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CHINA'S NEW INFRASTRUCTURE

CUSHMAN & WAKEFIELD RESEARCH

CHINA'S NEW INFRASTRUCTURE 2020

CONTENTS



03

OVERVIEW

05 What's Behind the New Infrastructure Initiative?

- Mitigate the Negative Impact of COVID-19
- Grasp New Economic Development Opportunities
- Upgrade Existing Infrastructure Areas



12

IMPLICATIONS FOR COMMERCIAL REAL ESTATE

14 What Does the New Infrastructure Initiative Mean for the China CRE Market?

16 Financing New Infrastructure Investment



18

SEVEN MAJOR INFRASTRUCTURE SECTORS

19 5G Infrastructure Development

20 Big Data Centers

21 Artificial Intelligence

22 Intercity High-Speed Rail and Urban Rail Transit

23 Ultra-High Voltage (UHV)

24 Electric Vehicle Charging Infrastructure

25 Industrial Internet Network



28

CONCLUSION / WHAT'S NEXT

01



OVERVIEW

What's Behind
the New
Infrastructure
Initiative?

Mitigate the
Negative
Impact of
COVID-19

Grasp New
Economic
Development
Opportunities

Upgrade
Existing
Infrastructure
Areas



China's New Infrastructure initiative is an ambitious new central government policy designed to channel large-scale investment into high-tech industry sectors, with the objective of kickstarting the nation's economic growth and boosting future job creation.

Devised primarily in response to the unprecedented shocks inflicted on China's economy by the COVID-19 crisis, the initiative represents a departure from central government infrastructure planning of the past, and reflects China's transition towards a new economic era.

In this report we will identify the factors behind the policy, summarize the key infrastructure sectors involved, and examine the implications for commercial real estate.

WHAT'S BEHIND THE NEW INFRASTRUCTURE INITIATIVE?

There are three key drivers behind the New Infrastructure plan: to mitigate the negative impacts of the COVID-19 pandemic, to grasp new economic development opportunities, and to upgrade existing infrastructure areas.

