Asia-Pacific
Economic Cooperation

Quality Transport Vision

APEC Transportation Working Group

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1. Executive Summary

1-1. Background and purpose

In the Asia-Pacific Economic Cooperation (APEC) Leaders' 2013 Declaration, economies shared their aspiration to reach a seamlessly and comprehensively connected and integrated Asia-Pacific through the pillars of Physical Connectivity, Institutional Connectivity and People-to-People Connectivity. For strengthening APEC connectivity, economies have made full efforts to develop transport networks in the region. Owing to devoted efforts, transport infrastructure has improved and contributed to economic growth.

Meanwhile the remarkable economic growth in APEC has brought further increasing demand for transport infrastructure networks. In addition to demand for more infrastructure networks, requests for transport quality has been increasing in tandem with economic development. Transport networks should keep up with the growing expectations from both the business sector and passengers. Therefore, economies have been developing, maintaining and renewing quality transport infrastructure and seeking to increase the quality and sustainability of APEC transport networks under the APEC Connectivity Blueprint for 2015-2025 endorsed by 2014 APEC Leaders Meeting.

One year before the Leaders Meeting, the initiative of "Quality Transport Vision" was launched at the 8th APEC Transportation Ministerial Meeting (TMM8) held in Tokyo in September 2013. Joint Ministers Statement describes that TMM8 direct the TPTWG to develop a "Quality Transport" vision, encompassing convenience, efficiency, safety, security, and sustainability as priorities, in cooperation with other relevant APEC fora. APEC Transportation Working Group Meeting (TPTWG) conducted a survey for drafting "Quality Transport Vision" under the direction of TMM8. Aiming at promoting understanding on quality transport and expanding it in APEC, the survey compiled quality transport cases with key success factors (setting effective implementation method, utilizing technology and know-how, promoting motivation among concerned parties) in the region and analyzed their quality. Japan sent questionnaires to all economies and dispatch field survey team. All economies kindly sent reply and accepted our survey team. In the analysis of quality, the survey identified aspects of quality transport in each case and categorized such aspects for better understanding. We, Japan, would like to take this opportunity to express our sincere appreciation for all economies' acceptance and cooperation to this survey.

An interim report of the survey was presented at the TPTWG held in Jeju (Korea) in May 2015. This report has reflected valuable comments submitted from economies during and after the TPTWG.

1-2. Outline of “Quality Transport” in APEC

(1) Aspects of quality transport cases

“Quality Transport” comprises a variety of aspects, which vary by reflecting economic and social conditions such as income and transport network development in respective economies. Therefore, this report adopted a bottom-up approach rather than a top-down approach with the objective of understanding quality transport itself in a comprehensive manner.

At the TPTWG held in Hong Kong in 2014, Japan, as project proposing economy, explained methodology of the project and all economies were requested to submit projects which were recognized as “Quality Transport” by its own economy. Around 70 projects were submitted by July 2015 through e-mail and at the TPTWG held in Jeju (Korea) (**Figure 1-1**). This survey has been implemented with co-sponsoring economies namely Chinese Taipei, Korea and the United States.

In considering the 70 quality transport cases of APEC economies, 37 aspects of quality transport have been identified (**Figure 1-2**). These aspects have been identified by each economy which submitted their case or responded to this survey.

Figure 1-1: The number of Quality Transport projects by economy

Economy	The number of projects	Transportation mode			
		Land (road)	Land (rail)	Maritime	Air
Australia	3	2	0	1	0
Brunei	0	0	0	0	0
Canada	5	3	0	0	2
Chile	4	1	1	0	2
China	0	0	0	0	0
Hong Kong,China	2	0	2	0	0
Indonesia	1	1	0	0	0
Japan	10	5	4	0	1
Korea	5	5	0	0	0
Malaysia	5	3	2	0	0
Mexico	2	1	0	1	0
New Zealand	3	1	2	0	0
Papua New Guinea	1	1	0	0	0
Peru	2	1	0	0	1
The Philippines	4	3	0	0	1
The Russian Federation	0	0	0	0	0
Singapore	3	2	0	1	0
Chinese Taipei	5	4	1	0	0
Thailand	4	2	1	1	0
The United States	6	4	2	0	0
Viet Nam	5	4	0	0	1
Total	70	43	15	4	8

Figure 1-2: Quality transport cases and their aspects

Economy	No.	Transportation Mode	Project name	Aspects
Australia	1	Land transportation (road)	● Policy Framework for Intelligent Transport Systems	● Reducing traffic congestion ● Providing information ● Reducing traffic accidents
	2	Land transportation (road and rail)	● Perth Parking Policy	● Reducing traffic congestion ● User friendly device ● Reducing traffic accidents
	3	Air transportation	● Body Scanner Implementation Project	● Strengthening security ● Securing privacy in inspection
Canada	1	Land transportation (road)	● Vehicle Safety and Environmental Technology	● Reducing traffic accidents ● Reducing CO_2 emission ● Reducing air pollution ● Saving fuels ● Promoting technology development
	2	Land transportation (road and rail)	● TransLink	● More transportation options ● Preferred fare system ● Reducing CO_2 emissions ● Reducing air pollution
	3	Land transportation (road and rail)	● Accessibility in the Transport Sector	● Improving accessibility of transport facilities
	4	Maritime transportation	● Port Access Control System	● Reducing traffic congestion ● Reducing CO_2 emissions ● Improving work efficiency
	5	Maritime transportation	● Power Supply to Ships from the Local Grid	● Reducing CO_2 emissions ● Saving fuels
Chile	1	Land transportation (road)	● New Drivers´ Knowledge Exam	● User friendly device ● Reducing traffic accidents
	2	Land transportation (rail)	● Rancagua Express	● Reducing travel time ● Punctuality ● Reducing congestion ● Reducing CO_2 emissions
	3	Maritime transportation	● Puerto a Gran Escala (PGE)	● Better service ● More transportation options Better transport facilities ● Disaster risk reduction
	4	Maritime transportation	● Puerto Central (PCE)	● Better service ● More transportation options ● Better transport facilities ● Disaster risk reduction
Hong Kong, China	1	Land transportation (rail)	● Octopus Card	● Better service ● Reducing travel time
	2	Land transportation (rail)	● Platform Screen Door, Automatic Platform Gate	● Reducing traffic accidents
Indonesia	1	Land transportation (road)	● ITS for Access Road to Tanjung Priok Port	● Providing information ● Reducing traffic congestion ● Reducing traffic accidents
Japan	1	Land transportation (road)	● Truck Girl Promotion Project	● Promoting Women's participation ● Human resources development ● Industrial development

Economy	No.	Transportation Mode	Project name	Aspects
	2	Land transportation (road)	● Standardization of Universal Design Vehicles	● User friendly device ● Improving accessibility of transport facilities ● Social considerations
	3	Land transportation (rail)	● Indexed of Comfortable and Easeful Public Transport (ICE-PT)	● Providing information ● Improving work efficiency
	4	Land transportation (rail)	● Improving Transport Hub	● Reducing travel time ● Reducing congestion ● Seamless transfer ● Improving accessibility of transport facilities ● Alignment with Development Plan ● Regional development
	5	Land transportation (rail)	● Introducing Aseismic Performance (Early Seismic Wave Detection Device and Reinforcement)	● Reducing traffic accidents ● Disaster risk reduction ● Life-cycle cost saving
	6	Land transportation (rail)	● Shinkansen-Japan's High-Speed Railway Systems	● Reducing travel time ● Punctuality ● Reducing traffic accidents ● Reducing CO_2 emissions ● Saving fuels ● Human resources development
	7	Land transportation (road and rail)	● ETC, ITS Spot and ETC 2.0	● User friendly device ● Providing information ● Reducing travel time ● Reducing congestion ● Reducing CO_2 emissions ● Saving fuels ● Promoting technology development
	8	Land transportation (road and rail)	● Improvement of Environment for Using Baby Buggy in Public Transport	● User friendly device ● Improving accessibility of transport facilities ● Social considerations
	9	Land transportation (road and rail)	● Mutual Available Transport Smart Card	● Better service ● Reducing travel time ● Reducing congestion ● Seamless transfer
	10	Maritime transportation	● Port Preventive Maintenance Plan	● Reducing traffic accidents ● Disaster risk reduction ● Life-cycle cost saving
Korea	1	Land transportation (road)	● ITS	● Providing information ● Reducing traffic congestion ● Reducing traffic accidents
	2	Land transportation (road)	● BRT	● Better transport facilities ● Reducing travel time ● Seamless transfer ● Reducing CO_2 emissions
	3	Land transportation (road and rail)	● Transfer Center	● Better transport facilities ● Reducing travel time ● Seamless transfer

Economy	No.	Transportation Mode	Project name	Aspects
	4	Land transportation (road and rail)	● One card, all pass	● Better service ● Reducing travel time ● More transportation options ● Industrial development
	5	All modes	● Green Transport	● Reducing CO_2 emissions ● Promoting technology development
Malaysia	1	Land transportation (road)	● Traffic Data Collection Station	● Reducing traffic congestion ● Reducing CO_2 emissions
	2	Land transportation (road)	● ASEAN NCAP	● Reducing traffic accidents ● Promoting technology development
	3	Land transportation (rail)	● Electrified Double Tracking and Purchase of Electric Railcars	● Reducing travel time ● Disaster risk reduction
	4	Land transportation (rail)	● Klang Valley Mass Rapid Transit (KVMRT)	● User friendly device ● Reducing travel time ● Seamless transfer ● Job creation ● Industrial development ● Alignment with Development Plan
	5	Land transportation (road and rail)	● Urban Transportation in the NKRA	● Better service ● More transportation options ● Seamless transfer
Mexico	1	Land transportation (road)	● Ecovia	● Better transport facilities ● Preferred fare system ● Reducing travel time ● Seamless transfer ● Reducing CO_2 emissions
	2	Maritime transportation	● EcoPort of Ensenada	● Reducing CO_2 emissions ● Reducing air pollution ● Reducing noise ● Protecting regional environment ● Saving fuel
New Zealand	1	Land transportation (road)	● Total Mobility Scheme	● More transportation options
	2	Land transport (road and rail)	● Safer Journeys	● Reducing traffic accidents
	3	Land transportation (rail)	● Auckland Electrification Project	● Seamless transfer ● Strengthening security ● Improving accessibility of transport facilities ● Reducing CO_2 emissions ● Saving fuels ● Disaster risk reduction
Papua New Guinea	1	Land transport (road and rail)	● Improvements to Land Transport Services or Establishment of Road Traffic Authority (RTA)	● Enhancing manner ● Reducing traffic accidents ● Strengthening security

Economy	No.	Transportation Mode	Project name	Aspects
Peru	1	Land transportation (road)	● South Inter-Oceanic Route, Section 4	● Reducing travel time ● Reducing congestion ● Reducing CO_2 emissions ● Debt sustainability
	2	Maritime transportation	● One Concentrate Loading Terminal in the Callao Port Terminal	● Reducing congestion ● Work efficiency ● Reducing air pollution ● Reducing noise ● Protecting regional environment
The Philippines	1	Land transportation (road)	● Traffic Accident Database	● Reducing traffic accidents
	2	Land transportation (road)	● Clean Fleet Management Toolkit with Low Environmental Impact	● Reducing CO_2 emissions ● Reducing air pollution ● Saving fuels ● Improving work efficiency ● Industrial development
	3	Land transportation (road)	● E-Trike Introduction	● Reducing CO_2 emissions ● Saving fuels ● Industrial development ● Debt sustainability
	4	Maritime transportation	● Power Supply from the Shore to Ro-Ro Ships	● Reducing CO_2 emissions ● Saving fuels
Singapore	1	Land transportation (road and rail)	● Land Transport Master Plan 2013	● Better service ● Reducing travel time ● More transportation options ● Reducing traffic accidents ● Improving accessibility of transport facilities ● Reducing CO_2 emissions ● Reducing air pollution ● Reducing noise ● Alignment with development plan
	2	Land transportation (road and rail)	● Smart Mobility 2030	● Providing information ● Reducing traffic congestion ● Reducing traffic accidents ● Promoting technology development
	3	Maritime transportation	● Maritime Singapore Green Initiative	● Reducing CO_2 emissions ● Reducing air pollution ● Saving fuels ● Promoting technology development
Chinese Taipei	1	Land transportation (road)	● Vehicle Cleaning Pool	● User friendly device ● Reducing air pollution
	2	Land transportation (road)	● i^3 Travel Project	● Reducing CO_2 emissions ● Reducing air pollution ● Reducing noise ● Protecting regional environment ● Promoting technology development

