

# *Delivering Rail Projects in Asia*



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# Introduction

Rail is an effective way to deliver mass transit to a large number of people. It provides fast, safe and comfortable transportation from suburbs into city centres or city centre to city centre. The cost of rail projects, both the upfront land acquisition and construction, as well as the ongoing operations and maintenance, is considerable. Thus, governments must carefully plan, structure and implement rail projects to ensure that they deliver value for money and transport policy objectives are met.

This paper covers:

- The different types of rail systems that can be implemented;
- An overview of the major rail projects planned and under construction in the Southeast Asian region;
- A review of major issues to be resolved when delivering rail projects and key success factors for successful projects; and
- Different approaches to funding the cost of rail projects.

PwC assists clients in both the public and private sectors to plan, manage and deliver large scale railway and transportation projects. PwC combines finance and engineering skills, to serve the full asset lifecycle of such capital projects and infrastructure. We work with governments, shaping their policy, developing frameworks and helping them to procure and implement Public-Private Partnerships (PPPs) in Mass Rapid Transit (MRT) systems and High Speed Rail. As an independent adviser, we can deliver a truly competitive bidding process to ensure value for money for government. We also advise private sector bidders, helping them to develop structures that allow them to access local and international funds and submit deliverable, robust bids while reconciling investors' need for profit with the requirements of Government.

We hope that you find this paper an informative and enjoyable read. If you would like to explore the issues or projects discussed here in greater detail, please get in touch with us.







**Mark Rathbone**  
Asia Pacific Leader,  
Capital Projects & Infrastructure  
Tel: (65) 6236 4190  
mark.rathbone@sg.pwc.com



**Oliver Redrup**  
Capital Projects & Infrastructure,  
Associate Director  
Tel: (65) 6236 4053  
oliver.jw.redrup@sg.pwc.com

# *Different Modes of Rail Transport*

There are different modes of railway projects which can be built to serve a country's public transportation needs. Selecting the right mode is a key decision for governments and transport authorities. Certain modes of rail transport naturally lend themselves to certain situations, however, governments should rigorously evaluate the different modes against each other. The evaluation must balance the competing pressures of cost and quality, and consider all relevant factors including technical feasibility, the local environment, the transport problems that the project is designed to tackle, and the overall budget for the government.

			
<b><i>Monorail</i></b>	<b><i>Light Rail</i></b>	<b><i>Metro</i></b>	<b><i>Long distance/ High Speed Rail</i></b>
<ul style="list-style-type: none"><li>• Elevated single rail track</li><li>• Suitable for fixed route through a built-up area and as a feeder line for MRT lines</li><li>• Lowest cost among train systems but more expensive than bus network</li><li>• Limited land take required and shorter construction period</li><li>• Disruption can be difficult to manage because of single track</li></ul>	<ul style="list-style-type: none"><li>• At-grade single cars or short trains run along exclusive rights-of-way</li><li>• Greater capacity than monorail but still on the lower end of costs</li><li>• Electric light rails are environmentally friendly</li><li>• Can be difficult to manage interface between vehicle traffic and light rail</li></ul>	<ul style="list-style-type: none"><li>• Fully segregated, usually elevated or underground and can be technically complex or may require tunneling or more land take</li><li>• High capacity for urban rail system</li><li>• Often forms the backbone of a dense city's public transport network</li></ul>	<ul style="list-style-type: none"><li>• Lines capable of speeds of 250 kph or more</li><li>• Suited to longer city-to-city journeys</li><li>• High capital cost and operations and maintenance costs</li><li>• Long planning and implementation phase</li><li>• Can effectively compete against air travel</li></ul>



# Rail systems in the region

Asia is seeing rapid growth and urbanisation, and there is an increasing need to develop transport services. Railway is a viable option to meet the demand for urban commuting as well as long distance travel. There are numerous railway projects in development or construction, representing billions of dollars in investment and spending.

## Thailand

- Multiple MRT lines under construction in Bangkok
- Preliminary proposals to develop high speed rail network



Thailand

Hong Kong



## Malaysia

- Electrified Double Track Project (Ipoh - Padang Besar) being implemented with planned operational start date in November 2014
- Klang Valley Mass Rapid Transit under construction with planned operational start date in 2017



Malaysia



Vietnam

## Malaysia and Singapore

- High Speed Line between Singapore and Kuala Lumpur has been approved and is in the planning stage now
- Rapid Transit System link between Johor Bahru and Singapore due to operate in 2018



Singapore

## Singapore

- Multiple MRT lines under construction and being extended
- Network will double in length by 2030
- Rolling stock fleet for existing lines being expanded

Indonesia





## Taiwan

### Taiwan

- Kaohsiung Light Rail under construction with planned operational start date in 2015

