streetscape improvements, building 126 km (about 78.29 mi) of new or expanded cycle lanes, building and rehabilitating 38 parks and public squares, redeveloping the surrounds of 96 metro stations and constructing one bus terminal, upgrading and installing over 850 streetlights and traffic signals, and implementing new street drainage systems. The project cost USD144.7 million, with USD 100 million financed by the World Bank and USD44.7 million provided by the government of China. The project was successfully completed by the end of 2022, despite delays during the COVID-19 pandemic.

Tianjin's redesigned streets prioritize cycling and walking, featuring safe bike lanes and pedestrian-friendly pathways—hallmarks of its award-winning sustainable transport transformation.
Credit: ITDP China.



As of now, Tianjin's metro network spans over 300 km (186.4 miles), marking a significant expansion. The project notably increased metro ridership in the city center by up to 85% compared to the 2015 baseline. Initially targeting 85,000 daily rides, the goal was revised to 95,000 in 2022. By the project's end in 2022, daily metro trips surpassed expectations, reaching over 175,000. Furthermore, the city now boasts 150 km (124.3 miles) of urban main streets with dedicated bus lanes and has upgraded 190 streets totalling 132 km to segregate motorized and non-motorized transport, fostering safer and more efficient mobility.

A cornerstone of the project's strategy was integrating different transport modes to enhance accessibility and connectivity. Transfer areas within 96 metro stations were redesigned to facilitate seamless transitions between metro, buses, and shared bicycles. In 2017, the city introduced dockless bikesharing, which now accounts for approximately half of all bicycle trips. This integration has been instrumental in promoting first- and last-mile connectivity and supporting transit ridership through improved accessibility to metro stations.

In 2019, the project expanded to include the Hebei district, a key commercial hub, as part of a broader restructuring effort to address the mobility needs of all central districts. By extending the project to Hebei and other areas like Heping and Nankai, Tianjin aimed to leverage its metro network to further encourage walking and biking while making urban transport greener and safer citywide. This strategic inclusion reinforced the project's mission to align transportation development with the city's broader environmental and social goals.

Key achievements (2015-2022)

1. Public Transport and Active Mobility:

- ▶ Metro ridership in the city center increased by 85% compared to 2015, exceeding the revised target of 95,000 daily rides to reach over 175,000.
- ▶ 150 km of urban main streets now feature dedicated bus lanes, and 190 streets have been reconfigured to segregate motorized and non-motorized traffic.
- ▶ 126 km of new or expanded cycle lanes, alongside the redevelopment of the surrounds of 96 metro stations and one bus terminal, enhanced connectivity and accessibility.

2. Infrastructure and Urban Space:

- ▶ 605,000 square meters of new pedestrian spaces, with the addition of 38 public parks and squares totaling 178,000 square meters.
- ▶ Enhanced flood resilience through 11 km of new drainage piping and over 850 upgraded streetlights and traffic signals.

3. Environmental and Social Impact:

- ▶ Annual greenhouse gas emissions reduced by 34,281 tCO₂e, far exceeding the target of 7,500 tCO₂e. This is equivalent of taking 7,600 cars off the road every year.
- ▶ Civic engagement reached nearly 12,000 participants, over half of whom were women, ensuring broad community support and feedback.

4. Policy Change

- ▶ The project contributed to the development of the country's first national standards for urban transport planning, emphasizing the prioritization of non-motorized transport (NMT) over traditional road classifications.

➤ Key Tactics in City-wide Transformation

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Tianjin's transformative Urban Transport Improvement Project, winner of the 2024 Sustainable Transport Award (STA), showcases the city's commitment to prioritizing people, decarbonizing transport, and fostering active mobility. The project achieved remarkable milestones, including a redesign of 132 km of streets to prioritize access and non-motorized transport (NMT), the creation of 126 km of new or improved cycle lanes, and the rehabilitation of public spaces to encourage walking and cycling.

By leveraging data-driven planning, enhancing metro access through NMT, and investing in pedestrian and cycling infrastructure, Tianjin has successfully increased active mobility while reducing car dependency. These achievements were underpinned by robust civic engagement, institutional adjustments, and a focus on capacity building, ensuring the project's impact is both immediate and long-lasting.

- Improved bike lanes and metro station connections in Tianjin are making it easier for commuters to switch between active transport and the metro, boosting ridership. Credit: Tianjin PMO.



