



## **PENANG BRIDGE, MALAYSIA**

### **Case Study (Transportation)**

#### **Project Summary:**

Malaysia is a federation of thirteen states and three federal territories in Southeast Asia. The State of Penang (shown in red on the map) in northwest Malaysia is comprised of Penang Island and Seberang Perai on Peninsular Malaysia. Prior to the mid-1980s, the only way to reach Penang Island was by ferry. As a result, communities on the island were isolated from the rest of the country.

The government developed the idea of constructing a bridge to connect the island to the mainland, as a means of accelerating economic development. In 1981, work commenced for the Penang Bridge, a public sector project, and on September 14, 1985, the bridge was opened to traffic. The Penang Bridge is a dual-carriageway bridge that connects Gelugor on Penang Island and Seberang Prai on the Malay Peninsula (on the mainland of Malaysia); it is the only connection to the island other than a ferry. The bridge is 13.5 kilometers (8.4 miles) in length and is the longest bridge in the country. The bridge consists of six lanes of traffic (three in each direction) and twenty-four lanes at the toll plaza, including ten for motorcycles only. The final cost of construction for the Malaysian Government was RM800 million (approximately \$330 million in 1985), excluding the cost of land acquisition. This project, among many other development projects undertaken during this time, led to high fiscal deficits and finally to a change in government strategy from a government-led development strategy to a private sector-led development strategy.

In 1993, the Malaysian Government and a private company entered into a concession agreement for the management, operation, maintenance and upgrade of the Penang Bridge. Penang Bridge Sdn Bhd (PBSB) was established as the single purpose company to oversee the bridge.

Today the Penang Bridge is a catalyst to tourism and industry in the State of Penang. The bridge is still the longest in Malaysia, one of the longest in Southeast Asia and a national landmark. In 2007, 23.31 million vehicles used the bridge, which was a 3.66 percent increase in volume from 22.49 million vehicle trips in 2006. This translates into an average 63,872 one-way trips per day on the bridge (return trips are not measured because tolls are only collected as vehicles enter the



island). PBSB is currently expanding the bridge to accommodate another lane of traffic in each direction in order to alleviate traffic congestion.

### **Project Objectives:**

This brownfield PPP has two main objectives: the government wanted to gain funds to help reduce its debt and spur private sector-led development in the State of Penang. Following a period of publicly funded development, the government had amassed large, unsustainable fiscal deficits. By entering into a public-private partnership, the government would be able to gain funds that could be used for debt reduction.

The government also wanted to spur private sector-led development in the State of Penang. Prior to the construction of the bridge, Penang Island could only be reached by a ferry and communities on the island were rather isolated from the rest of the state and country. Following the opening of the Penang Bridge in 1985, Penang Island's tourism and industry increased, which led to greater integration within Malaysia's economy. For development to continue and further integration, the bridge needed to be maintained and kept open to traffic. Typically, when government funding runs short, the maintenance budget is cut first. By entering into a concession agreement, maintenance and operation costs would be eliminated from the government's budget at the same time that contract provisions would require the private sector partner to fund maintenance.



## **Project Description:**

### **1. Partners**

The private sector partner established Penang Bridge Sdn Bhd (PBSB) as the single purpose company (special purpose vehicle) for this PPP. The company which established PBSB is a major Malaysian group involved in infrastructure, construction, property development, technology and communications.

The public sector partner is the Malaysian government, specifically the Malaysian Highway Authority, which was responsible for managing and operating the bridge prior to the concession agreement.

### **2. Implementation - Legislative and Administrative**

Beginning in the 1970s, the New Economic Plan transformed Malaysia's economic policy from one based on growth through exports to growth targeted to reduce socio-economic inequalities. To promote economic growth and spur development, the government undertook massive publicly funded development projects; this led to increased and unsustainable budget deficits. In 1983, the government adopted a private sector led growth strategy to continue its development push while bringing the ballooning deficit under control.

