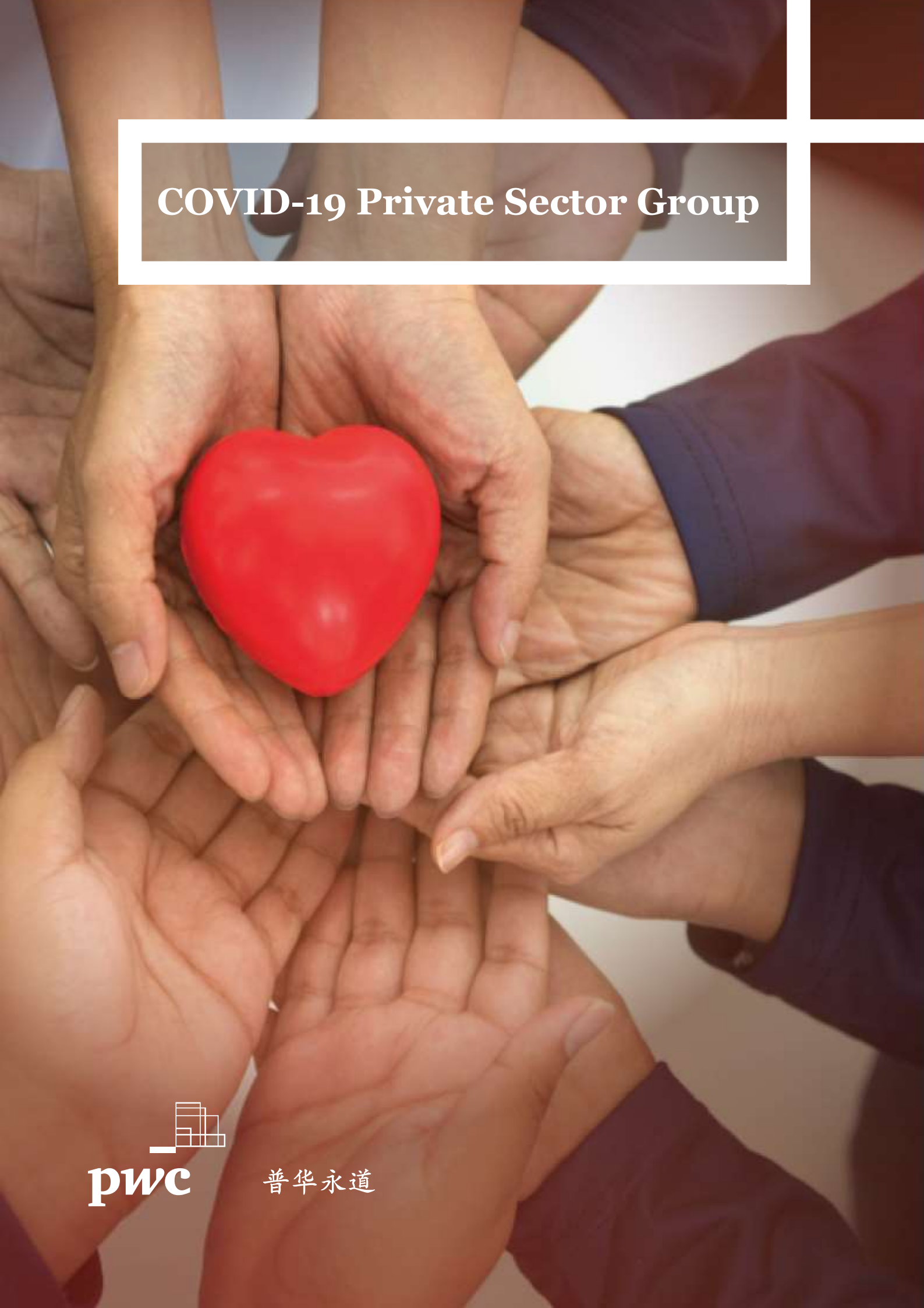

COVID-19 Private Sector Group

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New Infrastructure and New Opportunities Memo of the Eighth Meeting of the COVID-19 Private Sector Group (24 August 2020)

The New Infrastructure concept, first introduced in the Economic Work Meeting of the CPC Central Committee in 2018, was included in the Government Work Report released on 5 March 2019 and became a national strategy. On 4 March 2020, the Political Bureau of the CPC Central Committee expressly laid out the goals of speeding up new infrastructure constructions, including 5G networks and data centres, among others. The state's on-going and intensive efforts in formulating and implementing New Infrastructure strategy in answer to the broad needs of the new era for new and better infrastructure not only coincide with the economic and social development trends in China, but also meet the needs of the Chinese economy and society for their current development as well as transformation, and will serve as a new engine in driving the social and economic development in addition to shoring up the weak areas.