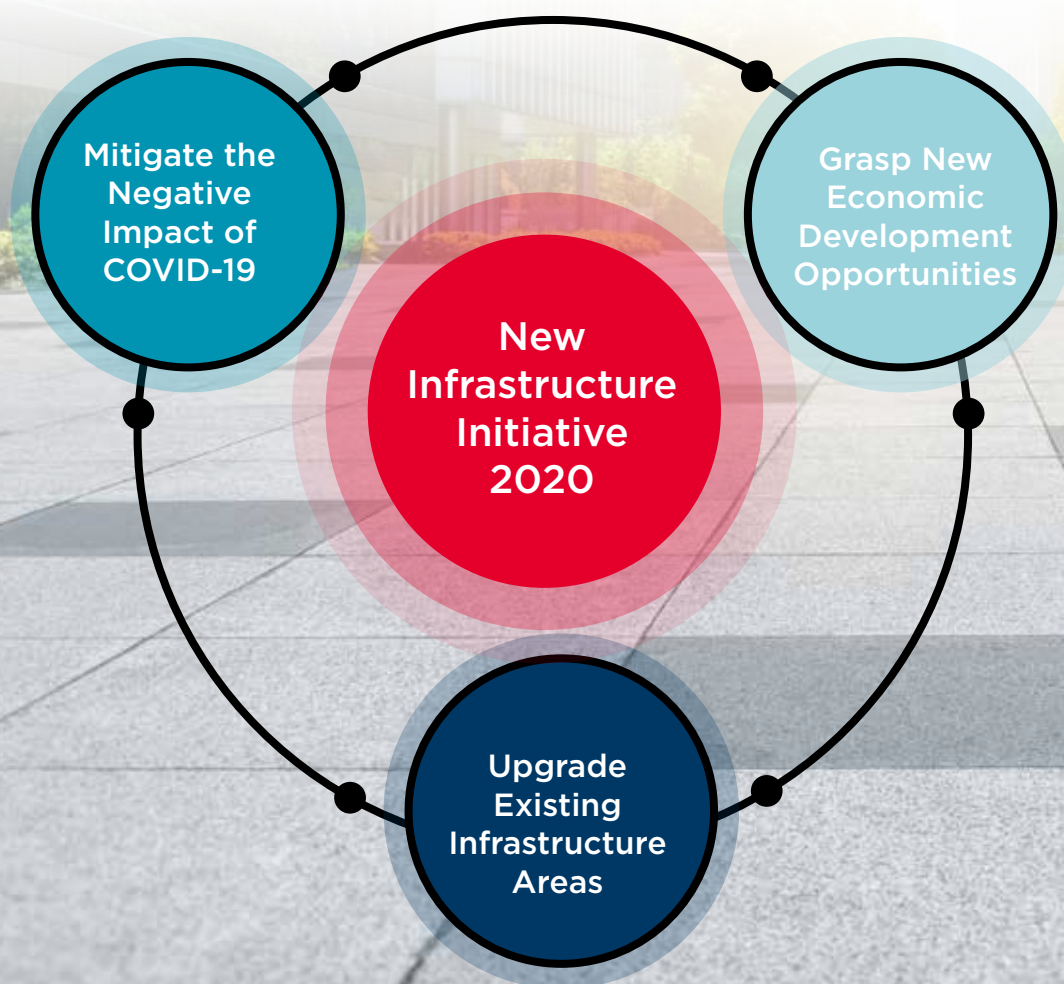


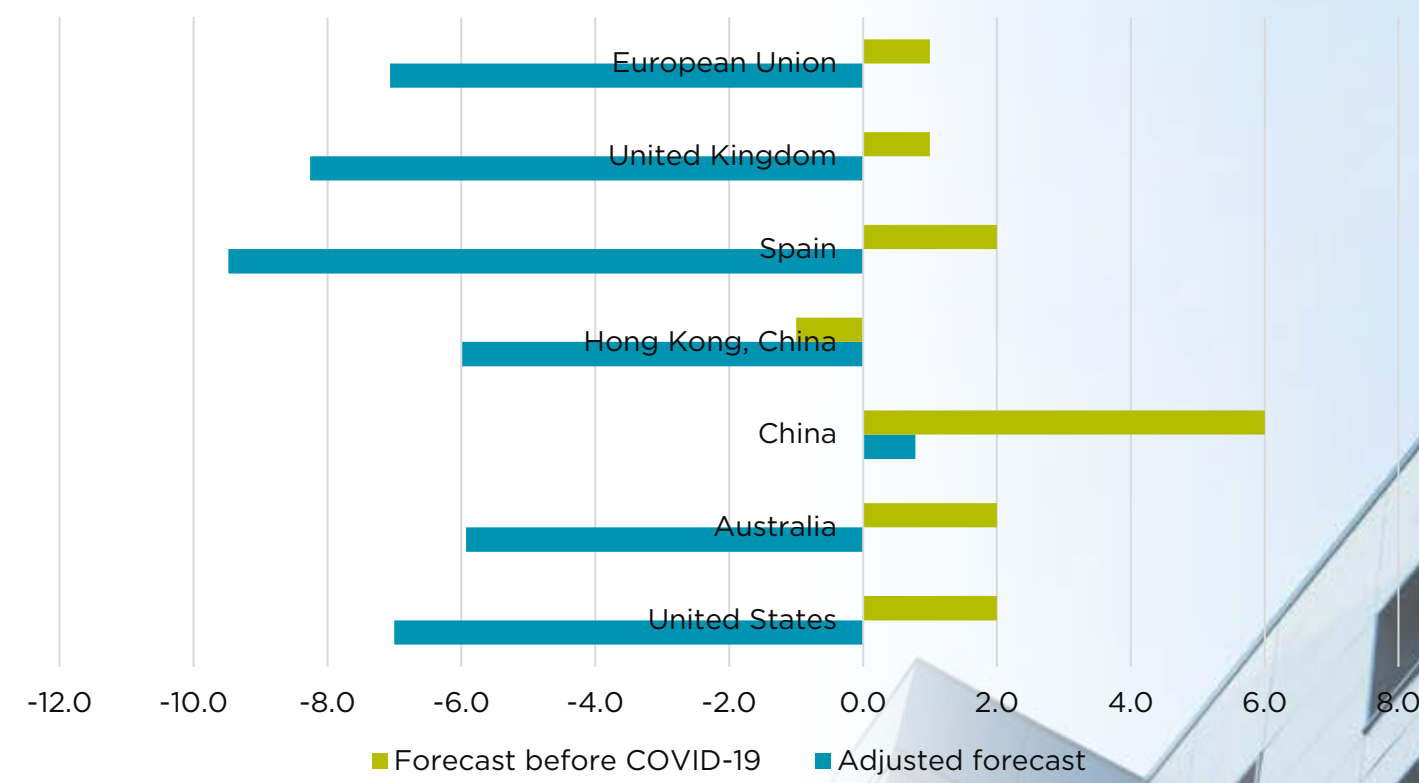
Figure 1:
The three drivers
of China's new
infrastructure
initiative

MITIGATE THE NEGATIVE IMPACT OF COVID-19

The COVID-19 pandemic has exerted an unparalleled impact on the global economy. According to Oxford Economics, as at May 2020, GDP growth in the U.S. is forecast to contract from a pre-COVID-19 estimate of

2% to a figure of -7%. The damage to the EU economy will be similar, with growth falling from 1% to -7.1%. In China, the GDP growth rate forecast is slashed from 6% to 0.8% (Figure 2.)