Economy	No.	Transportation Mode	Project name	Aspects
	3	Land transportation (road)	● YouBike	● Better service ● Better transport facilities ● User friendly device ● Preferred fare system ● Enhancing manner ● Reducing CO_2 emissions
	4	Land transportation (road)	● Connected Vehicles Technology Development and Its Demonstration in Road Safety and Mobility	● Providing information ● Reducing traffic congestion ● Reducing traffic accidents ● Promoting technology development
	5	Land transportation (rail)	● TRA Rapid Transit Systematization Project	● Better service ● Better transport facilities ● User friendly device ● Reducing travel time ● Reducing congestion ● Seamless transfer
Thailand	1	Land transportation (road)	● Q Mark	● Reducing traffic accidents ● Reducing CO_2 emissions ● Reducing air pollution ● Saving fuels ● Improving work efficiency ● Human resource development ● Industrial development
	2	Land transportation (road)	● Improve the Stability of Buses	● Reducing traffic accidents ● Debt sustainability
	3	Land transportation (rail)	● Construction of Railway	● Reducing travel time ● More transportation options ● Reducing traffic accidents ● Reducing CO_2 emissions
	4	Air transportation	● Gate Hold Manager (management at the time of aircraft takeoff)	● Reducing travel time ● Reducing CO_2 emissions ● Saving fuels
The United States	1	Land transportation (road)	● Express Lanes	● User friendly devices ● Reducing traffic congestion ● Reducing air pollution
	2	Land transportation (road)	● Automated Traffic Management (ATM)	● Providing information ● Reducing traffic accidents
	3	Land transportation (road)	● Bicycle Lane	● Enhancing traffic manner ● Reducing traffic congestion ● Reducing traffic accidents ● Reducing CO_2 emissions
	4	Land transportation (rail)	● High-Speed Rail	● Reducing travel time ● Reducing CO_2 emissions ● Industrial development ● Job creation
	5	Land transportation (rail)	● TriMet	● More transportation options ● Reducing CO_2 emissions ● Reducing air pollution ● Saving fuels
	6	All modes	● Mitigating Environmental Impact in Construction of Transport Infrastructure	● Protecting regional environment

Economy	No.	Transportation Mode	Project name	Aspects
Viet Nam	1	Land transportation (road)	● Introduction of Motorbike Exhaust Regulation	● Reducing air pollution
	2	Land transportation (road)	● Vehicle Inspection System	● Reducing air pollution
	3	Land transportation (road)	● Ethanol Production for Fuel	● Reducing air pollution
	4	Land transportation (road)	● Nhat Tan Bridge	● Reducing travel time ● Life-cycle cost saving ● Disaster risk reduction ● Debt sustainability ● Human resources development and institutional development ● Alignment with development plan
	5	Maritime transportation	● Initiative to Reduce Detention Rate of International Ships	● Reducing traffic accidents ● Strengthening security

(2) Classification of aspects

The survey tried to find similar characteristics of the aspects identified in the collected quality transport cases and grouped them based on their similarity. **Figure 1-3** shows the classification of aspects of the current “Quality Transport”.

Generally speaking, it is considered that maintaining “Safety” has high priority since people’s lives are at stake. Especially for public transport, “Safety” is an essential aspect in all economies.

“Disaster risk reduction” has also become increasingly important. Many economies in the APEC region are located along the ring of fire in the Pacific Ocean. Typhoon and tropical cyclone sometimes hit economies and cause severe damage to transport modes. “Disaster risk reduction” will become an increasingly important aspect because it is said that global warning will cause super huge typhoons.

At the same time, considering the fact that transport sector emits 20% of global warming gas and that users care more about the environment surrounding them, “environment” is one of the fundamental aspects which economies are working on.

Along with the income growth and development of transport networks, in addition to these basic aspects mentioned above, people increasingly demand high transport quality namely “user friendliness” and “easy to access”. In some economies which suffer from severe congestion due to excessive dependence on private automobiles, public transport needs to make itself more attractive to users. High reliability, punctuality and user friendliness will be necessary in order to make public transport attractive to users. This will also contribute to achieving a better environment.

Some economies identified aspects of “economic efficiency” and “regional effect”. With a view of improving economic efficiency, “life-cycle cost saving” and “debt sustainability” are recognized as necessary aspects for quality transport. PPP/PFI is one of the useful tools for improvement of debt sustainability. “Human resource development”, which was pointed out by some economies, is also

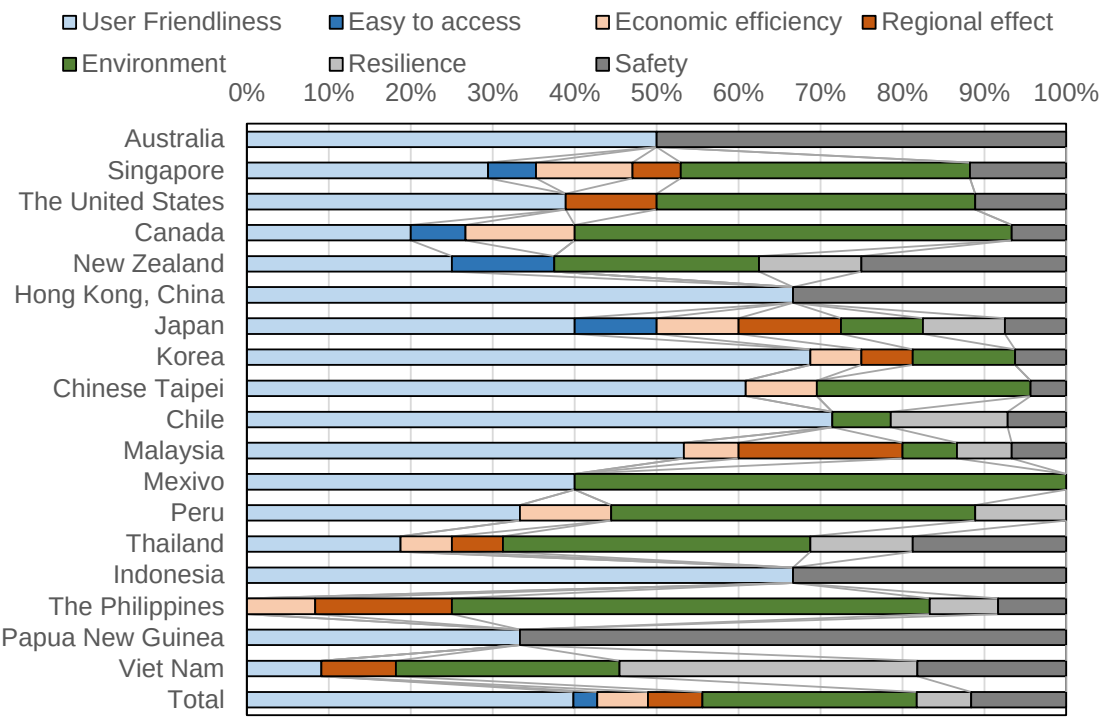
indispensable for quality transport because it improves user-friendliness and safety standards. Well-educated and trained staffs/officers/workers can operate the transport system properly and support evacuation of passengers in the event of an accident or natural disaster. These staff are also necessary for daily maintenance and inspection. Educating and training such staff will also contribute to the development of the region.

In addition, transport projects have impacts on regional economy and society. Social and/or economic impacts should be considered in planning quality transport projects. From this perspective, alignment with development plans at the national and/or regional level is also necessary.

Figure 1-3: Classification of aspects by characteristics

Characteristics	Aspects
User Friendliness	● Better service (transport and shopping), More transportation options, Better transport facilities, User friendly device, Preferred fare system, Providing information, Enhancing manner, Human resource development ● Reducing travel time, Punctuality, Reducing congestion, Seamless transfer
Easy to access	● Improving accessibility of transport facilities, Securing privacy in inspection, Promoting women's participation
Economic efficiency	● Life-cycle cost saving, Improving work efficiency, Promoting technology development, Human resource development
Regional effect	● Job creation, Regional development, Industrial development, Social consideration, Alignment with development plan
Environment	● Reducing CO_2 emissions, Reducing air pollution, Reducing noise, Protecting regional environment, Saving fuels
Resilience	● Disaster risk reduction, Life-cycle cost saving, Human resource development, Debt sustainability
Safety	● Reducing traffic accidents, Strengthening security, Securing privacy in inspection , Human resource development

Figure 1-4: Breakdown of characteristics of collected quality transport cases



Note: Economies are listed in order of amount of Gross Domestic Product per capita 2014.
Source: “World Economic Outlook Database, April 2015” (International Monetary Fund (IMF))

(3) Future “Quality Transport” in APEC

This survey has found that there are various aspects of “Quality Transport”. Each APEC economy has different backgrounds and needs, and such differences are reflected in the aspects and their priorities.

Despite such differences, there is a general trend of these aspects of “Quality Transport” being considered when APEC economies plan their transport systems. As economies continue to develop their transport networks while facing challenges including natural disasters, environmental problems, aging society, and limited budgets, these aspects of “Quality Transport” will become increasingly important.

The aspects identified and categorized in this report will be no doubt be considered when APEC economies plan their future transport networks. It is hoped that this report will be a useful reference for APEC economies in their planning transport networks and that “Quality Transport” will be further promoted in the APEC region.

2. Cases of Quality Transport

2-1. Australia

(1) List of Cases

No.	Transportation mode	Project name	Aspects of Quality Transport
1	Land transportation (road)	● Policy Framework for Intelligent Transport Systems	● Reducing traffic congestion ● Providing information ● Reducing traffic accidents
2	Land transportation (road and rail)	● Perth Parking Policy	● Reducing traffic congestion ● User friendly device ● Reducing traffic accidents
3	Air transportation	● Body Scanner Implementation Project	● Strengthening security ● Securing privacy in inspection

(2) Cases

1. Basic information

1-1. Economy	● Australia
1-2. Aspects of Quality Transport	● Reducing traffic congestion ● Providing information ● Reducing traffic accidents
1-3. Transportation mode	● Land transportation (road)
1-4. Project name	● Policy Framework for Intelligent Transport Systems
1-5. Major implementer	● DIRD
1-6. Site	● Australia wide
1-7. Period	● 2011 onwards
1-8. Total cost	-

2. Summary

- Intelligent Transport Systems (ITS) encompass the application of information and communications technologies to transport. ITS includes stand-alone infrastructure applications such as traffic management systems, as well as cooperative ITS (C-ITS) applications involving telematics, vehicle-infrastructure and vehicle-vehicle communications.
- The focus of this policy framework is on ITS as they are applied to road transport and to interactions between road transport and other transport modes.