New Infrastructure, connecting huge investments needs on the one hand and enormous consumer market that has been undergoing constant upgrades on the other, has become the new focal point in China's economic construction. The implementation of the New Infrastructure strategy will bring about a series of new changes and new opportunities, and many enterprises are busy strategizing how best to ride this wave to foster their transformation and growth. At the same time, New Infrastructure projects face many obstacles in their roll-out. Focusing on New Infrastructure and new opportunities, COVID-19 Private Sector Group (CPSG) engaged experts from relevant areas to exchange views and further understanding in the eighth meeting of CPSG members. As the CPSG secretariat, PwC hosted the meeting and has summarized the highlights and insights of the meeting as follows:

I. The Critical Role of New Infrastructure in Enhancing Urban Competitiveness

Recently, many provinces and municipalities leading in digital and tech-based economic development, including Zhejiang, Shanghai, Guangdong and Shandong, have issued a spate of action plans for New Infrastructure constructions, and the aggregate budget for the New Infrastructure construction plans released one after another by twenty plus provinces across the country exceeds RMB 50 trillion. New infrastructure, especially digital infrastructure constructions, will enable the cities to enhance their governance, improve public service quality, raise the efficiency of their economic and social development, and boost their overall attraction and competitiveness. More and more cities are seeing New Infrastructure as the new force to drive their urban development.

Firstly, new infrastructure is the very foundation required to build a smart city. In China, those cities who have been pioneers in embracing informatization are now forerunners not only in their economic development, but also in their environmental friendliness. New infrastructure constructions, including 5G networks, data centres and IoT facilities, will elevate the cities into a new age of intelligently interconnected services that provide timely and comprehensive information gathering and processing, safe and reliable data transmission, AI-enabled issue resolutions and precise decision-making, and will play a critical role in enhancing public health services, public transportation efficiency and experience and social governance, among other things.

Secondly, new infrastructure will serve as an accelerator in the shaping of new industrial formats. New infrastructure projects themselves involve the applications of many new technologies and new business models, which will infuse fresh forces into the industrial development of these cities and boost high-tech industries. As shared by CPSG members, the applications of smart algorithms, big data process and governance technologies can perform tasks that would require 300 human beings, and aided by AI searching and processing, deliver higher precision and efficiency than human labour. On the other hand, it will help promote business model innovation and industrial format updates. 5G, for example, from just a concept to rapid deployment, has propelled the development of related industries, including AI-empowered transportations, self-driving automobiles and green energies. In addition, it has created numerous employment opportunities in the cities, and these new jobs, possessing strong potentials to create a multiplier effect, will further boost the economic development in the cities.

Thirdly, small and medium-sized cities may achieve leapfrog development riding on the New Infrastructure wave. New infrastructure can serve as a major way to shore up the weak areas in cities, and new infrastructure initiatives can produce a quick and huge leap in the efficiency and quality of services in public service sectors, transportations and medical services. Tier-three and tier-four cities, in particular, may take advantage of the New Infrastructure opportunities to pool resources, including funds, projects, people and technologies, to elevate their overall soft qualities and attractiveness.

II. New Infrastructure will Redefine City Planning and the Use of Resources

In the meeting, the CPSG members shared their insights on New Infrastructure from the city planning angle, including its impact and the potential opportunities for urban developments.

Firstly, New Infrastructure will play a key role in city planning and will enable city planning to be more flexible. New Infrastructure touches every aspect of the economic development, and with New Infrastructure underpinning the planning and strategies, infrastructure planning, city planning, project feasibility studies as well as financial and economic planning will be fused into a whole. Spatial allocations for public transportation, medical, educational and network communication facilities will also change in the wake of New Infrastructure development. For city planning in a new age, low-impact development strategies and smart cities will become imperative major considerations. With the adoption of information technologies, city planning will also become more flexible in pre-studies and estimations, with substantially higher precision and operability.

Secondly, New Infrastructure will boost efficiency in the utilisation of urban resources. New Infrastructure will introduce new technologies and new products to urban public transportation design and optimisation as well as the utilisation of public spaces, and will involve redesigning of new operation models, both great news for boosting land development and use efficiency. Initial estimations indicate that thanks to New Infrastructure and AI technologies as well as the rapid deployment of smart transportation and self-driving solutions, lands marked for urban road constructions will be reduced from 30% to around 15% of the whole planned area, substantially expanding the space for urban development and land use. No doubt, the cities are carrying out new infrastructure projects without any risks, including huge investments required, long operating cycles, vulnerability to disruptions, high demands for iterative technological updates, as well as concerns of the public regarding their own needs and interests. It is important to note that at the early design stage of a new infrastructure projects, it is imperative to conduct in-depth analysis of the impact of the new project on the public interests and consider appropriate methods to obtain the public's support, as it will be critical for the approval and eventual smooth operation of the project.