Figure 2: Adjustment of GDP growth forecast of world’s major economies in 2020



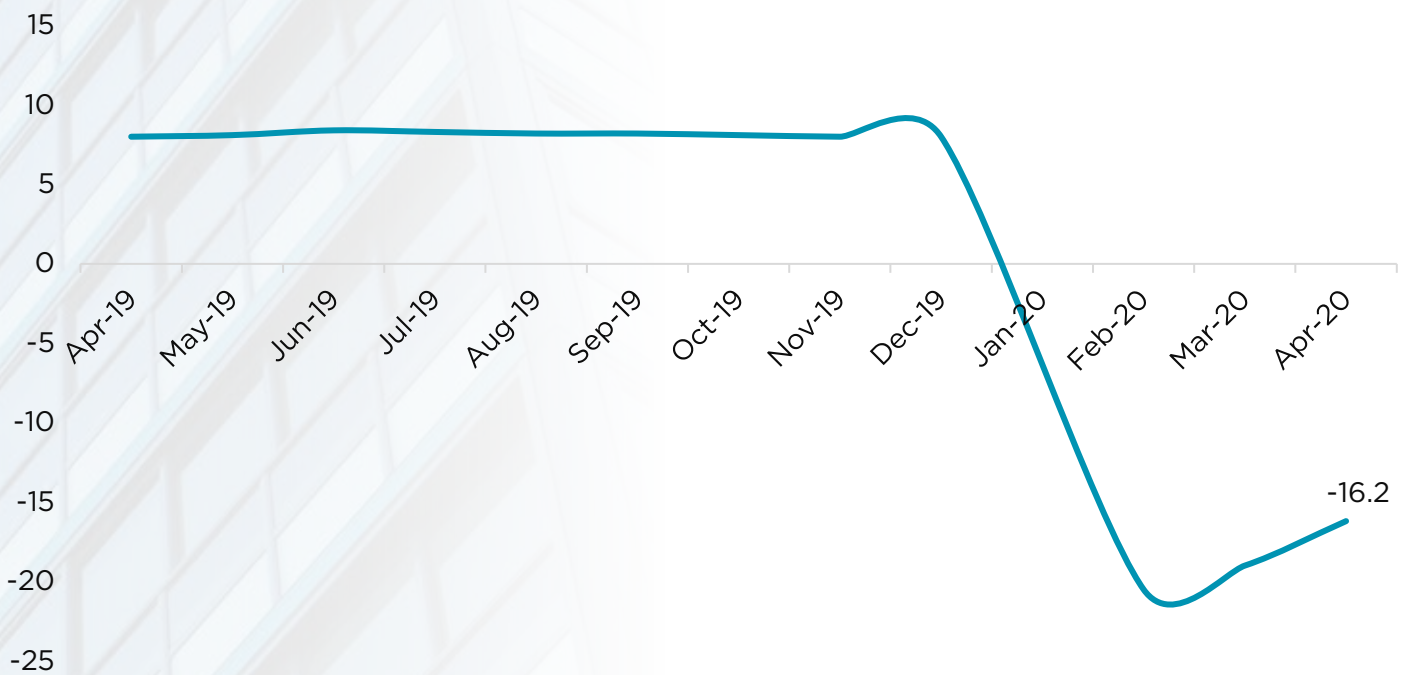
Source: Oxford Economics

In China, the pandemic caused a precipitous decline in exports and greatly weakened domestic consumption. The impact of the latter was particularly serious. Domestic consumption has become the main driver of China’s economic growth over the past two years, contributing to 57.8% of growth in 2019 and 78.2% in 2018. The arrival of the

coronavirus brought this consumer activity to a shuddering halt, with the subsequent pandemic containment orders and social distancing measures landing particularly heavy blows on key industries such as catering, retail and tourism. In February, March and April of 2020, cumulative year-on-year growth of total retail sales

of consumer goods went into free fall, at - 20.5%, - 19% and - 16.2% (Figure 3). Post-pandemic, the consumer market will eventually recover, but total consumption in 2020 will still be curtailed due to the weakened overall economy coupled with consumers' diminished propensity to spend.

Figure 3: Cumulative year-on-year growth rate of China's total retail sales of consumer goods (April 2019 - April 2020)



Source: National Statistic Bureau

To alleviate the economic damage from the pandemic and to maintain forward economic momentum, the central government has once again turned to investment as a key tool to stimulate growth. In particular, infrastructure investment, which, due to its sheer scale and stimulus effects, holds the greatest potential to stabilize the economy and create jobs.