3. Background and purposes

- The emergence of ITS for use in land transport networks and the vehicles that use them has potential to deliver significant safety, environmental and efficiency benefits to Australian transport users. Having considered this potential, Australian Transport Ministers agreed to develop a policy framework to build ITS into a shared vision of safe, sustainable, efficient, reliable and integrated transport1. This framework was endorsed by Ministers on 4 November 2011.
- The purpose of the framework is to:
  - guide the consistent implementation, integration and uptake of ITS nationally across all land transport modes;
  - promote innovation and competition through interoperable and, where possible, open access and open architecture ITS solutions;
  - provide standardization for important national and interdependent supplier/provider systems;
  - provide an umbrella for specific sectorial initiatives, which will continue to be developed consistent with the principles and objectives of this framework; and
  - facilitate the efficient and rapid uptake of ITS that meet consumer demands, driven by the perceived usefulness and benefits of the technology.

4. Content of implementation

- The framework provides guidance to ensure that the technology used in each jurisdiction is compatible and is developed around a set of agreed policy principles.
- The framework assists in the delivery of more consistent and cohesive services to citizens and support cost-effective delivery of ITS services by government and industry, by:
  - providing a common language: provides a common language for sectors involved in the delivery of cross-sector services;
  - enhancing collaboration: supports the identification of duplicate, re-usable and sharable
  - services;
  - assisting in describing and analyzing ITS investments: provides a basis for the objective review of ITS investment by government and industry; and
  - assisting in transforming Australia (citizen-centric, results-oriented, market-based): enables more cost-effective and timely delivery of ITS services through a repository of standards, principles and templates that assist in the design and delivery of ITS capability and, in turn,

business services to citizens.

5. Outcome

- This framework provides a roadmap for transport agencies to maximize the benefits of ITS through a nationally coordinated approach.
- Examples of ITS technology used in Australia include:
  - Managed motorways—technology is used to smooth traffic flows by coordinating ramp signals and introducing lane-use management systems such as variable speed limits and variable message signs.
  - Driver information—current GPS systems can provide information to drivers on traffic and road conditions as well as their primary purpose of giving directions. In some cases manufacturers have combined to share information to build a real time model of traffic flows from the data provided by individual vehicles.
  - Telematics—this is an ITS technology that allows monitoring of an individual vehicle's movements and can record the speed, location and mass of a vehicle. This technology is already being used by transport companies and has the potential to be used as a regulatory tool, for purposes such as road user charging, compliance and enforcement.
  - Rail Management—by using ITS technology, controllers will be able to run more efficient schedules due to better information on the location, speed and length of trains using the network. Work is also underway between governments to use ITS to improve rail level crossing safety.
  - Electronic tolling—the use of e-tags has improved traffic flows on motorways. When e-tolling began separate e-tags were developed for each motorway. This caused inconvenience to drivers who rightly questioned the need for multiple devices. Steps have been taken to unify these systems but the initial problems highlighted the need for coordinated action.

Source: DIRD

6. Key success factors

[Setting effective implementation method]

- The potential benefits of a harmonized approach to ITS across all Australian states and territories.

[Promoting motivations among concerned parties]

- Implementation of this policy framework is proceed by consultation with relevant stakeholder groups and take account of broader national processes including the national urban policy and current work on the COAG Road Reform Plan.
- Governments, private companies and academic researchers are all active in the development of ITS in Australia. ITS Australia was established as an incorporated, not-for-profit organization representing members of the ITS industry and also includes government and research organizations to involve relevant stakeholders in activities to implement and further develop this strategy.

1. Basic information

1-1. Economy	● Australia
1-2. Aspects of Quality Transport	● Reducing traffic congestion ● User friendly device ● Reducing traffic accidents
1-3. Transportation mode	● Land transportation (road and rail)
1-4. Project name	● Perth Parking Policy
1-5. Major implementer	● DOT (the government of Western Australia)
1-6. Site	● the CBD of Perth (Western Australia)
1-7. Period	● 1999 onwards
1-8. Total cost	-

2. Summary

● The Perth Parking Policy (PPP) is part of a wide-ranging plan to preserve Perth's air quality, reduce traffic congestion, improve pedestrian safety, free up short-term shopper parking and create a city environment that is both economically and environmentally healthy.
● All non-residential parking bays within the Perth Parking Management Area (PPMA) are required to be licensed with a fee paid where liable under the Perth Parking Management Act 1999 (the Act).
Source: Department of Transport, Western Australia

3. Background and purposes

● Since 1999, the PPP and the Act have given the state government an ability to influence urban congestion outcomes. The Act creates an area called the PPMA. Within this area there is a requirement to licence all parking except private residential; and new developments must conform to the Policy or have an explicit exemption granted by the Minister. Importantly the Act also requires that revenue raised through the tax only be spent within the PPMA on matters that give effect to the Policy.
● Revenue raised by parking bay licence fees has been used to implement a range of initiatives under the CBD Transport Plan, which will help to deliver a more balanced transport system in central Perth and surrounds.

4. Content of implementation

● Services compensated by the PPP revenue include the provision of the FTZ; operation and expansion of the free CAT bus system; implementation of bus priority lanes; extension of cycle paths; improvements for pedestrians; an upgraded traffic management system and contributions to other future significant CBD transport initiatives.
● Free transit Zone is one of popular services which all public transport (buses and trains) within the CBD area of Perth are enjoyed for free service of charge.
● CAT is a circulator bus service on four specific routes within the Central Perth. CAT service was commenced and fully funded with the PPP revenue.
● Passengers travelling within the FTZ zone can simply hop on and off any train, bus or CAT. If boarding a train or bus both inside and outside the FTZ, taking a valid ticket or scanning a digital card called SmartCard where onboarding automatically applies fares from a point the FTZ starts or ends.

Figure 2-1: Various services compensated from the parking levy revenue

Source: Created from interview to DOT

5. Outcome

- The Perth FTZ has been operating since 1989. This service provides approximately 4.4 million trips per year, 4.1 million on buses and over 300,000 on trains as of 2008. After the introduction of the parking tax in 1999 the boundaries of the FTZ were expanded to include all the area covered by the parking licence tax. Between 1999-2008, use of the CAT and FTZ has risen from about 5 million trips per year to 12 million, and every week an estimated 3000 short car trips of 2 km or less are eliminated from within Central Perth. A 'park once and use public transport or walk' culture has been created, thereby reducing congestion within the City Centre.
- Public Transport Authority conducts customer satisfaction survey every year since 1996. The latest survey reveals CAT, together with the FTZ, rose overall passenger's satisfaction with bus service from 45.6% in 1996 to 84.4% in 2014.
- CAT was introduced to neighbouring towns of Perth, Joondalup and Freemantle, and going to expand to the other parts of Western Australia.
- The initiatives collectively represent an example of a 'virtuous policy and service delivery cycle' which has clearly contributed to lower traffic volumes on city streets with lower levels of congestion than would have been the case without their influence. The balance of levy revenue and the service cost is viable, and the PPP continues contributing to further development of transport services other than the FTZ and CAT such as extension of cycle paths and improvements for pedestrians.

6. Key success factors

[Setting effective implementation method]

- The city of Perth had employed single ticketing policy and zoning system of fare. The policy contributed to reducing cost and time for introducing the FTZ, the CAT, expansion of routes of train and bus, and SmartCard.

[Utilizing technology and know-how]

- Facilities are often upgraded with better service for safety, hygiene and convenience. For example, financially healthy operation of CAT enables to retain the replacement of buses every three years with installations of latest technologies such as a low floor for wheelchairs, an audio announcement inside a bus and a real time sign board showing the next CAT's due at bus stop.

[Promoting motivations among concerned parties]

- More than 90% of passengers use a SmartCard, which contributes to passenger convenience and eventually more passenger trips as well as the reduction of operational cost for service delivery. This high rate of dissemination was increased through various approaches including concessions, linkage with banking systems, collaboration of school buses and students who use a SmartCard as ID.

1. Basic information

1-1. Economy	● Australia
1-2. Aspects of Quality Transport	● Strengthening security ● Securing privacy in inspection
1-3. Transportation mode	● Air transportation
1-4. Project name	● Body Scanner Implementation Project
1-5. Major implementer	● DIRD
1-6. Site	● Australia's eight international gateway airports: Melbourne, Sydney, Brisbane, Gold Coast, Cairns, Adelaide, Perth, Darwin
1-7. Period	● 2012 onwards
1-8. Total cost	● AU$7 million (for the purchase of 29 body scanners)

2. Summary

● The project introduced body scanner screening at international departure and transit screening points at Australia's eight international gateway airports.
● Body scanners provide an additional layer of security, which includes walk-through metal detectors, restrictions on the carriage of liquids, aerosols and gels, explosive trace detection and police presence, amongst other measures.
● Body scanner screening commenced at Australia's eight international gateway airports in December 2012.

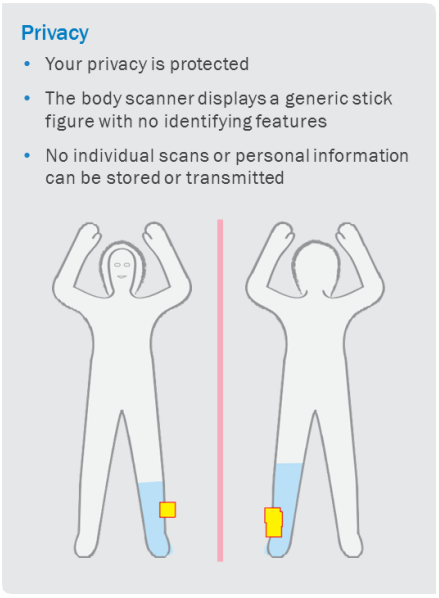
Source: "Optimal Technologies Proof of Concept Trial Report", Department of Infrastructure and Regional Development, Australian Government

3. Background and purposes

● Following the attempted bombing of North West Airlines flight NW253 over the United States of America on Christmas Day 2009, the Australian Government announced a package of measures to strengthen aviation security in Australia. The package, now referred to as the Strengthening Aviation Security Initiative, included the introduction of body scanners and multi-view X-ray machines for the screening of passengers and their carry-on luggage at Australia's eight international gateway airports.
● Body scanners represent the most advanced passenger screening technology available and are capable of detecting a range of sophisticated threats that other screening technologies are not able to detect.

4. Content of implementation

● This technology was introduced at international departure and transit points in Australian airports in December 2012.
● Passengers are asked to step into the body scanner on a random basis and stand with their legs shoulder width apart with their hands raised above their head. They are required to hold this position for approximately two seconds while the scan takes place.
● Once the scan is complete, it takes several seconds for the body scanner to analyse the scan. Instead of a naked form, the machines show only a generic outline of the human body with a yellow box over any suspicious items on your person.
● Security staff can then target only that part of a body to check for contraband.



Source: DIRD

5. Outcome

- The benefit of introducing body scanning technology is that it can identify a variety of sophisticated threats that cannot be detected by other means, including metallic and non-metallic items.
- Body scanners were implemented on time, with the assistance of the screening authorities at Australia's eight international gateway airports.
- Passenger throughput has not been adversely affected by the introduction of the new technology.

6. Key success factors

[Setting effective implementation method]

- There were public concerns about health risks and privacy in usage of body scanners. Adequate consultation and communications with public and private organisations were undertaken. Those communications brought about understanding of effectiveness for aviation security with body scanners.
- A trial was undertaken at Sydney (Kingsford Smith) Airport from 2 - 19 August and Melbourne International Airport from 5 - 30 September 2011 before the official introduction to the seven airports. The software was upgraded and operational procedures were amended according to findings from the trial, which led a smooth introduction of operation at the seven airports later.

