

The Sustainable Development of Rail Transit Construction and Operation in Guangdong-Hong Kong-Macau Great Bay Area, a Preliminary Analysis

MTR Corporation Limited

Executive Summary

The development of Guangdong-Hong Kong-Macau Great Bay Area (hereinafter referred to as “GBA”) is a national strategy crafted, deployed and advocated by General Secretary Xi Jinping. It is a new measure adopted in the new era to push ahead with the opening-up drive in an all-around manner, as well as a new attempt to promote the cause of “one country, two systems”.

As we have learned from international best practices, the construction and integration of rail transit system ought to be a foundational item on the development agenda of the GBA. Synergies are achieved via the sharing of functionalities of the cities within the GBA by shortening the time required to commute among these cities, thereby reducing the effect of any unique factors from individual cities that could have on the development of neighboring cities. The regional functionalities within the metropolitans will become gradually blurred as markets and areas covered by the rail transit system integrate, resulting in economy of scale and synergy via horizontal and vertical integration within the metropolitans of the GBA.

The “project lifecycle management” concept and the sustainability development model of “rail + property/community” advocated by MTR Corporation Limited (or “MTR”) have been proven and well acknowledged by local governments and citizens in Hong Kong, Macau, Beijing, Hangzhou, and Shenzhen as well as overseas in U.K., Sweden and Australia. By leveraging experiences in urban planning and sustainable development of rail transit, MTR looks forward to contributing to the economic development of GBA.

The development of Guangdong-Hong Kong-Macau Great Bay Area (hereinafter referred to as “GBA”) is a national strategy crafted, deployed and advocated by General Secretary Xi Jinping. It is a new measure adopted for the coordinated development of national economy and a highly open economic structure.

GBA comprises the two special administrative regions of Hong Kong and Macau, and nine economically most developed cities in the Pearl River Delta area. GBA is ranked second in the world Top 4 bay areas in terms of aggregate GDP, and first in terms of population, land area and seaport and airport throughput.

GBA should follow world-class metropolitan standards in its development to build infrastructure connectivity, such as the formation of world-class airport group to strengthen the coordination of airports in the Bay area and air traffic coordination; planning of three-dimensional transportation system and enhancing the connectivity of high-speed rail, inter-city express rail, subway and other forms of transportation in the Bay area, whilst daily and inter-city commuting should be centered around rail transit. There is a lack of a holistic and coordinated approach in rail transit planning and construction due mainly to the difference in the level of urban development of the cities in the GBA at present. One of the key challenges and critical factors to consider in the overall development planning of GBA calls for a comprehensive and integrated approach in assessing and planning of rail transit as part of overall urban, transportation and land use planning in GBA. Hong Kong, Guangzhou and Shenzhen are the only cities in GBA that operates a comprehensive network of rail transit by the end of 2018, others have either no rail transit or is on a single-line operation basis. It must be respected that the sustainable development of

urban rail transit network is a complex system of work, and the following criteria (non-exhaustive) are required for the sustained development of urban rail transit: an excellent foundation and outlook of local economy, matching scale of demographics and daily population movement pattern, the planning and designing of rail transit network based on the above information, high level of construction and operating abilities, and acknowledgment and preparation for escalating operating cost, upgrade and re-investment capital expenditure.

Drawing on the experiences of rail transit development in renowned international metropolitans, rail transit operators and relevant government authorities often lack sufficient knowledge and reasonable estimates for the operating cost of rail transit, as well as the absence of a reasonable fare adjustment mechanism; the essential elements of sustained operation of urban rail transit. Experiences show that the lack of cashflow support for upgrade and re-investment is a severe threat to the sustainable operation of an urban rail transit operator. An inevitable vicious circle as a result of government subsidy falls short of expected: deterioration of service and the reliability leads to reduced patronage, and in turn limiting the possibility of fare increase which results in widening funding gap, thereby creating problems for subsequent maintenance and re-investment. We have seen growing popularity of PPP in rail transit projects in mainland China over the past few years, however, the inappropriate allocation of risk-sharing (private sector is responsible for excess risk) will often result in failed PPP.