Historically, the government's fiscal policy-directed investments have been concentrated in high-speed rail, ports, and airports. In 2009, for example, in order to

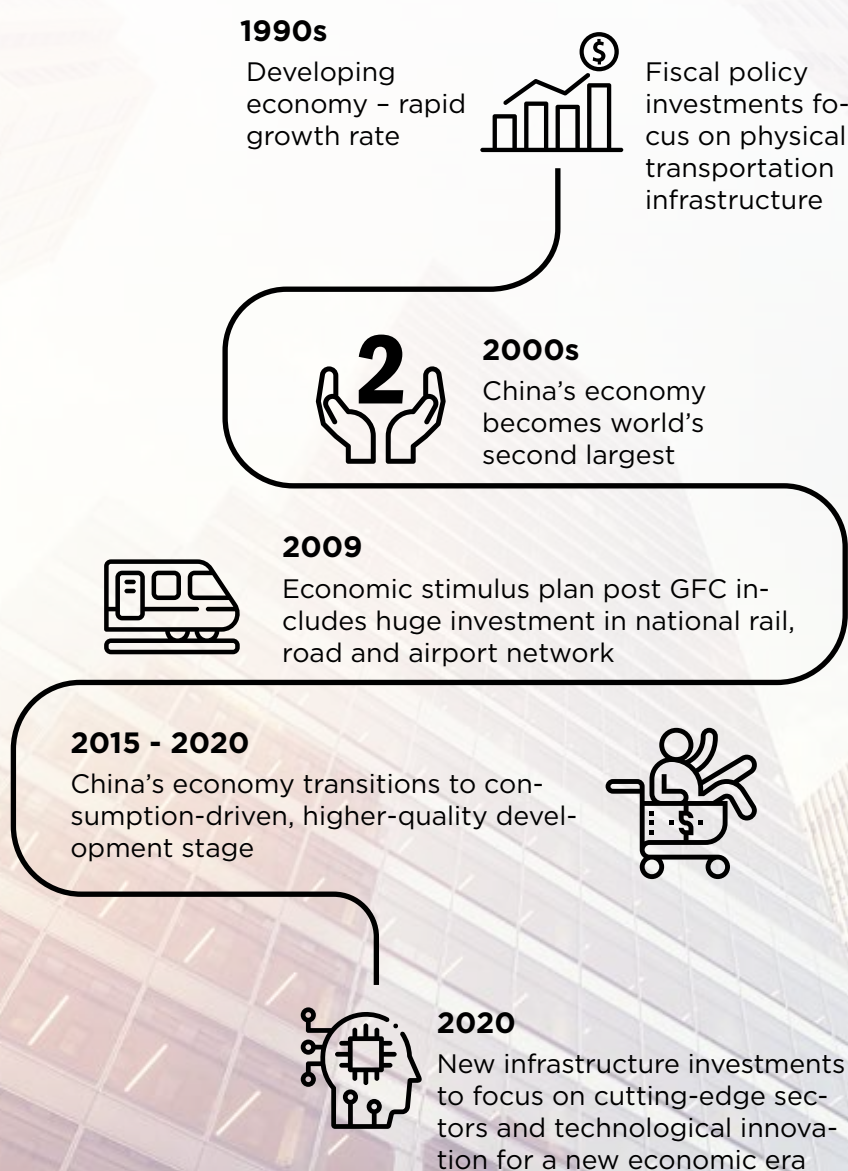
hedge against the negative impact of the global financial crisis on the economy, the government launched a massive round of infrastructure investment focusing on railways, highways and airports, significantly uplifting the country's infrastructure.

From 2008 to 2018 the number of civil aviation routes in China grew by a multiplier of 3.2, rail network distances grew 1.6 times, and the highway network grew 2.3 times. These infrastructure achievements provided a solid foundation for China's ongoing economic development during the period.

Now, with China transitioning into the next stage of economic development, the government has shifted the focus of infrastructure investment onto the development of cutting-edge science and technology sectors: New Infrastructure. The New Infrastructure principle holds that infrastructure investment should promote higher quality economic development and enhance social stability and wellbeing

through technological innovation. In short, new infrastructure requirements for a new era for growth. The plan identifies three areas for action: information-based infrastructure; converged infrastructure supported by new technology applications such as the internet, big data and artificial intelligence; and innovative infrastructure operations that support scientific research, technology and product development.

Figure 4:
Evolution of China government infrastructure investment



China's coronavirus recovery response has eschewed pumping vast volumes of liquidity into the market, focusing instead on the more targeted stimulus tool of the New Infrastructure program. As a result, local government debt controls may be eased to facilitate funding of these projects.

GRASP NEW ECONOMIC DEVELOPMENT OPPORTUNITIES

The New Infrastructure initiative recognizes the power that the development and application of new technologies can bring to bear in creating new industrial value in China, as its economy transitions from being resource- and investment-driven to being innovation-driven. The role of new technology in promoting national economic strength is highlighted. In the U.S., for example, the development of 4G technology has driven significant economic benefits. The 2018 Accenture Strategy report *How the Wireless Industry Powers the U.S. Economy* estimates that 4G technology has driven 4.8 million jobs in the U.S., adding US\$475 billion annually to the economy. And 4G has exerted a significant economic multiplier effect. The Accenture report says that each job in the 4G industry is estimated to generate a further 7.7 jobs across related industries, compared to a factor of 3.9 in hardware manufacturing and just 1.5 in the restaurant industry.