### Hong Kong

- MTR is in the process of delivering 5 new projects
- These include the West Island Line, the South Island Line (East) and the Guangzhou - Shenzhen - Hong Kong Express Rail Link

### Vietnam

- Currently no city MRT systems in operation but networks being developed in both Ho Chi Minh City and Hanoi

## Philippines



### Philippines

- The Department of Transportation and Communications has awarded LRT 1 Cavite Extension Project
- Other multiple projects under development including further LRT extensions and a 900 km Integrated Luzon Railway

### Indonesia

- Jakarta MRT under construction and phase one operation planned to start by 2018
- Jakarta Monorail in development
- Plan for Soekarno – Hatta Airport Express Link underway
- Urban transit rail projects planned for several cities – Bali, Bandung, South Sumatra, Surabaya and Surakarta
- High Speed Line from Jakarta to Surabaya and Bandung has been proposed

# Key success factors and issues to be resolved

Railway projects are complex and face financial, economic and technical challenges that must be overcome. Central governments, regional mayors and political leaders, as well as private sector developers or investors are often implementing railway projects for the first time which can increase these challenges. Here we consider some of the key factors that will determine the extent to which a railway project or network will be successful.

## 1. Land acquisition

Large-scale railway projects usually require land acquisition and displacement of homes and businesses. While governments may have the authority to acquire land when needed for development purposes, land acquisition often draws controversy as the associated human costs may be much more than the monetary compensation available. Moreover, in countries where clear land acquisition laws are not present, the challenge becomes very complex. Transparent and tested land acquisition laws and agreement between stakeholders over fair compensation play a crucial role in the timely and successful completion of railway projects. This is an even more crucial issue if private investment is funding the project as it can increase risks and create uncertainty around the project timeline. Slow land acquisition and land clearance issues are often major reasons for the delay or cancellation of railway projects.







## 2. Allocating risk correctly

The private sector has a role to play as governments cannot deliver railway projects on their own so. This private sector involvement can be through construction companies, systems suppliers, rolling stock manufacturers, operating companies or private finance. For the private sector to get involved in the project and provide value for money to the government, the allocation of various project risks must be done correctly. There is no 'template' allocation of project risks but as a guideline principle, each risk should be allocated to the party that is best placed to manage it. For some risks, the best approach can be for the risk to be shared between the government and the private sector. For example, passenger revenue risk can be shared through a revenue share mechanism; if revenue falls below a certain level then the government provides revenue support, but if revenue exceeds a threshold then the operator must share a portion of the excess revenue with the government. Using such mechanisms, and testing the market when allocating risks, helps to result in deliverable project structures.

## 3. Securing funding

Transport infrastructure is a public good and the services benefit a large number of people. Hence, it is not just the financial returns but also social returns that need to be considered when planning such projects. Prior to starting any railway project, governments must undertake a feasibility study to fully understand the funding requirement of the project and the key sensitivities to the project's financials. When this funding requirement is established, the project must secure funding from the government budget. For many Asian countries, this can be challenging as an established and effective Viability Gap Funding mechanism must be in place that can enable funds to be allocated to the project.

## 4. Maximising non-passenger revenue

In addition to passenger revenues, railways offer the opportunity of generating non-passenger revenues. This has the benefit of diversifying the revenue base and lowering the overall funding requirement, thus enhancing the sustainability of operations. Non-passenger revenues can come from a number of

sources including retail at stations, advertising, media and telecommunications. Transport authorities and train companies are being more and more innovative in their pursuit of non-passenger revenues; The Southeastern Pennsylvania Transportation Authority in the US<sup>1</sup> has signed a deal to sell the naming rights to a subway station.

## 5. Integration with other modes of transport

Economic growth and increasing pressures in the urban areas of countries in Asia emphasise the growing need for public transportation. Different modes of mass transit may be feasible and most appropriate in different areas of cities. A successful urban public transport strategy will offer convenience to the public by implementing integration of one mode with other modes so that they are more willing to switch to public transport from private ones. Singapore and Hong Kong are often cited as examples of the successful integration and development of public transport networks. Achieving this is not easy and requires time, planning and effective management of, and communication with, multiple stakeholders. 'Integration' needs to cover both 'hard' infrastructure (such as interchanges which are co-located for bus, rail and cycles) and 'soft' infrastructure such as common ticketing systems and fares policies, where integration is not effective and both governments and passengers lose out.

## 6. Public Acceptance

A major public infrastructure project like railway development is a huge investment. For instance, the government is always accountable to the public on why there should be an investment in railways rather than education, health or agriculture. Railway development may often lead to land acquisition and voluntary/involuntary resettlement of local population. Hence, public acceptance is a key element for successful initiation and implementation for any railway project. Governments must pro-actively seek to gain public acceptance and support for a project. This is a continuous process and must be supported by two-way communication channels and a willingness to revise and improve a project during development where necessary.