Urban rail transit has experienced tremendous growth over the past decade in mainland China. There are 34 cities with a total of 165 metro lines, representing 5,033km of operating mileage as of the end of 2017. 32 operating metro lines, a

total of 880km were added in 2017, a historical high in terms of new mileage added. A total of 62 cities received approvals for rail transit network planning (including 18 cities which received local governments' approval), representing a total of 7,424km of planned urban rail transit network as of 2017-year end. Urban rail transit network (under construction and planned) in mainland China has been growing at an accelerated rate in terms of both monetary investment and construction over the past decade: RMB 476 billion invested in 2017, of which Wuhan and Chengdu each invested over RMB 30 billion while Shanghai, Hangzhou, Beijing and Chongqing invested over RMB 20 billion respectively; an aggregate of 18 cities invested over RMB 10 billion on an individual city basis. 254 metro lines or 6,246km total mileage are under construction by 2017-year end, representing a total investment of RMB 3,876 billion.

Under the backdrop of accelerated development of rail transit in mainland China, local governments however would have to face and subsequently solve two puzzles: the paradox between accelerated urban infrastructure development and delevering, and the solution of sustained development of urban rail transit network operation. Recognizing the difference between traditional operating cost and project lifecycle management, as well as the adoption of sustainable development business model are of paramount importance.

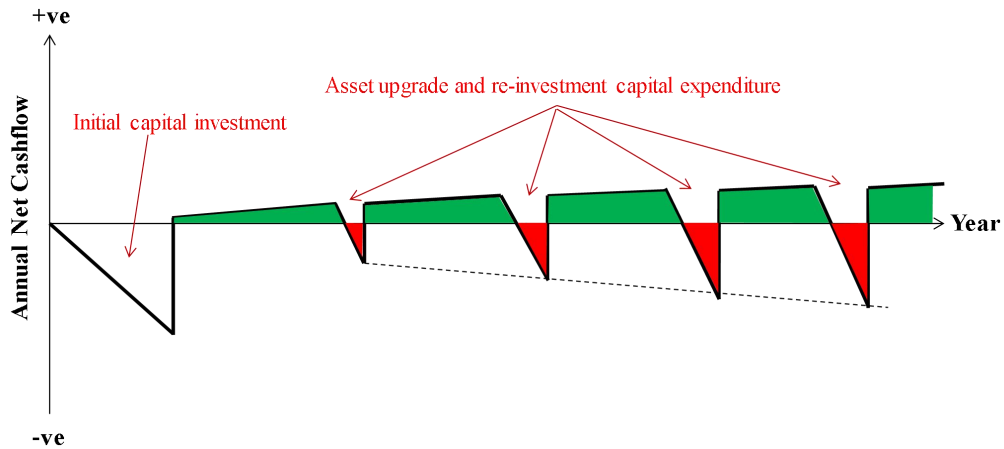
Presently, the construction cost of rail transit project is borne by the government as fiscal spending. Urban rail transit operators are responsible for day-to-day operation only, it is deemed profitable if fare and non-fare revenue should cover cost of operation. Depreciation, upgrade and re-investment capital expenditure are packaged as separate and independent fiscal budget item. Drawing from

international experiences that 100% government funding is not a sustainable path rather it will eventually become a heavy financial burden. Whilst the excessive dependence on patrons is also not a sustainable path either; rather difficult to maintain the balance between patrons (civil unrest) and government subsidy (financial burden).