China may have missed out on some of the benefits of earlier mobile network expansion, but has kept pace with global 4G advancements and is now fully committed to development of a 5G network. The China Academy of Information and Communications Technology (CAICT) estimates that the value of information consumption driven by 5G commercialization will exceed RMB8 trillion from 2020 to 2025, directly boosting total economic output by RMB10.6 trillion. According to the Academy's white paper on 5G's economic and social impact, by 2030, 5G will generate a direct economic output of RMB6.3 trillion, an economic value-add of RMB2.9 trillion, and eight million new jobs.

Finally, widespread adoption of 5G, big data, cloud computing and complimentary technologies is also expected to greatly promote development of 'smart' industries, including smart buildings, logistics, transportation and medical sectors.



UPGRADE EXISTING INFRASTRUCTURE AREAS

China has made great strides in its physical infrastructure capabilities following decades of sustained effort, but there is still significant room for improvement. In the World Economic Forum's 2019 *Global Competitiveness* report, China ranks 28th for competitiveness but only 36th for infrastructure, below that of nations such as Australia, Saudi Arabia and Malaysia.

The New Infrastructure initiative focuses on further development potential in the specific existing areas of intercity rail networks, electric vehicle (EV) charging facilities, and ultra-high voltage power transmission.

In rail transportation, China's national network already exceeded 130,000 km in 2019, ranking second only to the U.S. globally. However, significant gaps exist within the network. In particular, rail network capacity per capita in economically developed provinces is seriously lacking. For example, in the Yangtze River Delta and Pearl River Delta regions, which contribute more than 30% of national GDP, per-capita railway range is just 0.36 km, or 30% of the national average. Given the central government's long-term planned development of urban agglomerations, demand for both intercity and urban rail transportation is set to continue to grow, and hence the rail network remains a development priority.



As regards electric, or new energy vehicles, sales of vehicles have continued to outstrip the expansion of charging infrastructure. Public charging piles constitute the primary EV charging structure in China and, despite currently leading the world in charging pile numbers, estimates point to a gap of 63 million charging units in the country within the next ten years. Current targets call for 156,000 public charging piles and 373,000 private charging piles to be added in 2020, with an eventual objective to narrow the EV charging pile ratio from 3.5:1 to 1:1. Without such a jump, sustainable long-term growth of the EV industry within China may be shackled.

Figure 5: New energy vehicle sales volume and number of charging piles (2015-2019)



Source: China Association of Automobile Manufacturers, China electric vehicle charging infrastructure Promotion Alliance

Power generation is the foundation of the New Infrastructure initiative. The expansion of industry sectors such as 5G, data centers and EV charging networks is set to trigger immense new energy demands. In response, China is pioneering large-scale commercial operation of highly efficient ultra-high voltage (UHV) power transmission, which can dramatically reduce power losses within the grid. With the commencement of seven new UHV lines, the national UHV network is targeted to expand from 27,570 km in 2019 to 40,000 km by 2025. The huge project, with investment from the State Grid Corporation of China estimated at RMB112.8 billion, is expected to generate private sector investment in excess of RMB223 billion and to become a major job creator.



IMPLICATIONS FOR COMMERCIAL REAL ESTATE

What Does the New Infrastructure Initiative
Mean for the China CRE Market?

Financing New
Infrastructure Investment



WHAT DOES THE NEW INFRASTRUCTURE INITIATIVE MEAN FOR THE CHINA CRE MARKET?



China's New Infrastructure initiative can be viewed as a central government policy superstar, charged with the towering job of arresting the economy's COVID-19-inflicted slide and restoring it to a fit and proper trajectory. The rescue strategy aims to kick-start national economic growth, restore consumer confidence and spending, and boost future job creation.

From a high-level viewpoint, the initiative is evidently a positive for China's commercial real estate markets. A revitalized, consumption-led economy and long-term job growth will spur demand in key sectors such as office, retail, and industrial property.

Looking more closely, the focus on new technologies among the seven key sectors that comprise the infrastructure investment

plan is also a fillip for CRE markets. The seven sectors, individually and collectively, hold great economic promise. In particular, the greater TMT field is now clearly established as a key economic driver, and the ongoing efforts to promote China's Industrial Internet and overall digital economy will be a boon to the na-

tion's major office and data center markets.

More broadly, and longer-term, we can identify two mega-trends arising from and reinforced by the New Infrastructure plan, both of which are highly pertinent to the future of the China CRE market.