III. Key Considerations for Investment and Financing Planning and Risk Management of New Infrastructure Projects

The CPSG members also discussed and shared their experience and insights in relation to the key considerations for investment and financing planning and risk management of new infrastructure projects.

(I) The investment and financing features of new infrastructure projects

New infrastructure projects are foremostly huge in investment and financing scales, long-term in nature, and seek investments from the whole marketplace. Representative New Infrastructure industries, including 5G, AI, Industrial Internet and IoT, require investments to the tune of RMB 17.5 trillion, while they will create values in excess of RMB 80 trillion in related industries.

Secondly, new infrastructure projects involve deep integration and concerted development among investment and financing sectors, and demand innovative investment and financing solutions. New infrastructure projects integrate sensing, transmission, storage, computation and processing to achieve a higher level of coordination and fusion, and as a result, enable relevant areas to display features of deep fusion, joint development and mutual empowerment.

Lastly, new infrastructure assets possess multiple attributes typical of both tangible and intangible resources, and require increased use of equity instruments. The factors of production involved in traditional infrastructure projects are mainly tangible resources. In comparison, the factors of production involved in new infrastructure projects include, other than tangible resources, such as 5G base stations and data centres, massive intangible resources, including the development and applications of core technologies, such as the basic software and operating systems.

(II) Risk Factors for New Infrastructure Projects

Firstly, internal catalysts. These mainly include: internal catalysts created by technological changes, including the modularisation of plants and buildings; the impact of digital technologies on processes and operations, such as whole life-cycle costing and planning; innovative contract arrangements and enhanced risk participation mechanisms; standardized investment management frameworks; lean construction management and lean operations management; more prudent project performance management (time/cost/quality); and the impact of technological changes on the organisation, people and culture, such as imperative restructuring and optimisation of human resources and the talent pool, as well as continuing training and development and cross-discipline knowledge management.

Secondly, external disruptive factors. These mainly include disruptive factors arising from technological changes, including: adoption of new materials, AI-enabled construction equipment and AI-enabled monitoring equipment across the whole life-cycle of investments; process and management reforms caused by digital technologies, such as the optimisation of processes and management practices through digital tools, AI-enabled models and big data, as well as innovative models for subcontractor and supplier management; the impact on business strategies, such as innovative and disruptive profit-making models; and the impact of pervasive information sharing on the society. All these factors require continued communications with the end users and communities during the life-cycle of investments.

Thirdly, multilateral collaboration factors. These include: the digitisation of engineering and construction technologies by virtue of technological changes, such as 3D printing, and their wide applications during constructions through multilateral collaborations; on the business strategy front, the need for greater considerations of sustainable investment portfolios optimised for the whole life-cycle of investments, as well as the aggregate scale effect of combined investment objectives; with respect to the impact on the organization, people and culture, the need for cross- organisational, cross-cultural and cross-industry incentive mechanisms; and for the purpose of industrial collaboration, the need for multilateral acceptance of the cross- disciplinary technical criteria and processes to enable greater data exchanges and sharing of best practices and eventually achieve value-driven cross-industry collaboration.

Fourthly, the hindering factors. The current fragmented state of the infrastructure industry remains a major hindering factor, while the rapid iterative technical upgrades typical of New Infrastructure make it harder to achieve cross-sector technical integration and fusion. The New Infrastructure projects face many investment and financing difficulties, including the limited guarantee capability of asset-light tech companies, the mismatches between highly intensive initial investments and long-term returns of New Infrastructure projects, and different requirements of investors for investment returns. The fact that the capital markets are not yet ready for the New Infrastructure investments and the severe impact of anti-globalisation on overseas market are among the potential hindering factors for the New Infrastructure sector.

Fifthly, the policy factors. In order to effectively pan out, changes arising from new technologies require foremostly a more effective interplay between investment stakeholders and the public sector. Regulatory policies need to adopt more consistent technical standards and criteria while facilitating simplified licensing and review and approval processes. For market policies, the level of openness for international investors is a major variable. In terms of fiscal policies, incentives and subsidies for R&D and technological applications remain factors that demand serious attention of the public sector and the governments. At the same time, greater efforts are needed to implement more strict anti-corruption procedures, increase the transparency of bidding processes, promote bidding and procurement processes adopting the whole life-cycle costing approach, and actively manage multiple-year investment planning and costing.