# Funding Options

Implementing railway projects is a major and strategic decision for governments as the funding requirement is large and development takes a long time to complete and offer benefits to the public. There are a number of different approaches to funding railway projects. To deliver the project, they must often be combined to secure sufficient funding. Above traditional direct government funding (which is usually the primary source of funding for a project), there are a number of other innovative funding mechanisms which can be applied to a project to close any funding gap.

## 1. Tax increment financing

This is a financing mechanism that allows local authorities to borrow against future growth in revenue from taxes. The principle behind the mechanism is that a railway project will lead to increased tax revenues such as property taxes as result of an area benefiting from the improved public transport network and land values increasing as a result. Governments can then use these future increased revenues to borrow from financial institutions and fund the upfront development and construction costs of the railway project. This mechanism has been used extensively in the US and in some countries in Europe.



### Case Study: UK Crossrail

Crossrail is the largest railway construction project in Europe. It will link commuter and suburban services and provide a high-frequency, high-capacity link between Heathrow Airport, the West End, the City of London and Canary Wharf. The £15.9 bn project will be delivered through a special purpose vehicle wholly owned by Transport for London (TfL). To fund such a large project, an innovative approach must be taken and multiple funding sources must be utilised. £4.1 bn will be raised through business rate supplement (BRS) which will be collected as a levy of 2% on non-domestic properties with a rateable value of over £55,000. Property developers will contribute £600 million as Community Infrastructure Levy and key direct beneficiaries like City of London Corporation and Heathrow Airport will contribute £500 million. The remainder of the funds will be provided by central government grant, TfL and Network Rail.



## 2. Rail-property development model

Rail-property development is a rail infrastructure financing model that is based on transferring the increase in value of the property in a location from transport access to finance infrastructure development. As transportation systems are developed, the value of land in the area increases. Tapping this increase in value of land to fund transport projects is an option for financing. Some schemes that can be used under this method are sale of development rights, land sales, joint development of infrastructure with the private sector, and development impact fees.



### Case Study: MTR Hong Kong

MTR, the urban transit agency of Hong Kong, engages in property development which leads to generation of revenues to finance railway development and also increases patronage population catchments areas that contribute to the patronage of the railway. The government grants exclusive property development rights of the station areas to MTR below market rates. Hong Kong has been a pioneer in using this approach to fund railway projects, and other cities are increasingly looking to implement it.

## 3. Hypothecated taxes

Hypothecated tax is a tax in which the revenues (whole or in part) collected are used for a particular purpose rather than going to the central government budget. Tax revenues are allocated to be used for specific means rather than with general taxes which are later allocated by the government on different ends. In the case of hypothecated taxes (also called earmarked taxes), the tax-payer knows what the government will use his or her money for. Some examples of hypothecated taxes in practice are gasoline taxes in the US which are used to finance transport infrastructure, aviation fuel excise in Australia that is used to cover air service costs and the Transport Innovation Fund in the UK that was used to curb congestion. Recently, the option of using earmarked funds for rail projects is being discussed in the US for light rail in Florida and for high speed rail in California.



### Case Study: UK Transport Innovation Fund

The Transport Innovation Fund (TIF) was a funding mechanism in the UK that allocated part of the budget of the Department of Transport to provide incentives to local and regional transport bodies to reduce congestion and improve productivity by using strategies such as road pricing, modal shift and better bus services. It required local pricing schemes to be implemented in cities that received funding, and the revenues from these taxes to be allocated to further transport projects.

## 4. Official development assistance

Multilateral agencies and bilateral donors have been playing an important role in financing infrastructure projects throughout the developing world as part of their commitment to sustainable development. Their funding is primarily in two forms; direct grants or 'soft' loans – loans which have terms that are more favourable than conceived borrowing. Major railway infrastructure projects in Asian countries have been financed using official development assistance. Jakarta MRT is largely being funded by Japan International Cooperation Agency (JICA). Hanoi Metro is being constructed with assistance from JICA, the French Development Agency, Asian Development Bank and the European Investment Bank.

## 5. Private finance

Governments in the region are typically operating on budget deficits and facing increasing pressures to allocate the budget among different development priorities of the country. However, there is a large pool of capital stock in the financial markets which can be tapped on for railway projects. Pension funds, sovereign wealth funds, insurance companies and other institutional investors manage \$50 trillion of global capital stock<sup>1</sup>. Infrastructure accounts for only 0.8% of this pool. Hence, there is potential for drawing capital from the financial markets to infrastructure investment. MRT 3 in Metro Manila is an example of a Build-Operate-Transfer arrangement<sup>2</sup> with private investment. Bangkok Skytrain is another example of the private financing of railways.

1 The Economist, 'The Trillion Dollar Gap', 22 March 2014

2 World Bank, 'Private Sector Participation in Light Rail – Light Metro Transit Initiatives', 2010