Firstly, urban agglomeration. Already an important aspect of China's economic engine, with 20 such formations already created, development of urban agglomerations is set to be accelerated nationwide. These new city clusters will drive demand in advanced infrastructure areas such as intercity high-speed

rail, urban rail transport systems, 5G networks, AI platforms, and big data centers. Of the latter, the central government has already formed a number of data center industrial cluster areas, including Gui'an in Guizhou province, Langfang in Hebei province, and Hohhot in Inner Mongolia, with the construction of an additional eight national-level big data areas also now approved.



rollout of the Internet of Things (IOT), smart cities in China are poised to implement a centrally controlled approach to energy distribution, health care, manufacturing, public services, residential site management, social administration, traffic, and even entertainment services. With official government support and backed by the New Infrastructure program, the rise of smart cities in China will result in two huge development opportunities for real estate markets, in the form of smart building development and smart retail operations.



And secondly, smart cities. China is already a global leader in smart city development, accounting for nearly half of all smart cities under construction worldwide, according to Deloitte's 2018 *Global Smart City 2.0* report. The statistic underlines China's economic transition – from a nation that “makes” to one that “creates.” Against a backdrop of accelerated urbanization, growing consumer spending, and the imminent

FINANCING NEW INFRASTRUCTURE INVESTMENT

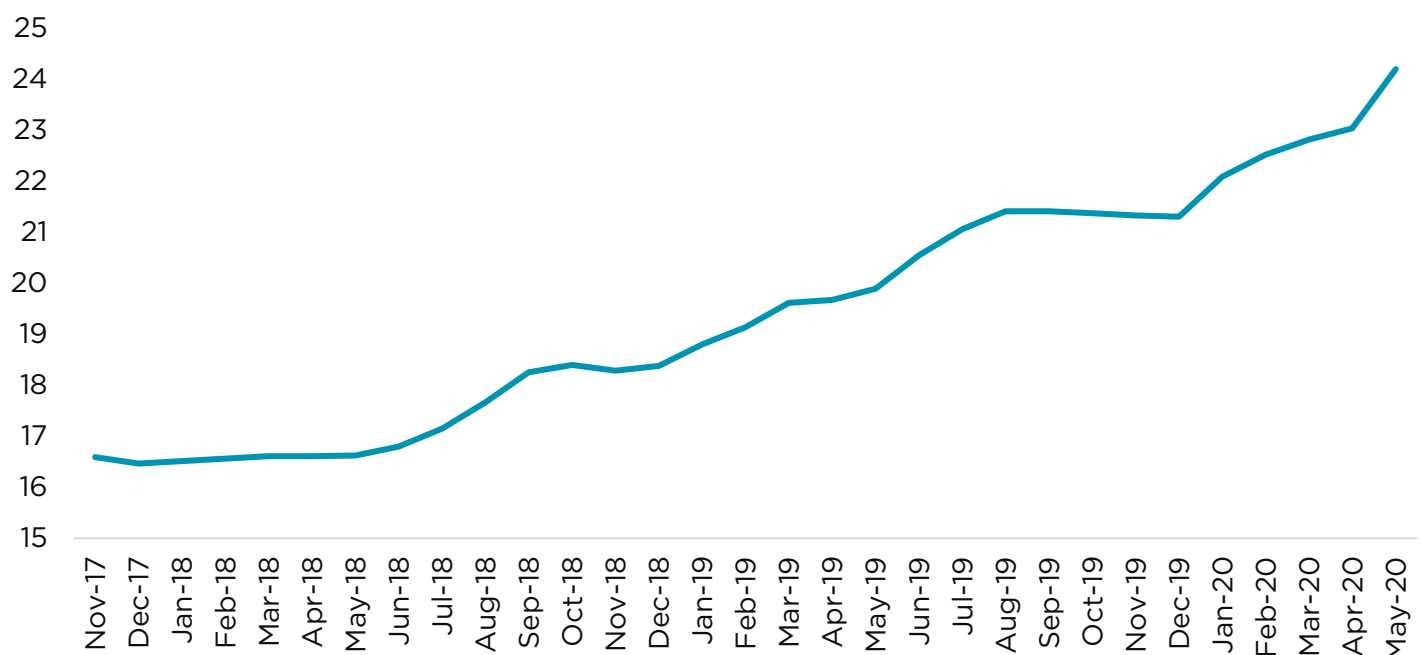


Finally, the question of finance. Large-scale infrastructure investment projects require copious funding. China National Bureau of Statistics data reveals that, at 2018, capital sources for such projects within China have been largely derived from self-funding, accounting for 58% of the total, as well as domestic loans (18%) and national budget allocations (17%). Foreign investment accounted for only 8% of total infrastructure funding. But this model is becoming problematic. Capital sums raised by local gov-

ernment financing platforms have been incurring ever greater financial risk, with the local debt balance ballooning to RMB24 trillion as at May 2020, up more than 45% from May 2018.

Alert to the debt danger, the central government has clamped down on the issuance of local government bonds and taken measures to limit the traditional financing mode of bank loans.