(III) Recommendations concerning New Infrastructure Projects

For investors, key considerations include: the combined use of big data analytics and the agile approach to perform value analysis on the investment projects; keen estimation of the impact of the disruptive factors on the needs and use of New Infrastructure projects, and maximal simulation of the future investment process; and high attention to the new asset types created from technological innovations.

For policy makers, areas requiring their serious attentions include: determination of the impact of external disruptive factors on New Infrastructure investments, and identification of potential hindering factors; full consideration of the impacts of internal factors and external disruptive factors, and revisiting the prioritisation of projects to avoid the segregation of investments based on individual functionalities of projects; strong promotion of value analysis methods based on the whole life-cycle of the investment projects, pooling of the internal capabilities and resources of all parties with a stake in the projects, and developing policies and mechanisms that are able to steer and coordinate various risk participants and relevant facility owners; and creating and maintaining a policy environment to foster collaboration among market participants and cooperative competition among enterprises.

For constructors and service providers, key points include: providing incentives to promote innovation; making full use of new technologies and big data analytics, developing medium and long-term development roadmaps, and optimising and maintaining investment portfolios that are well balanced between traditional business lines and new investment operations; and enhancing the internal execution necessary to deliver results.

IV. The Critical Factors for the Successful Delivery of New Infrastructure Projects

Last but not least, the CPSG members discussed and summed up the critical factors for the successful delivery of New Infrastructure projects.

Firstly, the government leadership should play an effective guiding role. This involves policy and funding incentives on the one hand, and efforts to promote the use and showcase the New Infrastructure projects. The support from the governments is all the more important when the profit-making models have not been clearly demonstrated. Such support requires not only funding, but breakthroughs in cooperation measures and options to support the realisation of application scenarios through government procurement and government-sponsored pilot programs. Many New Infrastructure-related new technologies require applications in a live environment to be able to develop more actionable iterative optimisation solutions and help the products to further optimise and upgrade.

Secondly, unified efforts should be made to establish the rules procedures and mechanisms at the early stage of the projects. New Infrastructure projects generally involve a large number of entities, and it is of particular importance to establish mechanisms to ensure an adequate balance of interests between the government and the market as well as among different participants. Only when all risks and stakes, be they short-term, long-term, potential or inherent, have been fully identified and addressed at the early stage of project design, can New Infrastructure projects roll out and operate efficiently without being hindered by lack of clarity in roles and responsibilities or confusions and bottlenecks in the way things are managed, and can these projects be sustainable.

Thirdly, these projects require interdisciplinary talents. New Infrastructure involves the combination of multiple fields of the social and economic spheres. Interdisciplinary infrastructure in particular, itself being a novel concept, demands people who both specialise in IT R&D and are knowledgeable about integrated industry applications to truly fuse the two parts into a whole and more effectively deliver the most fundamental needs of the users.

Last but not least, risk identification should be completed upfront. New Infrastructure projects are large in nature in terms of the investments required, and are conceived with neither established frameworks and standards nor many precedents for enlightenment. As such, it is critical to holistically map out the way forward for New Infrastructure projects, establish the overarching framework and comprehensively identify all risks, including construction safety risk, data breach risk, and the risk of the technologies losing their edges through iterations. In addition, adequate balances should be maintained between short-term and long-term returns, as well as between returns to the enterprises and benefits to the society.

New Infrastructure is not only mission critical to the high quality development of China's strategic emerging industries and the Chinese economy in the long term, but also essential in ensuring the country's stable economic growth and stable employment in the short term, especially after the outbreak of the pandemic. The meeting calls for investors, governments, high tech enterprises and services providers to take part in the New Infrastructure undertakings in a way that demonstrates their open-mindedness, commitment to be agile and professional, and innovativeness in creating financing solutions, and make their contributions to China's robust development.

We express special thanks to the following special guests and representatives of the CPSG member organizations who shared their insights in the meeting:

Mark Harrison, former Global Chairman of Urban Planning and Director of China Urban Development Division, Atkins Group

Dr. HE Xun, Market Director, Business Development Department, China Tower Corporation

Mr. YAO Jia, Chief Financial Officer, Wenge Tech

Mr. JIANG Hongbin, OFS-Urbanisation Partner, PwC

Mr. Wilson WY CHOW, Global TMT Partner, PwC