The new strategy came in two parts: Malaysia Incorporated (Malaysia, Inc.) and the Privatization Policy. Malaysia Inc., introduced by the Prime Minister, called for closer cooperation and collaboration between the public and private sectors. He labeled Malaysia a 'business entity' that is jointly owned by both sectors and explained that national development required their mutual cooperation.

The Privatization Policy was also announced in 1983 as a national policy. The privatization policy was established to help facilitate economic growth, relieve the financial and administrative burden of the government, reduce the government's presence in the economy and decrease public spending. Policymakers believed this policy would allow market forces to govern the economy, leading to greater efficiency and productivity. While the title appears limiting in nature, the Privatization Policy was more encompassing than a pure sale of public assets to the private sector. Implementation methods approved under this policy included sale, lease, management contracts, build, build-operate-transfer (BOT), build-operate-own (BOO), build-operate, build-lease-transfer, land development or land swap and management buy outs.



The government decided on a case-by-case basis which type of method was to be used for each project. However, the choice was usually based on the highest degree of practical private sector involvement that could be achieved for a given project.

### 3. Financial Agreement

In 1993, the private sector partner paid the government of Malaysia RM550 million to lease the Penang bridge for 25 years. To recoup its initial invest and future investments to upgrade the bridge, PBSB levies and collects tolls for each crossing to Penang Island.

Tolls are only collected for traffic entering Penang Island; travel back to the mainland does not require a toll. The toll rate varies by vehicle type, ranging from RM1.40 for motorcycles to RM75.00 for tractor trailers. The table below outlines the seven classes of vehicles and their corresponding rates, as of late 2008.

Class	Types of Vehicles	Fare (RM)
1	Motorcycles	1.40
2	Motorcycles with sidecars, 3-wheel commercial vehicles, cars, station wagons	7.00
3	Lorries (trucks) and vans with two axles and four wheels	12.00
	Buses with two axles and four wheels	6.00
4	Lorries (trucks) and vans with two axles and five or six wheels	25.00
	Buses with two axles and five or six wheels	12.50
5	Vehicles with three axles	45.00
	Buses with three axles	22.50
6	Vehicles with four axles	60.00
7	Vehicles with five or more axles	75.00

In 2000, PBSB collected RM106 million in revenue, which marked the fifth year in a row that revenue topped RM100 million. In 2007, PBSB collected RM149.96 million in revenues and made RM 52.22 million in profit before taxes.



#### **4. Contract Provisions**

The government of Malaysia and PBSB entered into a 25 year concession agreement for the management, operation, maintenance, and upgrade of the Penang Bridge on August 15, 1993. In exchange for an upfront payment, PBSB was granted the management and operation rights for the bridge. PBSB also took over toll collection operations and receives all revenue from the bridge as the method to recoup its investments. The contract categorizes vehicles in seven classes, each with a different toll rate (see chart above). The Malaysian Government set the original toll rate and must approve all subsequent toll rate increases; PBSB is allowed to raise the toll rate every five years.

The contract also includes termination provisions if the government chose to take back the bridge. If the government ends the contract within the first ten years, it would have to pay compensation of ten years of pre-tax income and settle any loans taken by PBSB. If the government cancels the concession after ten years, it would be required to pay the estimated remaining profit for the project.

#### **5. Implementation Metrics**

Because the private partner accepted the demand risk for this project, i.e. the risk that traffic volume will be sufficient to generate adequate revenue, the private partner has proactively invested in the bridge to make it efficient and attractive to travelers. Since PBSB took over operation of the Penang Bridge, several maintenance and upgrade projects have taken place. Maintenance for PBSB includes bridge structure inspections on land, above water and underwater, preventive maintenance and heavy repair. Beginning in 1999, PBSB changed and upgraded four short stay cables located at the pylons of the Bridge's four main spans. The upgrade was done to improve the bridge's ability to handle current and projected traffic loading. PBSB also upgraded the original toll booths and converted the temporary booths into permanent structures, bringing the number of total booths up to twenty-four. Lanes were reconfigured to separate heavy vehicles from others to reduce the wait time to pay the toll.