Figure 6: Trend of local debt balance (Trillion RMB)



Source: Ministry of Finance



As a replacement approach, the government has moved towards the marketization of infrastructure financing. On April 30, 2020, the China Securities Regulatory Commission and the National Development and Reform Commission jointly issued the *Notice on Promoting the Pilot Work of Real Estate Investment Trust Funds (REITs) in the Field of Infrastructure*, aiming to mobilize private investment, revitalize existing asset stocks, and encourage non-governmental capital to participate in infrastructure investment.

Although there are no public offering REITs in China as yet, infrastructure real estate has been trialed in domestic private REITs and commercial mortgage-backed security (CMBS) markets. According to data from the Cushman & Wakefield China Valuation team, as of April

30, 2020, a total of 15 industrial logistics asset securitization projects have been issued in China, with key issuers including top domestic logistics brand operators such as Cainiao Network, SF, Yupei and Baowan Logistics.





Industrial Internet Network

5G INFRASTRUCTURE DEVELOPMENT

The New Infrastructure initiative highlights the importance of the commercialization of 5G technology and the economic benefits stemming from its development – recognizing the potential for a first-mover nation to gain an economic advantage for years to come. 5G brings significantly faster data, reduced latency, higher system capacity and unlimited device connectivity to the Internet of Things. 5G networks will also unlock vast new opportunities in artificial intelligence, automation, manufacturing, energy and transportation, all while making cities more livable. The CAICT forecasts that 5G expansion in China will generate a direct economic output of RMB10.6 trillion from 2020 to 2025, and an indirect economic output of about RMB24.8 trillion. By 2030, 5G in China is expected to generate around 20 million new job opportunities.

Base stations are the nuts and bolts of building-out 5G networks and will need to be one-and-a-half times more numerous than their 4G predecessors. The plan calls for 600,000-800,000 base stations to be built to achieve 5G network coverage in all prefecture level cities in China by 2020, with expansion to eight million base stations by 2025.



BIG DATA CENTERS

The big data center has undoubtedly become the cornerstone of the development of China's digital economy. Growth in facilities has been rapid in recent years. According to CCID Consulting there were around 74,000 data centers operating in China by the end of 2019, accounting for 23% of the global total. The number of racks jumped more than 83% from 2016 to 2019 to reach 2.27 million.

The IDC market in China is set to continue to expand, meeting burgeoning demand from data-intensive sectors such as big data, virtual reality and artificial intelligence; and supported by a national *Accelerating the Improvement of Digital Infrastructure and Accelerating the Construction of Digital China* strategy.

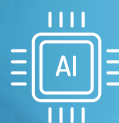
According to Kezhi Consulting, China's IDC market achieved year-on-year growth of more than 27% by the end of 2019 and is forecast to maintain this momentum towards a market value in excess of RMB320 billion by 2022.



ARTIFICIAL INTELLIGENCE

Artificial intelligence is identified as a high-potential sector in the New Infrastructure strategy. China's AI industry has been growing at a compound average growth rate of more than 54% over the past four years, above the global average rate of around 36%, with the market size exceeding RMB41.5 billion by the end of 2018. The number of AI enterprises in the country is now at 1,189, accounting for 22% of the world's total and second only to the U.S. As well, the number of AI-related patent applications filed in China rose ten-fold from 2010 to 2018.

The development plan for the AI sector predicts exponential market growth, from RMB150 billion at the end of 2020 to RMB400 billion by 2025 and RMB1 trillion by year 2030.



INTERCITY HIGH-SPEED RAIL AND URBAN RAIL TRANSIT

Intercity and urban rail transportation are both assigned to play starring roles in China's future socioeconomic development in light of the long-term planned development of urban agglomerations. High-speed rail travel continues to grow in popularity. The National Statistics Bureau reports that high-speed rail's share of passenger traffic volume rose from 25.6% in 2013 to 64.1% in 2019. Nationwide, the high-speed rail network grew 21% y-o-y in 2019 to reach 35,000 km. However, network coverage is uneven, specifically in economically significant regions such as the Yangtze River Delta and Pearl River Delta regions, where per-capita railway range is just 30% of the national average. In urban rail, transit lines exceeding 6,700 kms were operating in 40 cities by the end of 2019.

Demand for intercity and urban rail transportation will continue to grow in response to the planned development of urban agglomerations, of which more than 20 have already been formed. The 'city group' principle – grouping super- or mega- cities as a regional economic core – as the cornerstone of China's future urbanization planning ensures that a fully developed intercity and urban transit network will remain a New Infrastructure investment priority.



ULTRA-HIGH VOLTAGE (UHV)

China's sustained economic growth has resulted in skyrocketing energy needs, with power-hungry industries leaving an uneven electricity distribution grid unable to cope, with consequent power shortages. New technology industries such as 5G, data centers, and EV charging networks will exacerbate the problem, with each 5G base station, for example, requiring three times as much power as its 4G predecessor. To meet the challenge, China is pioneering large-scale commercial operation of highly efficient ultra-high voltage (UHV) power transmission to dramatically reduce power losses within the grid.