[Utilizing technology and know-how]

- The type of body scanners introduced in Australia is safe and private for all travelers. Privacy concerns are addressed by the use of automatic threat recognition. Areas of concern are highlighted on a generic 'stick' figure.
- The body scanners introduced to Australia has a learning function that incorporate detected trends into its computing system so that errors will occur less over time and usage at the site.
- The body scanners use non-ionising radio frequency energy in the millimetre-wave spectrum. One scan represents only 10,000th of the power emitted during a mobile phone call.

2-2. Canada

(1) List of Cases

No.	Transportation mode	Project name	Aspects of Quality Transport
1	Land transportation (road)	● Vehicle Safety and Environmental Technology	● Reducing traffic accidents ● Reducing CO_2 emissions ● Reducing air pollution ● Saving fuels ● Promoting technology development
2	Land transportation (road and rail)	● TransLink	● More transportation options ● Preferred fare system ● Reducing CO_2 emissions ● Reducing air pollution
3	Land transportation (road and rail)	● Accessibility in the Transport Sector	● Improving accessibility of transport facilities
4	Maritime transportation	● Port Access Control System	● Reducing traffic congestion ● Reducing CO_2 emissions ● Improving work efficiency
5	Maritime transportation	● Power Supply to Ships from the Local Grid	● Reducing CO_2 emissions ● Saving fuels

(2) Cases

1. Basic information

1-1. Economy	● Canada
1-2. Aspects of Quality Transport	● Reducing traffic accidents ● Reducing CO_2 emissions ● Reducing air pollution ● Saving fuels ● Promoting technology development
1-3. Transportation mode	● Land transportation (road)
1-4. Project name	● Vehicle Safety and Environmental Technology
1-5. Major implementer	● TC
1-6. Site	● Nationwide
1-7. Period	-
1-8. Total cost	-

2. Summary

● To improve the safety and environmental performance of light – and heavy – duty vehicles, Transport Canada has taken the lead in regulating and setting the standards whenever new technologies are introduced, in collaboration with the automakers. Transport Canada is also active in areas such as human factors safety research, direct fuel-injection engines to reduce emissions, and electric vehicles (EVs) through its own research facility and test course.
● This approach in Canada is relevant to the economies where mainly foreign-origin vehicles are imported and which have factories in Canada, to determine how government should get involved in safety and environment issues.

3. Background and purposes

● The federal, provincial and in some cases, municipal governments are responsible for the improvement of vehicle safety, and to establish laws and regulations under their respective areas of jurisdiction, ordinances, and related programs. In Canada, CCMTA does information exchange about road users, develops policies, smoothly processing driver and car registration and issuing driver's licenses. In 2015, it is planning to announce a traffic safety strategy.
● Transport Canada establishes safety standards for newly manufactured or imported cars for sale in Canada, in addition to child restraints and tires. Transport Canada also does research and develops, establishes and implements regulations.

4. Content of implementation

[Safety standards for vehicles]
● Based on the Vehicle Safety Act of Canada, Transport Canada sets the safety requirements for new cars, imported used cars, new types of child seats, and new tires through regulations and standards. It also promotes policies based on the joint research with other economies and knowledge of legal requirements.
● For example, it does human factors research about the following.
1. Development of the evaluation process and design guidance in the vehicle warning system
2. Standardization of measurement procedures for visual and cognitive driver distraction
3. Safety measures for driver distraction
4. Crashes due to drifting out of the lane and their prevention
5. Design of the label for proper installation of child restraint systems
6. Testing the impact on safety of a failure of power assist steering
7. Vehicle safety guidelines
● Transport Canada also has a government contractor operate the Vehicle Test Centre. This organization does research on the latest vehicle crash avoidance systems, tests on automatic

emergency braking system performance and crash tests. The results are reflected in Canada's safety standards (**Figure 2-2**).

Figure 2-2: Tests in the Vehicle Test Centre

Source: TC

[Environmental standards for vehicles]

- The program tests, evaluates and provides expert technical information to vehicle regulators about the environmental and safety performance of advanced technologies for passenger vehicles and heavy-duty trucks. Testing focuses on new technologies that manufacturers are introducing into the market to meet increasingly stringent greenhouse gas emission regulations in Canada.
- Transport Canada has announced the CA$870 million (US$818 million) "Clean Air Agenda" in 2011. Under it is the "ecoTECHNOLOGY for Vehicles Program" with a budget of CA$37.9 million (US$36 million). This program is intended to test the environmental performance and safety performance of the latest light-duty vehicles and heavy vehicles.

5. Outcome

- Transport Canada's strategic objective is to develop the transport system with Consideration for both safety and the environment. The above-described activities back up that objective. The following effects can be seen in terms of automotive environmental standards:
  1) To inform the development of vehicle regulators, codes and standards
  2) Addresses regulatory knowledge gaps about the performance of new advanced technologies, especially when looking at unique Canadian conditions (e.g. cold weather)
  3) Support the development of non-regulatory codes, standards and test protocols that support industry efforts to integrate new vehicle technologies; and support national, continental and international standards alignment

6. Key success factors

[Setting effective implementation method]

- There are no Canadian-owned automakers. However, the government sets standards based on its own independent research about safety performance and environmental performance for both imported vehicles and those manufactured in Canada.

[Utilizing technology and knowhow]

- Transport Canada shares the testing outcome from the Vehicle Test Centre with each of the automakers. The testing work primarily depends on the safety and environmental technology that each of the automakers uses. The following areas are the ones that Transport Canada, in cooperation with the United States, takes a leading role in:
  - Rules and standards for EVs
  - Advanced gearshift system and lower buffering and lubricating oil use
  - Direct fuel-injection engine
  - Audible alarm to alert for vulnerable pedestrians
  - Battery safety
  - EV system performance in cold weather

[Promoting motivations among concerned parties]

- To achieve the greenhouse gas emission regulations that were formulated with the United States, the Canadian government is actively involved in testing and evaluating new and emerging technology for light- and heavy-duty vehicles.

1. Basic information

1-1. Economy	● Canada
1-2. Aspects of Quality Transport	● Multiple transportation means ● Preferred fare system ● Reducing CO_2 emissions ● Reducing air pollution
1-3. Transportation mode	● Land transportation (road and rail)
1-4. Project name	● TransLink
1-5. Major implementer	● TC
1-6. Site	● Metropolitan Vancouver
1-7. Period	● Since 1986
1-8. Total cost	-

2. Summary

● In Vancouver, British Columbia, TransLink is developed as the city transport system combining buses, railways, trolley buses, and ferries. The zonal fare system with no transfer costs works well and the residents' usage rate is high.
● TransLink has realized good access from the airport to the city center.

3. Background and purposes

● TransLink is the name for all the public transport of Metropolitan Vancouver, British Columbia. The public transport has buses, the SkyTrain, the West Coast Express, and the SeaBus ferry.
● TransLink takes a leading role in Canada, where rail transit is not well developed as a means of municipal transport. It links up the buses and the SeaBus to reduce the traffic inflow to the city. The objectives are to reduce vehicle emissions and accidents. TransLink works at sharing the roads with bicycles.

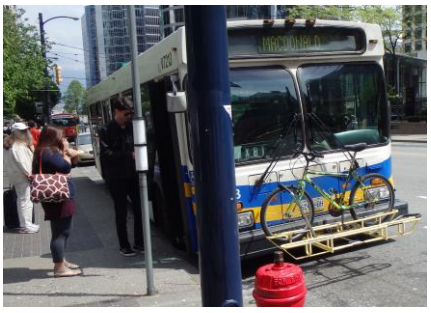
4. Content of implementation

◆ Bus

● Centered around the route nodes at SkyTrain station inside Vancouver, bus lines are operated on a variety of routes. There are both diesel buses and electric trolleys (**Figure 2-3**). The buses have bicycle racks installed in front, for the convenience of bicycle riders sharing the road (**Figure 2-4**).

Figure 2-3: Trolley bus running in the city

Figure 2-4: Bicycle rack on the front of a bus



Source: TransLink

◆ Night bus

● The night bus operates after the SkyTrain operation ends. The interval of operation is longer but the buses run up to 3 or 4 AM.

◆ **SkyTrain**

- SkyTrain is a type of railway that runs underground in the city center and on an elevated railway elsewhere. It does not have a conductor (**Figure 2-5**). In comparison with the similar system of the "Yuri Kamome line" in Tokyo, SkyTrain operates at a high speed and it has 2 different destination lines. It appears that the SkyTrain operation is at higher level.
- SkyTrain opened in 1986 for the World Exposition on Transportation and Communication. It has been in operation for 28 years.

Figure 2-5: SkyTrain

Source: TransLink

◆ **West Coast Express**

- West Coast Express is the railway connecting Waterfront Station and Mission City Station. More than 11,000 riders use it every day (**Figure 2-6**).

Figure 2-6: West Coast Express

Source: TransLink

◆ **SeaBus**

- SeaBus can transport 400 passengers per trip. It connects urban Vancouver and North Vancouver (**Figure 2-7**). During the day, the operating interval is every 15 minutes and the transit time is about 12 minutes.

Figure 2-7: SeaBus

Source: TransLink

◆ **Fare system**

- TransLink has fee tables with a zone system. Within one zone and within the first 90 minutes, getting on and off and transfer incurs no extra cost. After 6:30 PM, there is no zone differentiation and adult fare is flat fare of CA$2.75 (US$2.59).

5. Outcome

- TransLink is the municipal area transport system including SeaBus utilizing the local features of Vancouver. Many citizens use the system. There is still a morning and evening vehicle commute rush, but the vehicle inflow in general has been reduced.

6. Key success factors

[Utilizing technology and knowhowe]

- To improve user convenience, TransLink promotes the multimodal system and provides such features as a time-differentiated fare system that is easy to understand and satisfactorily covers the commute time, very good accessibility, and sharing the road with bicycles.

[Promoting motivations among concerned parties]

- Vancouver hosted the 1986 World Exposition on Transportation and Communication and the 2010 Vancouver Winter Olympics and Paralympics. TransLink was upgraded with the cooperation of the residents for those international events.

1. Basic information

1-1. Economy	● Canada
1-2. Aspects of Quality Transport	● Improving accessibility of transport facilities
1-3. Transportation mode	● Land transportation (road and rail)
1-4. Project name	● Accessibility in the Transport Sector
1-5. Major implementer	● Vancouver
1-6. Site	● Vancouver
1-7. Period	● Since 1994
1-8. Total cost	-

2. Summary

● Vancouver is working to improve accessibility in the transport sector, in conjunction with the Vancouver Foundation and the area communities as Vancouver has many people with limited mobility.
● Installing pedestrian lighting, improving accessibility to public transport and putting in disabled parking are the focus of this effort

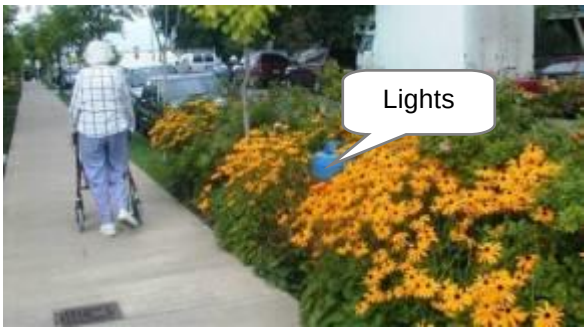
3. Background and purposes

● In Vancouver, 15% or more of the city's population has a physical disability or limited mobility. Many use wheelchairs or canes. By comparison, the number of people with physical disabilities in Japan is 3.66 million, or approximately 3% of the total population. Vancouver appears to have many more people with mobility constraints.
● Since the 1970's, Transport Canada has been working to realize the optimal transport system, developing and implementing policies, establishing rules and managing the services. One of its efforts is to improve accessibility. To realize the inclusive community, accessibility in the transport sector is promoted in cooperation with the community. The nonprofit Vancouver Foundation works on issues in British Columbia. The municipal government has collaborated with the Vancouver Foundation since 1994 to promote accessibility. The city government and the Vancouver Foundation invested CA$50,000 each (US$47,000) for this purpose. Every year, CA$4,000 to $6,000 (US$4,800 - $5,600) is used to improve the accessibility of the community, including its transport. Vancouver was named "the most accessible city in the world."

