

Tunnel visions: China bets big on subways as cities expand

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A worker looks out of a train at the construction site of Line 14 of the Shanghai metro system

Deep under Shanghai, workers on a flood-lit construction rig carefully install massive concrete wall sections for a new subway tunnel, adding metre-by-metre to the world's longest metro system.

The Shanghai metro's future Line 14 is part of plans to extend the

already sprawling network another 35 percent by 2020 to 830 kilometres (515 miles)—more than the distance from New York to Chicago.

Yet Shanghai is just one player in an unprecedented subway-building boom as China's massive cities race to keep pace with rising urban populations.

In 2001, four mainland Chinese cities including Beijing and Shanghai had rather limited networks. By end-2016 there were around 30, including some of the world's longest and busiest networks, and about a dozen more cities have gotten the green light.

State media reports say Chinese spending on subway construction could top 2 trillion yuan (\$295 billion) from 2016-2020 alone.

"(China is seeing) the fastest period in human history for the development of metro systems. It's quite remarkable," said Liu Daizong, a World Resources Institute transport expert in Beijing.

Legendary traffic jams

Usually reserved for first-tier cities, subways are running even in third-tier population centres far inland.

Shanghai metro system

Shanghai's network is among the world's top three busiest, along with Tokyo and Beijing



Graphic showing the expansion of the Shanghai metro system, which is among the world's busiest networks.

The driving factor is a massive shift of humanity to Chinese cities.

Only around 12 percent of Chinese were urban-dwellers in 1950. Today the rate is about 55 percent and targeted to rise by 2030 to 70 percent—or around one billion people.

Officially encouraged to lift millions from rural poverty and fuel economic growth, urbanisation has also brought congestion, pollution and sprawl.

Shanghai's population has nearly doubled since 2000 to 24 million—China's largest—and is on course for 30 million by 2030. Its [traffic jams](#) are legendary.

To keep up, its metro system has roughly doubled in the past decade, and on April 28 handled a record 11.86 million individual trips.

Along with Tokyo and Beijing, the network is among the world's top three busiest and has grown so much that there are plans to connect it with the metro of the neighbouring [city](#) of Suzhou more than 100 km away.



This picture taken on July 19 shows commuters in the morning rush hour on line 2 of the Shanghai Metro in Shanghai

Going deep

But challenges have emerged—new Shanghai lines must be dug as deep as a 15-storey building to squeeze under the maze of existing tunnels, said Zhou Xisheng, an engineer with state-run Shentong Metro Group which runs the system.

"As the depth increases, so does the difficulty... and the price," Zhou said, standing in a yellow hardhat next to a giant pit during a government tour of new construction.

Metro construction is notoriously expensive, and questions hover over China's ability to pay for all the plans.

But Lillian Li, a Shanghai-based credit expert with Moody's, said ruling Communist Party support should see projects through.

"Transport is a key infrastructure sector that the government would like to support for (national) integration and coordination. That's looking pretty good," Li said.

Chen Xiaohong, a transportation engineering professor at Shanghai's Tongji University, said China had no choice but to press ahead.



This picture taken on July 19 shows commuters during the morning rush hour at a station of the Shanghai Metro in Shanghai

"Subways must be built to solve both present and future transportation problems. We cannot wait until roads get completely clogged and only then build a subway," she said.

The building spree is part of larger visions sketched out by planners that include the development of massive "city clusters" such as one grouping Shanghai and nearby cities like Suzhou and Hangzhou that could top 50 million people.

Such urban agglomerations would connect to nearby lower-tier cities and other regions of China via fast-expanding high-speed rail systems, with economic benefits all around through enhanced flow of labour, financing, resources and administrative expertise, experts said.

A transport ministry statement on Tuesday declared China to be in a "golden era" of transport development.

The resulting bonanza of infrastructure investment, likewise, will boost the national objective of spurring domestic consumption to lessen China's reliance on volatile overseas trade, said Zhu Dajian, a sustainable-development expert at Tongji University.

"Subways solve a lot of problems, raise the quality of a city, and reduce driving time and energy consumption," he said.

"In 10 to 20 years this path will be proven correct."

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