The need to provide for escalating operating cost, upgrade and re-investment capital expenditure puzzles every operator of rail transit. MTR Corporation Limited (or “MTR”) adopts and advocates “project lifecycle management” philosophy, which is concerned with the overall consideration of all the cash outflow during the construction and operation phases of urban rail transit (including construction cost, financial cost, operating cost, upgrade and re-investment capital expenditure) for a period of 25-30 years. A plan is developed to ensure financial balance for the sustained, smooth and effective operation of the urban rail transit. Let’s look at an example in the context of present situation in mainland China cities, a city with 200km of subway network with RMB 800 million per km of initial capital investment (electromechanical equipment portion of 30%-40%); total network capital investment amounts to RMB 160 billion.

30-year total operating cost estimate: approx. RMB 110 billion to 160 billion (excluding inflation, depreciation and cost of finance). Upgrade and re-investment capital expenditure: approx. RMB 65 billion to 80 billion (excluding inflation). The above cash outflows are necessary regardless of the model of co-operation (PPP or not) applied.

Chart 1: Project Lifecycle Cost



One needs to also include the effects of inflation, depreciation and cost of finance in order for the sustained operation of an enterprise of market economy.

Comparing to the popular cash subsidy model in mainland China presently, MTR adopts and advocates the “rail + property/community” sustainable model in order to provide for the funding gap as a result of construction and operation of the rail transit by using the proceeds generated from the development of land along the rail line. Rail transit drives up the value of the adjacent land whilst the development of land generates patronage as part of operating income.

Given the prevailing policies with regard to land use and development in mainland China, and to effectively apply “R+P” model to ensure reasonable return for supplementing financial shortfall of constructing and operating urban rail transit whilst maximizing public resource allocation and efficiency, the following key considerations must be resolved: model and land price of the land granted? Negotiation of profit-sharing mechanism with local government. The entity(s)

responsible for developing rail related properties? Land use right cannot be transferred via negotiation to rail transit construction and operation enterprise under the current regulations in mainland China, rather it has to go through the public auction process. The practice in Hong Kong allows land use right adjacent to rail lines to be transferred via negotiation between rail transit operator and the H.K.S.A.R Government, by first calculating the funding gap of construction and operation of rail transit project such that equivalent land development can then be determined and land price paid by the rail transit operator. The land granted is then developed by rail transit operator in partnership with developers.

A reasonable PPP model should be based on the principle that “risk shall be borne by the party that is most suitable and capable to control or tolerate risks”. Project risks should be rationally allocated and shared: commercial risk such as project design, construction, finance, operation and maintenance should be undertaken by private investors. Those risks such as changes to laws and policies and minimum operating requirement guarantee that private investors are unable to control should be borne by the government. A recent document published by the PRC Treasury concerned with further regulating PPP encourages private sector capital participation in public projects by stating preferential treatment under same bidding terms, as well as making private sector participation a performance evaluation criterion of local governments.

As the most developed and international city in the GBA, Hong Kong has a sound financial system, full-fledged infrastructure facilities, a well-designed regulatory system, and ample talent pool. It has a high degree of integration with the international system and therefore is able to play a strategic role in the

development of the GBA. Due to the limited availability of land in Hong Kong, the government has to exercise extra caution when planning urban development. More importantly, a coordinated approach when developing plans for urban development, rail transit development and land development such to guide and modify population distribution among various functional districts as well as the daily commute of the residents in Hong Kong. Spatial scale of Hong Kong is effectively expanded and public transport system is given a leading role in the process of urban development planning. We believe the practice in Hong Kong in terms of urban planning and rail transit development should serve as a good reference for GBA development.

MTR, a H.K.S.A.R government-controlled entity is the backbone constructor and operator of transport infrastructure and public transport system in Hong Kong. It is the only Chinese rail transit company that has taken part in operating rail transit systems in western developed countries. After years of operations in Hong Kong, mainland China and international markets, MTR has accumulated ample experiences and expertise in urban development planning, public transport development and international investment, and earned its reputation as a safe, efficient and responsible rail transit operator in the global rail transit market. MTR is willing to contribute to and capable of providing counselling and assistance to the rail transit development of GBA.