4. Content of implementation and outcome

● Vancouver works to improve accessibility in the transport sector. It is installing pedestrian lighting, improving accessibility to public transport, and putting in parking spaces for people with disabilities. Walking is the basic means to move. In Vancouver, pedestrian lighting has been installed at over 200 locations, so that more than 95% of urban walkways have lighting. This creates the environment where those with mobility constraints can walk smoothly.

Figure 2-8: Pedestrian lighting



Source: City of Vancouver

● Vancouver City has been working to improve accessibility. All of the buses, the monorail SkyTrain, the Canada Line connecting the city center and Vancouver International Airport, the SeaBus ferry, and all the railcars of the West Coast Express connecting the city center and the suburbs are accessible (**Figure 2-9**). Accessibility of facilities is also improving, with 80% of stations and bus stops being accessible

by people with disabilities.

- Vehicle use is widespread in Vancouver. Many people move using vehicles. It is possible for people with disabilities to use the dedicated parking spaces. SPARC issues the disabled parking permits. The people with disabilities displaying the certificate inside the vehicle can park in the designated spaces (**Figure 2-10**). There is also metered parking where the vehicles driven by people with disabilities can park.

Figure 2-9: Bus for people with disabilities

Source: City of Vancouver

Figure 2-10: Disabled parking space

Source: City of Vancouver

5. Key success factors

[Setting effective implementation method]

- In Vancouver, the city works to improve the accessibility of public transport and the walking environment, which are important to those with limited mobility. It also creates disabled parking spaces to provide the environment that is convenient for people with limited mobility who travel by vehicle.

[Promoting motivations among concerned parties]

- The City of Vancouver and the Vancouver Foundation are providing the capital and working with the community toward the realization of fully accessible transport.

1. Basic information

1-1. Economy	● Canada
1-2. Aspects of Quality Transport	● Reducing traffic congestion ● Reducing CO_2 emissions ● Improving work efficiency
1-3. Transportation mode	● Maritime transportation
1-4. Project name	● Port Access Control System
1-5. Major implementer	● TC
1-6. Site	● Major ports
1-7. Period	-
1-8. Total cost	-

2. Summary

● Transport Canada promotes the port-facilities access control system at major container ports to reduce greenhouse gas emissions. The program links the private sector truck reservation system to port-related information. This made the work time shorter without truck congestion. Business sees this program promoting the work efficiency.

● From Transport Canada's point of view, this is means to reduce the greenhouse gas emission from the trucks at ports. This program is an example for showing the sustainable and win-win solution.

3. Background and purposes

● Container handling has been increasing at every port in Canada. So has truck transport. As a result, the number of trucks accessing port terminals is increasing. Often, trucks line up at the port entrance, creating congestion. The crowded conditions create long periods of idling because of the long waiting time (**Figure 2-11**). This leads to increases in emissions of greenhouse gas and air pollutants.

● Improving these conditions has been the issue for port and logistics business people. Transport Canada spent CA$7.5 million to attack this problem. It started the “Clean Transportation Initiative on Port-Related Trucking,” and introduced a port-facilities access control system.

Figure 2-11: Crowded port in Canada

Source: TC

4. Content of implementation

- The Clean Transportation Initiative on Port-Related Trucking uses the port-facilities access control system. This utilizes a truck reservation system that a private corporation developed and was using. This efficiently conducts incoming trucks to the port by linking the different pieces of information such as estimated and planned time for the trucks to arrive at the gates of the major ports (Vancouver, Montreal, and Halifax), loading and unloading, terminal position, and the time required for cargo handling.
- This program is shared by the Port Authority of Canada, private organizations and terminal owners as well as their employees.

5. Outcome

- The following effects have been observed since the port-facilities access control system was put into service (**Figure 2-12**).
    - Environmental advantage: reducing the truck idling time reduces the total amount of emissions. By using this widely, it can make the entire supply chain greener.
    - Efficiency advantage: realizing time and fuel savings for container transport with productivity increases. This can lead to reductions in congestion and time delays at gates and port terminals.
    - Competitiveness: By supporting the supply chain at the major Canadian container ports, these ports gain solid positions as the gateways supporting the long-term growth of Canada.

Figure 2-12: Trucks entering the terminal using the port-facilities access control system

Source: TC

6. Key success factors

[Setting effective implementation method]

- One factor of the success is that the port-facilities access control system is based on the reservation system that the truck industry already uses. The port-related information is linked to this to realize the more efficient truck operation system, with cooperation between the public and private sectors. As a result, air pollution is reduced.
- For the truck driver, job efficiency means completing the tasks in less time. However, this also reduces the environmental burden. This is a good example of addressing both economic advantage and environmental advantage.

[Promoting motivations among concerned parties]

- Canada positions the Port of Vancouver as the maritime gateway to Asia, Halifax as the gateway to Europe, and Montreal as the gateway to the United States. Improving the environment, efficiency and competitiveness of those ports is important for the growth of Canada.

1. Basic information

1-1. Economy	● Canada
1-2. Aspects of Quality Transport	● Reducing CO_2 emissions ● Saving fuels
1-3. Transportation mode	● Maritime transportation
1-4. Project name	● Power Supply to Ships from the Local Grid
1-5. Major implementer	● TC
1-6. Site	● Vancouver Port
1-7. Period	● 2010
1-8. Total cost	-

2. Summary

- Transport Canada provided funding to install shore power technology at Port Metro Vancouver in 2010, in order to reduce CO_2 emissions and also improve local air quality.
- British Columbia's goal for greenhouse gas emissions is a 33% reduction from 2007 levels by 2020. The goal for Canada is a 17% reduction from 2005 levels by 2020. Provision of power from the local grid to ships can show the definite effect and is expected to play a role.

3. Background and purposes

- Transport Canada's Shore Power Technology Program provides cost-shared funding to Canadian port authorities, terminal operators and ferry operators to support the deployment of marine shore power technology. By providing ship operators with an alternative to running diesel auxiliary engines, shore power technology reduces fuel consumption, fuel costs, greenhouse gas and air pollutant emissions from vessels, and helps support the competitiveness of Canadian ports.

4. Content of implementation

- At the pier, a power cable held by an arm (**Figure 2-13**) is pulled inside the ship (**Figure 2-14**) to be connected to the power facilities so that the power can be supplied.

Figure 2-13: Power cable at pier

Figure 2-14: Pulling the power cable into the ship

Source: Cochran Marine

5. Outcome

- There were 44 ships connected to the local grid during the period of April to October 2010. (Of the 58 ships that tried to connect to shore power, 14 ships could not connect.) Total connection time was 267.7 hours. Total power consumed was 2,024.1MWh (**Figure 2-15**).
- The resulting diesel fuel savings of 475.6 tons (1.78 tons per hour) led to a reduction in CO_2 emissions of 1,521 tons (5.68 tons per hour) (**Figure 2-16**).
- Since 2010, shore power technology has been installed at 5 additional ports across Canada through the Shore Power Technology for Ports Program.

Figure 2-15: Number of ships coming into the port and number of Shore Power Technology arms placed at the piers

Total Number of Visits	No. of Shore Power equipped Visits	Berthed Time
177	58	629.5 hours

Source: Transport Canada

Figure 2-16: Number of Shore Power Technology arms used and effect in reduction in fuel use and CO_2 emissions

No. of Completed Connections	Connected time (hrs)	Electrical Consumption (MWh)	Fuel Savings (tonnes)	CO_2 Equivalent Reduction (tonnes)
44	267.7	2,024.1	475.6	1,521

Source: Transport Canada

6. Key success factors

[Setting effective implementation method]

- It is known that supplying power to the ship from the local grid is environmentally advantageous. Countering this was the upfront cost of installation of CA$9 million (US$8 million). Transport Canada has determined that usage will be extensive, so that the return on the investment is fully possible.

[Utilizing technology and knowhow]

- The project to supply power to ships from the local grid is the partnership with the private company, Cochran Marine of Seattle, Washington in the United States. The power generation mix in Canada is 59.0% hydro, 14.7% nuclear, 12.0% coal, and 9.8% natural gas. It is highly likely that the power for Port Metro Vancouver comes from hydro generation in Canada, creating large reductions in greenhouse gas emissions.

[Promoting motivations among concerned parties]

- British Columbia's goal for greenhouse gas emissions is a 33% reduction from 2007 levels by 2020. The goal for Canada is a 17% reduction from 2005 levels by 2020. Provision of power from the local grid to ships can show the definite effect and is expected to play a role.
- Of all of the NOx emissions in the transport sector, those originating from the ports are only about 10%. However, this approach has been evaluated as creating firm reductions in NOx emissions.

2-3. Chile

(1) List of Cases

No.	Transportation mode	Project name	Aspects of Quality Transport
1	Land transportation (road)	● New Drivers´ Knowledge Exam	● User friendly device ● Reducing traffic accidents
2	Land transportation (rail)	● Rancagua Express	● Reducing travel time ● Punctuality ● Reducing congestion ● Reducing CO_2 emissions
3	Maritime transportation	● Puerto a Gran Escala (PGE)	● Better service ● More transportation options ● Better transport facilities ● Responding to natural disasters
4	Maritime transportation	● Puerto Central (PCE)	● Better service ● More transportation options ● Better transport facilities ● Improving durability

(2) Cases

1. Basic information	
1-1. Economy	● Chile
1-2. Aspects of Quality Transport	● User friendly device ● Reducing traffic accidents
1-3. Transportation mode	● Land transportation (Road)
1-4. Project name	● New drivers´ knowledge exam
1-5. Major implementer	● National Road Safety Commission - Ministry of Transport and Telecommunications
1-6. Site	● Chile (Nationwide)
1-7. Period	-
1-8. Total cost	-

2. Summary

- This is a policy to improve the level of requirements to obtain a driver´s license. The purpose is to create a standardized test to evaluate all drivers in Chile with the same evaluating tool.
- This initiative replaced the former paper-based exam to a computer-based exam. The questions of the paper-based test were always the same and widely known by the public, but applicants are now tested with various sets of questions on computer.

3. Background and purposes

- Applicants of a driver's license were required to sit a paper-based exam. However, since there was only one set of questions on the exam, test takers would easily memorize the questions and the correct answers only to pass the exam.
- National Road Safety Commission of the Ministry of Transport and Telecommunications launched a policy to improve the level of requirements in the exam with an aim to enhance road and drivers' safety.

4. Contents of implementation

- National Road Safety Commission led the implementation of the new exam, such as designing a framework and testing applicability of questions, in order to develop user-friendly software for touch screen exam devices.
- Under the supervision of the Ministry of Transport and Telecommunications, municipalities (local governments) apply the test through a computerized system.
- More than 1,000 computer devices were installed at 240 points throughout the economy.

5. Outcome

- Before the change, the exam had an approval rate of 95% which implied that exam takers knew all the questions beforehand. After the implementation of the new exam approval rate dropped to 50% since the exam is now computer-based and the questions are randomly selected from a pool of 800 questions. Additionally, a new resource - New driver´s handbook"- was created to help new drivers prepare their exam.
- Drivers came to be better prepared with more knowledge of Chilean traffic law and safety regulations.