PBSB has also upgraded the technology used to monitor the bridge and collect tolls. For traffic monitoring and security, 24-hour closed circuit television (CCTV) cameras were installed along the main span of the bridge, the laybys (a term used for both rest areas and pull-off areas) and at both ends of the bridge to ensure that PBSB has up-to-date traffic and incident information. In 2000, emergency telephones were placed along both bounds at 1.2km intervals that connect people with the communication center and the 24-hour bridge patrol vehicles. PBSB installed



the SmartTAG and Touch ‘n Go toll collection systems to increase efficiency and reduce toll collection time. The SmartTAG is an electronic collection system where a device is attached to the windshield of the vehicle and the toll is deducted from the Touch ‘n Go account. The Touch ‘n Go system can be used in two ways: the card can be inserted into the SmartTAG device and the toll will be deducted or the card can be removed and touched to a reader at the toll plaza. The Touch ‘n Go system can handle up to 800 vehicles per hour while the combined system with SmartTAG can handle 1,200 per hour, both of which are much greater than the number of vehicles handled that pay cash.

The largest upgrade project for the bridge commenced at the end of 2005 and is expected to be completed by late 2009. PBSB has hired a subcontractor for the structural widening of the portion of the bridge which is over water. Once completed, 4.8 meters will have been added on each side of the bridge, which will provide a fourth lane of traffic in each direction. The cost of this upgrade project is RM409 million.

The cumulative cost of these improvements is significant. However, the increasing traffic volume and project revenue demonstrate that these improvements have made the Panang Bridge an attractive and competitive alternative to the ferry service to the mainland.

## **Commentary:**

### **1. Keys to Success or Failure**

Although the contract included provisions for toll rate increases every five years, to date, rates have not increased. Increases were scheduled for 1998 and 2001, but events—the Asian Financial Crisis and outbreak of Severe Acute Respiratory Syndrome in 1998 and the terrorist attack on the United States in 2001—prevented the increases from taking affect. While PBSB was able to maintain and operate the bridge and make a profit, the government was in violation of the contract and PBSB could have asked for compensation. In this case, there does not appear to be significant damage from the deviation from the contract since the project remains financially viable, but in other cases major problems can occur (see case study on Martin Garcia Channel), making it important for partners to work together and communicate with one another. Unilateral contractual actions such as this can also raise the perceived political risk of future transactions, thus increasing the project cost.

Another potential problem is a second bridge to connect the city of Batu Kawan on the mainland with Batu Maung on the island, which is in the planning stage. The bridge was proposed in 2006



as part of the Ninth Malaysian Plan, which is the national economic plan for 2006-2010. While the Malaysian Government wants a second bridge to be completed as soon as possible, this would have a negative impact on PBSB's revenue stream because it would divert some of its users. Initially, the parent company of PBSB and a Chinese company reached an agreement for the construction of the new bridge, which would have allowed PBSB to incorporate the two bridges into one cohesive unit; however, the companies were unable to sustain agreement after construction material costs escalated. It is also possible that the government will extend PBSB's concession period for the Penang Bridge to compensate them for the potential decrease in revenue. Whatever solution is reached will need to include PBSB's parent company.

A major success of the project is the efficiency of the toll plaza. PBSB made prudent investments to improve the efficiency of the toll plaza, and make the bridge more attractive to travelers. For many bridges and highways, the toll plaza serves as a bottleneck because there are either not enough lanes or there are too many vehicles paying cash. The plaza now has twenty-four lanes, of which ten are for motorcycles only. There are two SmartTAG lanes and five Touch 'n Go lanes, three of which are for motorcycles only. The electronic only lanes and the motorcycle only lanes help maintain the traffic flow and reduce the chances of bottlenecks and congestion.

Overall, this brownfield PPP is an excellent example of a project which provides much needed funds to a government while at the same time ensuring maintenance of the asset. PBSB continues to fund upgrade projects to make the bridge more effective and efficient for its users. Development in Penang has continued to expand as people can more easily travel from the island to the mainland and vice versa.