➤ Use of data for better planning

As one of the first steps, Tianjin's Urban Transport Improvement Project utilized a data platform that integrated various data sources to improve decision-making and planning for active mobility. The platform combined urban data, bikesharing activity, and computer vision techniques to analyze cycling patterns, metro access, and infrastructure needs. It assessed the safety, convenience, and accessibility of streets, identifying over 200 street segments for improvement. This data-driven approach helped prioritize street improvements, understand travel behavior, and assess the impact of interventions, fostering a smarter and more responsive transport planning process.

Additionally, it incorporated public feedback through geolocation-based surveys, allowing the city to prioritize and refine its plans based on real-time data and community input.

An [economic analysis](#) of the Urban Transport Improvement Project identified cost savings because of individual travel time savings, reduced vehicle operation costs, reduced bus operations and maintenance costs, reduced emissions, and reduced vehicle crashes.

➤ Increasing support for metro ridership through active mobility

The example of Tianjin shows how to leverage a catalyst of ideas, such as improving access to the metro system, to increase investment in non-motorized transport. The entry point here was the metro line construction: Tianjin was looking for ideas on how to maximize its investment in the metro, which was under-utilized in the years after its completion. From 2015, the Urban Transport Improvement Project focused on re-prioritizing non-motorized transport to create conditions that would revive the "Bicycle Kingdom". This was intended to increase support for metro ridership through better connectivity and accessibility of metro stations via active mobility.

One of the most impactful changes was the upgrade of 190 roads in the city's urban core (a total of 132.19 km) to reconfigure existing street layouts and separate NMT from vehicles. The city followed the complete streets approach, paying particular attention to the areas around metro stations. The project interventions focused on the integration of station entrances, including bus stops, bicycle parking areas, taxi stands, and public and green spaces surrounding the stations. This encouraged multimodality and improved the station coverage range.

Investing in pedestrian and cycling infrastructure

Part of the streetscape development in Tianjin was the design approach of complete streets, which is characterized by responding to its community context. In addition, Tianjin reconfigured existing street layouts, used bollards and barriers to separate non-motorized transport from vehicles, introduced more pedestrian crossing facilities, added 43,000 square meters of sidewalk landscaped with grass and small shrubs, and improved street lighting as well as underground drainage piping, which increased flood resilience in downtown areas. Planting 3,541 sidewalk trees further improve the streetscape.

By expanding the active mobility infrastructure, most notably providing 126 km of added or widened cycle lines, it became much easier for residents to access the metro. The city also enhanced public spaces by rehabilitating parks and public squares to positively impact walking, cycling, transport, and the economy.

The results showed an additional 261,144 daily trips by walking and cycling. The walking share jumped, from 24% to 34% on weekdays and from 22% to 36% on weekends, that are based on a sample of the improved streets. The improved streetscapes also contributed to making transport roads safer in Tianjin and were associated with improving local economic activity.

This was mostly financed through the World Bank's loan of USD 100 million, plus a USD 44.5 million contribution by the Government of China. Some of the funds also went towards upgrading public squares, streetlights, traffic signals and implementing complete streets.

By reimagining streets to prioritize people over vehicles, Tianjin leads a new era of pedestrian-friendly urban design. Credit: Tianjin PMO.



➤ Strong civic engagement

Overall, the Urban Transport Improvement Project held 60 civic engagement events reaching almost 12,000 people, more than half of them women, and received mostly positive feedback. The results showed that the project substantially improved the safety of streets for all pedestrian and bicycle road users in Tianjin.

A sample of the improved streets (20 roads, totaling 16.5km) were assessed in an independent post-construction road safety audit following the International Road Assessment Program Star Rating methodology.

➤ Institutional adjustments and capacity building

A unique aspect of Tianjin's Urban Transport Improvement Project is its scale. This was possible due to institutional adjustments and capacity building. The initiative began with the development of Tianjin's inaugural Green Transport Strategy, which outlined key performance indicators and a vision for transforming the city into an international green transportation capital by 2030. The strategy was based on three core objectives: creating a compact city, building a world-renowned bicycle-friendly city, and fostering a livable environment.

These core objectives translated to the following strategies:

- ▶ Building a transit network with various options and focusing on development around transit hubs to create a compact, transit-friendly city.
- ▶ Expanding the walking and cycling network to make Tianjin a leader in bicycle-friendly cities.
- ▶ Reducing car use through better controls and incentives to support sustainable transportation and create a more livable city.

The strategy was presented to the leadership team of the People's Government of Tianjin Municipality who expressed strong support.