6. Key success factors

[Setting effective implementation method]

- Close relation for better coordination between the Ministry of Transport and Telecommunications, National Road Safety Commission and Transport Departments on each municipality were established months before implementation.

[Utilizing technology and know-how]

- The software and the program were well developed, easy to use and adapted by the public quickly.

1. Basic information

1-1. Economy	● Chile
1-2. Aspects of Quality Transport	● Reducing travel time ● Punctuality ● Reducing congestion ● Reducing CO_2 emissions
1-3. Transportation mode	● Land transportation (Railway)
1-4. Project name	● Rancagua Express
1-5. Major implementer	● Empresa de Los Ferrocarriles del Estado
1-6. Site	● Región del Libertador Bernardo O'Higgins ● Región Metropolitana de Santiago
1-7. Period	● 2013 - 2107
1-8. Total cost	● US$ 500 M (construction cost was funded by the government)

2. Summary

- This project is to construct a new railway to connect Santiago de Chile and Rancagua. Santiago de Chile is the capital city of Chile, and Rancagua is 100km from the capital city and a very active area in terms of economy.
- The line will start and end from a terminal station of Santiago de Chile for passengers to transfer to buses and metro lines. A new metro station is also planned to construct in order to connect with the Rancagua Express line.
- The current train services take 80 minutes to travel between the two towns. The fastest trains of Rancagua Express will connect the two towns for less than 40 minutes.
- The investment of the proposed railway is financed with public funds. The operating costs are covered by fare revenue.

Source: Grupo EFE's

3. Background and purposes

- Construction of a railway extending to the southern part of Santiago de Chile had been considered for many years in development plans for the economy, as the two towns are economically important and there is a big commuters' demand in between
- The railway construction will reduce 50 minutes of travel time between Santiago de Chile and Rancagua.

4. Contents of implementation

- This project constructed and installed the following facilities and services:
  - 18 stations
  - Operating 16 hours a day
  - Accessible lifts for the disabled and wheelchairs
  - Security cameras and guards
  - Operational and physical integration with bus fare
  - Considers the implementation of commercial premises in the main rail stations

5. Outcome

- Approximately 25 million passengers will use the railway services a year.
- 19 uneven rail crossings are constructed, security is improved and occasional accidents caused by train are reduced.
- Traveling time is reduced and welfare of passengers using the service is improved.
- Vehicular congestion on roads in the city of Santiago are reduced through intermodal shift from private cars to public transport connecting Rancagua Express.
- Elastomeric rail fixings - sleepers and baffle focused in the wheel-rail are installed and will be in operation in 2016.

6. Key success factors

[Setting effective implementation method]

- The government funded US$ 500 M for the construction as to implement the project and to reduce financial risk that a construction company would had otherwise taken.

[Utilizing technology and know-how]

- New trains cut off 25% of noise level comparing to the former type of trains using newly installed equipment.
- New trains are technically controlled to reduce 50% vibration.
- Noise and vibration levels are monitored by technologies applied.
- New technologies such as elastomeric rail fixings - sleepers and baffle focused in the wheel-rail are introduced.

1. Basic information

1-1. Economy	● Chile
1-2. Aspects of Quality Transport	● Better service ● More transportation options ● Better transport facilities ● Responding to natural disasters
1-3. Transportation mode	● Maritime transportation
1-4. Project name	● Puerto Central (PCE)
1-5. Major implementer	● Puerto Central S.A.
1-6. Site	● San Antonio, Chile
1-7. Period	● From 2013 to 2019
1-8. Total cost	● $ 370 Million

2. Summary

● Puerto Central (PCE) is an important port that supplies 60% of capacity on seaport transport of Chile.

● The project is to expand transport capacity by building a longer and deeper berth over an existing infrastructure. Thus, it would be possible to accommodate more ships simultaneously and also would be capable of serving bigger ships.

3. Background and purposes

● The project builds a new berth of 700 meters in length that expands operational capacity of the port at the rate of 1 Million TEU per year approximately. This berth will be built in two phases.

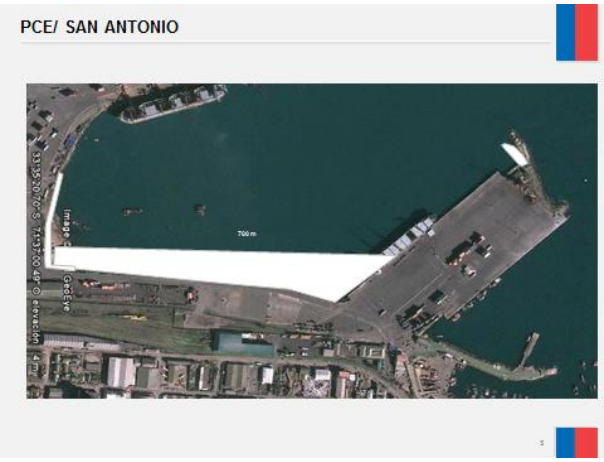
4. Contents of implementation

● The implementation takes two phases as follows.

● 1st phase includes:
- Building a berth of 350 [m]
- Dredging up to 15 [m] depth 18 [ha] in the mooring area
- Modifying protection of breakwater
- Paving, enabling yards and boarding point sulfuric acid

● 2nd Phase, it includes:
- Building the remaining 350 [m] of berth to reach the total length of a 700 meter pier.
- Dredging up to 15 [m] depth 12 [ha] in the mooring area
- Investment in equipment
- Paving, enabling yards and boarding point sulfuric acid.

Figure 2-17: the project site of PCE



Source: MTT

5. Outcome

● The capacity for cargo transfer in the V region was improved.

● The port infrastructure was built in order to serve the projected growth in transport efficiently.

6. Key success factors

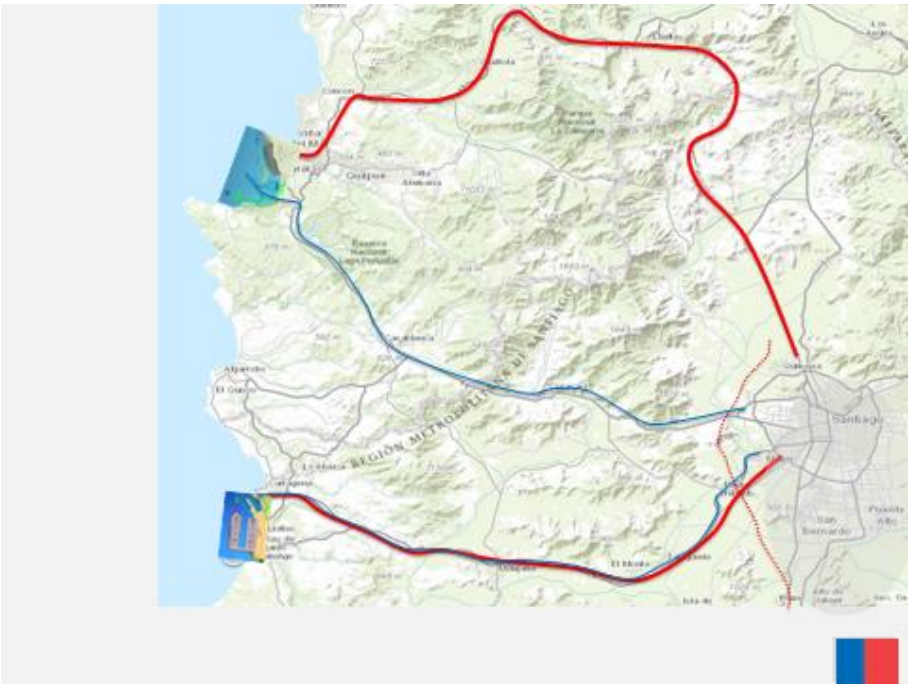
[Setting effective implementation method]

- Each phase was completed according to the schedule of investments

1. Basic information	
1-1. Economy	● Chile
1-2. Aspects of Quality Transport	● Better service ● More transportation options ● Better transport facilities ● Improving durability
1-3. Transportation mode	● Maritime transportation
1-4. Project name	● Puerto a Gran Escala (PGE)
1-5. Major implementer	● This project will be tendered by the government
1-6. Site	● V region (two alternatives; San Antonio and Valparaiso)
1-7. Period	● Currently undergoing engineering studies
1-8. Total cost	● San Antonio: appx. $ 2.100M ● Valparaíso: appx. $1.230M

2. Summary

Figure 2-18: The location of the project



Source: MTT

- The transport capacity of the existing port will become unable to serve enough by the first half of 2020's decade, according to demand estimations of previous studies.
- The project plan was initiated to expand the transport capacity up to 6 million TEU per year in the port complex of the center zone in Chile.

3. Background and purposes

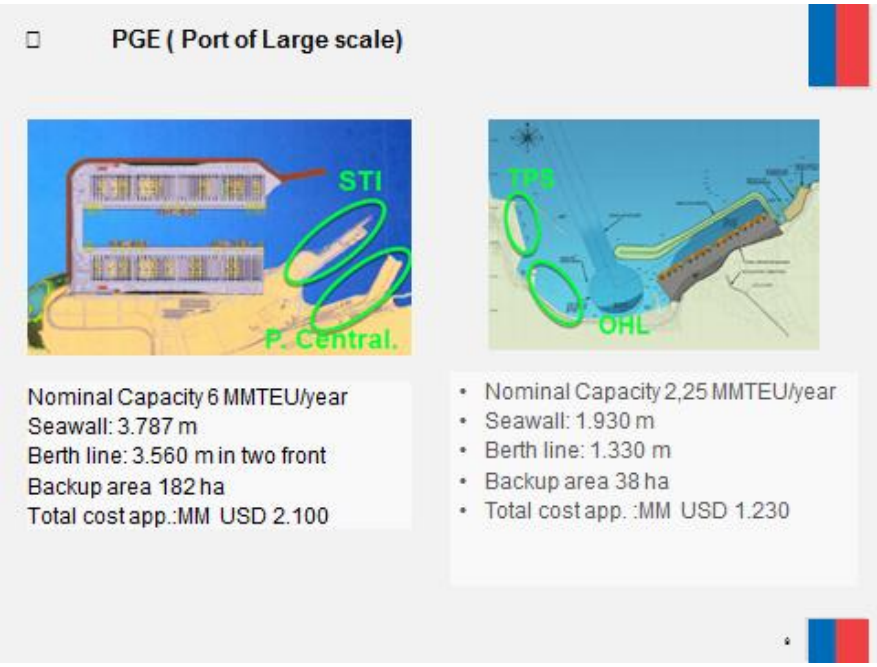
- Engineering studies are currently being undertaken, and will be finished in the second period of 2016.
- The plan aims to expand the supply of seaport transport capacity. The project corresponds to a coherent set of investments in the central area of Chile to ensure required transport and

distribution capacity for freight, especially containers. This project also incorporates new technology, information and coordination into governmental seaport management.

4. Contents of implementation

- The project will be implemented in some stages. It Includes:
  - Expansions and dredging depth of berth
  - New breakwater to generate sheltered waters
  - New fronts and support areas
  - Enlargements overtaking lanes on roads
  - New railway lines

Figure 2-19: The project implementation



Source: MTT

5. Outcome

- The capacity for cargo transport in the V region will be improved.
- The port infrastructure will be built in order to serve the projected growth in transport efficiently.