The new national UHV network is targeted to expand to 40,000 km by 2025. With an estimated RMB112.8 billion investment from the State Grid Corporation of China, the project is expected to generate significant private sector investment and job creation.



ELECTRIC VEHICLE CHARGING INFRASTRUCTURE

Sales of electric, or new energy, vehicles are forecast to make up 25% of all car sales in China by 2025. Public charging piles comprise the major charging infrastructure for electric vehicles, and China already leads the world with more than 500,000 units installed. However, the '25% share' scenario will result in a gap of 63 million electric vehicle charging units in the country within the next ten years – a market estimated at more than RMB1 trillion. Charging piles can also be integrated with communication, cloud computing, smart grid and vehicle connectivity technologies to form intelligent networks.

The immediate infrastructure development target is for an additional 156,000 public charging piles and 373,000 private charging piles in 2020, with a long-term objective to reduce the charging pile deficit from its current ratio of 3.5:1 to 1:1.



INDUSTRIAL INTERNET NETWORK

China is transitioning into its own Industrial Internet era, with the State Council detailing development plans in the 2017 *Deepening the Development of the Internet Plus and the Advanced Manufacturing Industry* guidance. Globally, the Industrial Internet platform was estimated to be a US\$3.3 billion market in 2018 and forecast to grow to US\$5.8 billion in 2020 and US\$24.8 billion by 2025. In China, CCIID Consultants forecast the country's Industrial Internet market size to grow steadily from RMB698.9 billion in 2020 to reach RMB1.34 trillion in 2025.

The China Industrial Internet infrastructure plan includes the implementation of first-stage internet-plus and advanced manufacturing industry development, with the formation of three-five international standard industrial internet platforms, by 2025. By the end of the following decade the next-stage mandate is to build an international-leading Industrial Internet network infrastructure and platform.



At a glance: seven major sectors and key objectives of China's New Infrastructure initiative

Major Sectors

Key Objectives

5G infrastructure Development

Build 600,000-800,000 5G base stations to achieve network coverage in all prefecture level cities by 2020, with expansion to eight million base stations by 2025.

Big Data Centers

IDC market is set to continue to expand rapidly as the cornerstone of the development of the digital economy -- forecast to grow at over 27% y-o-y to exceed RMB320 billion by 2022.

Artificial Intelligence

AI industry grew at a compound 54.6% from 20015 to 2018, versus global average of 36%, with development plan target for RMB1 trillion market size by 2030.

Intercity High-Speed Rail and Urban Rail Transit

National high-speed rail network grew 21% y-o-y in 2019 to reach 35,000 km, while urban rail transit lines exceeding 6,700 kms now operate in 40 cities. Demand for both intercity and urban rail transport will continue to grow in response to long-term development of urban agglomerations, with 'city group' planning ensuring that fully developed rail networks will remain an investment priority.

Major Sectors

Key Objectives

Ultra-High Voltage (UHV)

Pioneering large-scale commercial operation of UHV transmission to meet huge increase in energy demand from new technology sectors. Commencement of seven new UHV lines with UHV network target of 40,000 km by 2025.

Electric Vehicle Charging Infrastructure

156,000 public charging piles and 373,000 private charging piles will be added in 2020, with target to narrow EV charging pile ratio from 3.5:1 to 1:1.

Industrial Internet Network

Implement first stage of internet-plus and advanced manufacturing industry development plan with formation of three-five international standard industrial internet platforms by 2025, with the industrial internet market value forecast to reach RMB 1.34 trillion by 2025.

04



CONCLUSION / WHAT'S NEXT



China's New Infrastructure initiative is the result of traditional central government economic management thinking, reimagined for the 2020s and beyond. Much of the policy intent is familiar from previous infrastructure stimulus plans — overarching economic objectives, nationwide construction, and on a grand scale — yet, as the name infers, this time the targets are new, with investment focused onto leading-edge science and technology sectors. The seven key industry sectors included in the initiative are bound by the common thread of technological innovation and potential for development of intelligent systems. This infrastructure plan is tasked with recharging economic growth and to create future employment, but is also designed to help shepherd China's economy through its transition into a new era of higher-quality, innovation-led development, and to enhance overall social stability and wellbeing.

The New Infrastructure initiative's economic recovery objectives, the seven key industry sectors involved, and the visible trends of urban agglomeration and smart city development are all positives for CRE markets in China. The policy opens huge new business opportunities and the prospect of long-term market sustainability for key real estate sectors such as office, retail, and industrial property.

In terms of financing channels, the government's pilot policy of public offering RE-ITs for infrastructure construction seeks to revitalize existing assets and encourage private capital to participate in infrastructure investment. In so doing, the China real estate market is taking a step forward in reducing leverage, mitigating risks, and broadening sources of investment and financing for infrastructure projects.

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