Institutional adjustments and building internal capacity and understanding of the value of active mobility helped the project move forward. A Project Management Office (PMO), set up in the 1990s to oversee the first World Bank project financed in Tianjin, along with other municipal agencies, defined the project scope and ultimately coordinated and implemented it. The PMO engaged several design and university research institutes to provide technical support. The World Bank also provided targeted technical assistance to prioritize active mobility and integration with public transport.

Institutional capacity-building efforts extended to the establishment of performance monitoring mechanisms and the adoption of sustainable planning paradigms. These efforts set the foundation for Tianjin's long-term ambition to serve as a model city for low-carbon and green transportation, influencing both national and international best practices.

Tianjin's project has already left a legacy, inspiring the development of China's first National Standards for Urban Pedestrian and Bicycle Transportation System Planning and Design. This achievement underscores the importance of aligning institutional reforms with technical capacity to deliver large-scale, transformative urban projects.

One of the lessons from Tianjin's Urban Transport Improvement Project is that development partners should take a holistic view of active mobility as a key component of urban transport. The project included public space enhancements, which have been proven to impact walking, cycling, transport and economy in the city.

Another lesson is that the investment in cycle infrastructure is a means of supporting other goals, such as improving public transport, reducing congestion and CO2 emissions. Tianjin's initial motivation for investing in active mobility was to increase metro use. Without the delivery of bicycle lanes, complete streets and public squares, investments in the metro system would not have been maximized.

✔ Through city-wide active mobility investments, Tianjin showcases how prioritizing people-friendly infrastructure can drive sustainable transport and economic growth. Credit: Runjie Huang.

Simultaneously, projects that implement active mobility infrastructure improvement should also consider strict parking management measures. Otherwise, motor vehicle parking can encroach on active mobility infrastructure, impacting usage rates and safety negatively. In the case of Tianjin, illegal parking is still a big challenge and some of the new lanes for non-motorized transport as well as footpaths get occupied by illegally parked cars. Enforcement against illegal parking is key and should be a standard feature in projects seeking to increase walking and biking.



Considering the significant emission mitigation benefits that Tianjin has achieved, the example also shows how aligning transport and climate benefits can make a case for climate financing. City-wide active mobility infrastructure projects strongly contribute to climate change and mitigation targets. By working with development partners to leverage innovative climate financing mechanisms like green bonds, it is possible to distribute risks and increase the confidence of banks and other investors.

Focusing on the buy-in of the population through people-centric planning was also key to Tianjin's success. Streetscape and improved public spaces were seen to better connect people to the metro, which has resulted in the win-win of a greener city that caters to active mobility and encourages metro ridership. By focusing on non-motorized transport and accessibility, the city paved the way for residents to use the metro. This in turn **generates more income for the metro, which can finance the developments.**

To ensure the delivery of sustainable transport infrastructure and its associated benefits, investments must be tracked and reported. Targets for cycle lanes and a reduction in road user injuries and fatalities should be set at the start of the project. However, the evaluations and quantifications are often difficult to compare to other projects, which makes the case for a comprehensive methodology that evaluates the costs and benefits of any active mobility project. This would be a useful tool for reducing risk and building confidence among investors.

Tianjin's active mobility upgrades connect people, cut emissions, and inspire green investments. Credit: Tianjin PMO.



Summary of lessons learned

The Tianjin Urban Transport Improvement Project is a good (and rare) example of a megacity achieving rapid, city-scale, transformative change to improve streets for walking, biking, and public use and enjoyment. It is the largest active mobility project ever funded by the World Bank.

Maximizing the city's investment in its metro system was an important entry point, showcasing how economic motivation can be incentivized. The project also had a people-centric approach, seeing streetscape and public space redevelopments to better connect people to the metro. Accordingly, interventions were planned at scale and across the entire city, surpassing the pilot project scale and instead aiming at a transformed paradigm in Tianjin towards people-centric planning. The city now has the technical capacity, financial capacity, and political will to roll out similar improvements prioritizing non-motorized transport across the whole city.

Since the end of the project, the lessons learned have influenced the National Standards for Urban Pedestrian and Bicycle Transportation System Planning and Design, which are expected to have a large impact on the quality and quantity of walking and bicycle infrastructure in China. The project is being promoted nationally and internationally to help make the case for large-scale investing in walking, biking and public space in large cities worldwide.

Tianjin continues to enhance its non-motorized infrastructure, including the construction of a new 15.8-kilometer “Haihe Blue Ribbon” bicycle lane, which caters to the cycling, health and recreation needs of residents along the Haihe River. In addition, plans are underway to develop a high-quality cycling route downtown soon.



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