6. Key success factors

[Setting effective implementation method]

- A comprehensive risk and demand analysis were done.
- Each phase is expected to complete according to the schedule of investments
- A close working relationship with communities was established through engineering studies.
- The project plan fulfills concerned regulations

2-4. Hong Kong, China

(1) List of Cases

No.	Transportation mode	Project name	Aspects of Quality Transport
1	Land transportation (rail)	● Octopus Card	● Better service ● Reducing travel time
2	Land transportation (rail)	● Platform Screen Door, Automatic Platform Gate	● Reducing traffic accidents

(2) Cases

1. Basic information

1-1. Economy	● Hong Kong, China
1-2. Aspects of Quality Transport	● Better service ● Reducing travel time
1-3. Transportation mode	● Land transportation (rail)
1-4. Project name	● Octopus Card
1-5. Major implementer	● Octopus Cards Limited (formerly named “Creative Star”), with the support of major public transport operators of Hong Kong, China
1-6. Site	● Territory-wide
1-7. Period	● Since 1997
1-8. Total cost	-

2. Summary

● The Octopus smartcard system was launched in 1997 as a common fare collection system, allowing commuters to travel across different public transport modes using one single Octopus Card, a contactless IC card based on the FeliCa.
● Shareholders of the Octopus Holdings Limited, the parent company of Octopus Cards Limited, are all public transport operators in Hong Kong, China. Octopus Cards Limited operates in accordance with commercial principles and receives no subsidy from the Hong Kong SAR Government.
● Apart from fare collection for public transport, the use of Octopus Cards is now extended to a wider base of different applications, especially in the retail sector.

3. Background and purposes

● Hong Kong, China has a well-developed, comprehensive and inter-modal public transport system. Public transport, operated by private operators on commercial principles, accounts for about 90% of passenger trips which amount to over 12 million each day.
● Before the introduction of Octopus Cards, passengers of various public transport modes needed to purchase designated tickets from individual public transport operators or to pay by cash every time. To bring convenience to passengers, the public transport operators jointly set up a joint venture named the Creative Star, (renamed Octopus Card Limited in 2002) to develop a common fare collection system, which could allow passengers to pay the fares of different public transport modes by a single card. The Octopus Card was later launched in 1997 for this purpose.
● In view of its convenience, the use of Octopus Cards has been extended to non-transport related sectors, such as retail sectors. In recent years, it has gone into use in the Netherlands, New Zealand and Dubai.

4. Content of implementation and outcome

● Octopus Cards use the FeliCa contactless integrated circuit card technology developed by Sony of Japan. Many applications can be built in with a high degree of security and it can process communications very rapidly. Initially, Octopus Cards could only be used in the public transport modes which were its shareholders. It was subsequently adopted by other public transport modes which were not the shareholders of Octopus Card Limited. Currently, apart from fare collection for public transport, the Octopus Cards can also be used to pay mobile phone fees, kiosk purchases and other electronic commercial transactions using the Octopus Card PC reader, such as supermarket purchases. It can also be used for attendance management at schools, access control in commercial and residential buildings, and payment for leisure or entertainment facilities.

Figure 2-20: Major services using Octopus Card

[Pay for MTR]

[Mobile phone fee payment]

[Purchase at kiosk (1)]

[Purchase at kiosk (2)]

[School attendance management]

[Building entrance management]

Source: Octopus

- In Hong Kong, China, 24 million Octopus Cards have been issued so far. There are 67,000 Octopus Card readers. Every day, 13 million transactions for approximately HK$140 million ($18 million) are processed.

5. Key success factors

[Setting effective implementation method]

- The Octopus Card can be used not only to pay for public transport, but also for a wide range of fees and payments as well as school attendance management, access management to residential and commercial buildings and payment for leisure and entertainment facilities. In view of its high level of convenience, its use has become widespread.

[Utilizing technology and knowhow]

- The Octopus Card uses FeliCa technology and is a contactless IC card. It can be used very conveniently by placing it over the card reader. Based on the FeliCa technology, it comes with a high degree of security and high-speed communication with many applications built in. It can be conveniently and safely used.

[Promoting motivations among concerned parties]

- The introduction of Octopus Cards was initiated by the public transport operators, which were the major users of the system. In view of its popularity, other public transport operators were also interested to join at a later stage, which further enhanced its role as a common fare collection system for public transport.

1. Basic information

1-1. Economy	● Hong Kong, China
1-2. Aspects of Quality Transport	● Reducing traffic accidents
1-3. Transportation mode	● Land transportation (rail)
1-4. Project name	● Platform Screen Door, Automatic Platform Gate
1-5. Major implementer	● MTRCL
1-6. Site	● Territory-wide
1-7. Period	● Since 1997
1-8. Total cost	● 2000 to 2008: About HK$2,003 million (US$264 million)

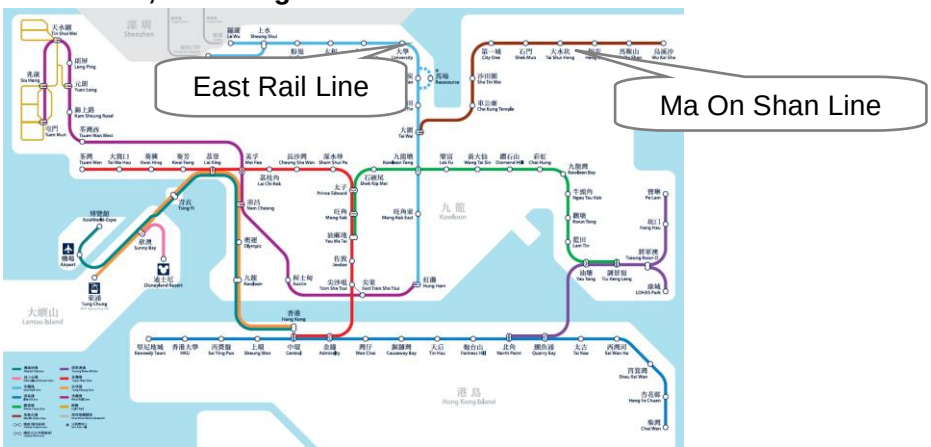
2. Summary

- To enhance safety of passengers, MTR Corporation Limited (MTRCL) completed the installation of the platform screen door at 30 underground stations between 2000 and 2006, and automatic platform gates at 8 aboveground and at-grade stations in 2008. It is currently installing automatic platform gates at the remaining 22 aboveground stations.
- The funds for installing platform screen doors and automatic platform gates were partly absorbed by MTRCL and partly contributed by passengers (an additional HK$0.1 (around US$0.01) was collected from each passenger journey until the designated amount of expenditure was recouped). Part of the installation works, which is currently carried out in conjunction with the construction of new railway lines, is funded by the Hong Kong SAR Government.

3. Background and purposes

- Railway is the backbone of the public transport system of Hong Kong, China. The average daily patronage is more than 5 million, accounting for about 40% of the total passenger journeys of all public transport modes. Railway safety is of paramount importance. To prevent passengers from accidentally falling from the platforms onto the tracks, MTRCL introduced platform screen doors on underground or enclosed station platforms and automatic platform gates on aboveground station platforms in 1997 to serve as barriers between passengers and the tracks.
- MTRCL has completed the installation of platform screen doors or automatic platform gates in 65 out of 87 stations. For the remaining 22 stations, all being aboveground ones, installation works are underway.
- Apart from enhancing safety of passengers as the major reason, the installation of platform screen doors on underground or enclosed station platforms can also enhance the efficiency of air conditioning and save energy.

Figure 2-21: MTR lines, including East Rail Line and and Ma On Shan Line



Source: MTRCL

4. Content of implementation and outcome

● There are currently 87 MTR stations. Of those, 65 stations are already equipped with platform screen doors or automatic platform gates on the platforms. MTRCL is now installing automatic platform gates for the remaining 22 stations, all being aboveground, of its East Rail Line and Ma On Shan Line. The cost will be borne by MTRCL and the Hong Kong SAR Government.

Figure 2-22: Platform screen doors on an underground station and automatic platform gates on an aboveground station

[Platform screen]

[Movable platform fence on the station]

Source: MTRCL

5. Key success factors

[Setting effective implementation method]

● Installation of platform screen doors and automatic platform gates is not an easy task. To ensure that normal railway operation would not be adversely affected during the installation, MTRCL worked out a detailed plan for it, including squeezing most of the works in midnight after service hours and deploying sufficient manpower at the platforms to offer assistance to passengers and ensure safety during service hours.

2-5. Indonesia

(1) List of Cases

No.	Transportation mode	Project name	Aspects of Quality Transport
1	Land transportation (road)	● ITS for Access Road to Tanjung Priok Port	● Providing information ● Reducing traffic congestion ● Reducing traffic accidents

(2) Cases

1. Basic information

1-1. Economy	● Indonesia
1-2. Aspects of Quality Transport	● Providing information ● Reducing traffic congestion ● Reducing traffic accidents
1-3. Transportation mode	● Land transportation (road)
1-4. Project name	● ITS for Access Road to Tanjung Priok Port
1-5. Major implementer	● MPW
1-6. Site	● Tanjung Priok Port Access Road
1-7. Period	● Starting 2015
1-8. Total cost	-

2. Summary

● MPW has a build-operate PPP project for the toll access road connecting Jakarta to Tanjung Priok Port as a part of the Jakarta Outer Ring Road that connects the city center of Jakarta and its suburban areas. MPW is considering the use of ITS to mitigate traffic congestion by making traffic flow more smoothly.

● For the ITS of Tanjung Priok Port Access Road, MPW is considering the use of technical cooperation with JICA to establish the traffic information center, automatic toll payment system, and monitoring of the weight of vehicle loads.

3. Background and purposes

● With the growth of the Indonesian economy, the volume of cargo handling at ports is increasing and Tanjung Priok Port is becoming increasingly important as an international port close to Jakarta. However, there is a lag in the buildup of transportation infrastructure in Jakarta such as roads, with a resulting increase in traffic congestion. The cost of transporting goods between Jakarta and Tanjung Priok Port is expensive due to the length of time needed for transport. In addition, the urban flooding during monsoon season is becoming more serious.

● MPW is aiming at building and operating a toll access road to Tanjung Priok Port from Jakarta as a PPP project. It would be a part of the Jakarta Outer Ring Road that connects the city center of Jakarta and its suburban areas. Under the Tanjung Priok Port Access Road build-operate PPP project, ITS, utilizing IT to manage the traffic information, is being considered to mitigate traffic congestion by securing the traffic safety and smoothing out of the traffic flow.

4. Contents of implementation

● For ITS of Tanjung Priok Port Access Road, the master plan for the introduction of ITS was formulated to apply to both Jakarta and its suburban areas. The following ITS technologies are being considered (**Figure 2-23**).

Figure 2-23: ITS technology under consideration for use with Tanjung Priok Port Access Road

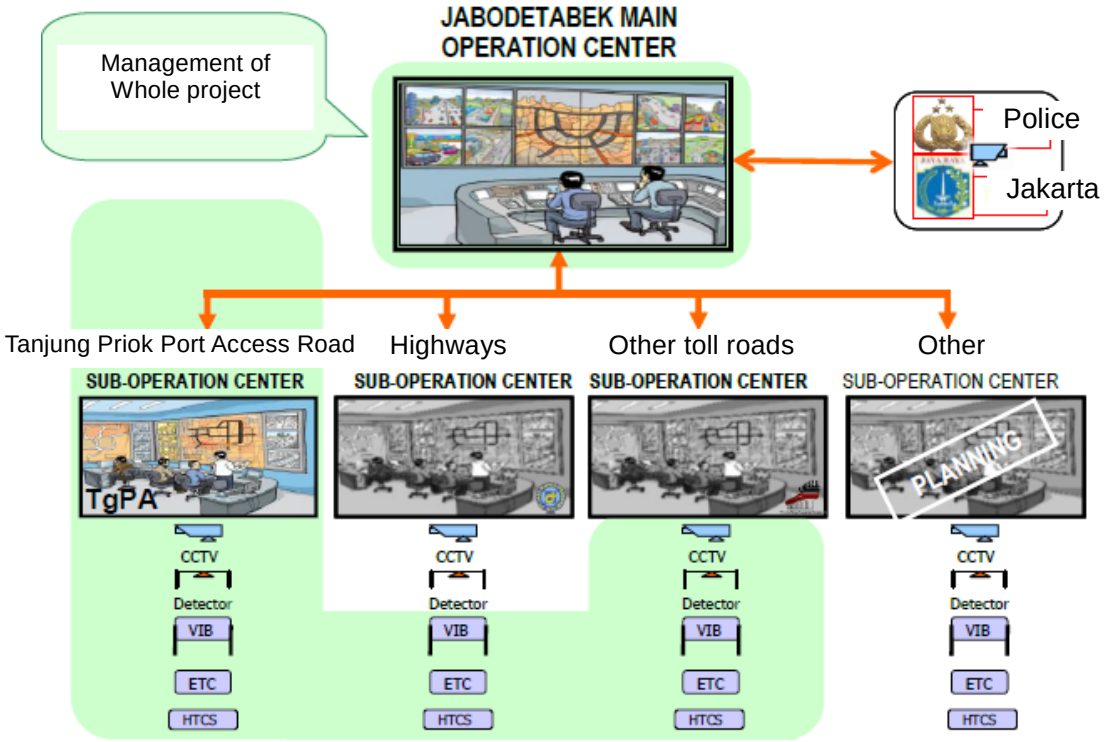
○ Installation of the traffic information center
○ Traffic volume survey by traffic counter
○ Obtain traffic information using the monitoring camera
○ Provision of traffic information
○ The introduction of the automatic toll payment system
○ Monitoring of the loading weight of vehicles

Source：JICA

● Among the ITS technologies under consideration for Tanjung Priok Port Access Road are a main traffic information center in Jabotabek for Jakarta and its suburban areas. After that, many

sub-centers for traffic information would be installed: one for Tanjung Priok Port Access Road, one for highways, and still others for the operating companies of the toll highways. The main operation center should be linked with the police to obtain police cooperation in collecting traffic congestion information and the like (**Figure 2-24**). In addition, the automatic toll payment system and non-contact ETC in 21 locations in Tanjung Priok Port Access Road will be introduced. For the vehicle monitoring and monitoring of overloaded trucks, there is a possibility that overloaded trucks could destroy or damage roads and bridges. It is expected that axle load meters or the like will be placed at 14 toll gates along Tanjung Priok Port Access Road where police can spot and divert overloaded trucks.

Figure 2-24: Tanjung Priok Port Access Road traffic information center schema



Source："FY2010 private sector infrastructure building for general projects (Indonesia, Tanjung Priok Port Access Road PPP project survey report)" (Ministry of Economy, Trade and Industry, Japan)

5. Outcome

- Under the Tanjung Priok Port Access Road build-operate PPP project, by using ITS to provide traffic congestion information and to decrease toll payment time, it is expected that traffic will become smoother, traffic congestion will be mitigated and safety will be ensured through cracking down on overloaded trucks.

6. Key success factors

[Utilizing technology and know-how]

- There are a variety of technologies for ITS. It is important to address the technology suitable for the development status of each type of transport infrastructure. The “ITS for the Tanjung Priok Port Access Road Project” is utilizing JICA technical cooperation. Under discussion are installation of traffic information centers, the automatic fee payment system, and monitoring of vehicle loading weight.

[Promoting motivations among concerned parties]

- ITS requires facilities and equipment that are expensive to install. The “ITS for the Tanjung Priok Port Access Road Project” is making use of international yen loans, thereby reducing MPW’s financial burden.

2-6. Japan

(1) List of Cases

No.	Transportation mode	Project name	Aspects of Quality Transport
1	Land transportation (road)	● Truck Girl Promotion Project	● Promoting Women's participation ● Human resources development ● Industrial development
2	Land transportation (road)	● Standardization of Universal Design Vehicles	● User friendly device ● Improving accessibility of transport facilities ● Social considerations
3	Land transportation (rail)	● Indexed of Comfortable and Easeful Public Transport (ICE-PT)	● Providing information ● Improving work efficiency
4	Land transportation (rail)	● Improving Transport Hub	● Reducing travel time ● Reducing congestion ● Seamless transfer ● Improving accessibility of transport facilities ● Alignment with Development Plan ● Regional development
5	Land transportation (rail)	● Introducing Aseismic Performance (Early Seismic Wave Detection Device and reinforcement)	● Reducing traffic accidents ● Disaster risk reduction ● Life-cycle cost saving
6	Land transportation (rail)	● Shinkansen-Japan's High-Speed Railway Systems	● Reducing travel time ● Punctuality ● Reducing traffic accidents ● Reducing CO_2 emissions ● Saving fuels ● Human resources development
7	Land transportation (road and rail)	● ETC, ITS Spot and ETC 2.0	● User friendly device ● Providing information ● Reducing travel time ● Reducing congestion ● Reducing CO_2 emissions ● Saving fuels ● Promoting technology development
8	Land transportation (road and rail)	● Improvement of Environment for Using Baby Buggy in Public Transport	● User friendly device ● Improving accessibility of transport facilities ● Social considerations
9	Land transportation (road and rail)	● Mutual Available Transport Smart Card	● Better service ● Reducing travel time ● Reducing congestion ● Seamless transfer
10	Maritime transportation	● Port Preventive Maintenance Plan	● Reducing traffic accidents ● Disaster risk reduction ● Life-cycle cost saving

(2) Cases

1. Basic information

1-1. Economy	● Japan
1-2. Aspects of Quality Transport	● Promoting women's participation ● Human resources development ● Industrial development
1-3. Transportation mode	● Land transportation (road)
1-4. Project name	● Truck Girl Promotion Project
1-5. Major implementer	● MLIT
1-6. Site	● Japan
1-7. Period	● From 2014
1-8. Total cost	-

2. Summary

- Only 2.4% of all truck drivers is female in 2013, although the female percentage is 42.8% across the whole industry sector. This is due to lack of understanding of the importance of female participation and the slow improvement of labor environment in companies. In 2014, MLIT started talking with companies' managers aiming at deepening their understanding of the importance of female participation in this area.
- MLIT also persuades companies to improve labor environment by introducing labor saving systems and methods. The web-page launched by MLIT shows how to get a driver's license for large size vehicles and other useful information.
- MLIT introduces best practices for this project in their web-page.

3. Background and purposes

- Only 2.4% of all truck drivers is female in 2013, although the female percentage is 42.8% across the whole industry sector. However, the number of truck drivers as a whole is expected to decrease due to the aging society in Japan. This means truck drivers we will be short in the future. On the other hand, there are 134 thousand women with driving licenses for large size trucks. Shortage of truck drivers will be solved if more women with truck driver licenses join this labor market.
- Female drivers tend to carry cargo softly and have high communication ability with customers. In addition, they drive trucks very carefully. Therefore, female drivers are expected to contribute to the development of the logistic industry.

4. Content of implementation

- MLIT meets companies and explains the importance of this policy aiming to improve the labor environment by introducing labor saving systems and methods
- MLIT launched a web-page to guide the way for acquiring a driver's license for large size vehicles and other useful information including relevant events for finding jobs. Best practices to improve environments for female drivers and cooperative companies are introduced on the web-page (**Figure 2-25**). And MLIT introduces subsidies for female drivers in collaboration with Ministry of Health, Labor and Welfare.

Figure 2-25: Best practices introduced on the MLIT web page

Source: MLIT

Figure 2-26: Logo of "Truck-girl" and cute truck by Mitsubishi Fuso Truck for female drivers

Source: MLIT

5. Outcome

- MLIT has not finished policy review on this project because it started only one year ago. However this policy received attention from the media due to project's unique title "Tora Girl." It means "Tiger Girl".

6. Key success factors

[Setting effective implementation method]

- Policy's title and web-page is accessible. People have interest in this project and there is more understanding that female truck drivers are cool.

1. Basic information

1-1. Economy	● Japan
1-2. Aspects of Quality Transport	●User friendly device ●Improving accessibility of transport facilities ●Social consideration
1-3. Transportation mode	● Land transportation (road)
1-4. Project name	● Standardization of Universal Design Vehicles
1-5. Major implementer	● MLIT
1-6. Site	● Japan
1-7. Period	●2008 - 2011
1-8. Total cost	-

2. Summary

● In order to promote the development of universal design vehicles such as buses and taxis, the Japanese government developed their standard specifications. For this purpose, MLIT Japan had examined these issues from FY2008 to FY2010. In the process, MLIT had established the working party on Barrier-Free (*) vehicles which consisted of experts, associations of elderly people, associations of disabled people, operators of bus and taxi, and automakers. In addition, two working groups, the working group on bus and taxi, were responsible for technological issues. (“Barrier-Free” in Japanese means better accessibility for every people including elderly people and disabled people.)

● The working party on Barrier-Free vehicles accumulated information for better universal design vehicles by conducting interviews and questionnaires and experimented on these vehicles by using mock ups. In July 2011, the working party concluded a report for Low-Floor Bus and on Universal design guidelines for taxi and shared taxi. Automakers have already released products which comply with guidelines developed by the working group.

3. Background and purposes

● In reaction to the necessity of accessibility improvement in the aging society, Transportation Barrier-Free Law was enacted in 2000 and standard specifications for Low-Floor Bus and Barrier-free Taxi were developed in 2003. In addition, Transportation Barrier-Free Law and Heart Building Law (enacted in 1994) were integrated into the New Barrier-free Law 2006, which makes it easier for local authorities to improve special accessibility in districts which contain major public facilities including transport stations.

4. Content of implementation

● In order to promote the development of universal design vehicles such as busses and taxis in an aging society, the Japanese government developed their standard specifications.

● MLIT Japan had examined these issues from FY2008 to FY2010. In the process, MLIT had established the working party on Barrier-Free vehicles which consisted of experts, associations of elderly people, associations of disabled people, operators of bus and taxi, and automakers. In addition, two working groups, the working group on bus and taxi, were responsible for technological issues.

● The working party on Barrier-Free vehicles accumulated information for better universal design vehicles by conducting interviews and questionnaires and experimented on these vehicles by using mock ups. In July 2011, the working party concluded a report for Low-Floor Bus and on Universal design guidelines for taxi and shared taxi. Automakers have already released products which comply with the guidelines developed by the working group.

● The Government of Japan introduced special tax treatment for spreading universal designed cars (**Figure 2-27**). In addition to this, MLIT adopted a symbol mark to easily identify universal designed taxis (**Figure 2-28**). Taxis with universal designed structure can show this symbol mark

on the surface of the vehicle. MLIT also provides subsidy to projects aiming at promoting easy accessibility.

Figure 2-27: Universal designed taxi

Figure 2-28: Symbol mark of universal designed taxi (UD TAXI)

Source: MLIT

5. Outcome

- Many local governments and taxi operators became interested in introducing universal designed taxis and low floor buses. Yokohama city set a goal that 5% of all taxis in the city should be universal designed taxi immediately. In 2013, 56.7% of all public passenger bus is low floor bus in Japan. Moreover 43.9% is low-floor bus.

6. Key success factors

[Promoting motivation of concerned parties]

- The working party to discuss how to develop universal designed vehicle showed preferable direction and focused on policy measures including tax reduction and subsidy. In tandem with measures on the public side, the private side has been promoting its initiatives to develop and introduce universal designed vehicles.

1. Basic information

1-1. Economy	● Japan
1-2. Aspects of Quality Transport	● Providing information ● Improving work efficiency
1-3. Transportation mode	● Land transportation (rail)
1-4. Project name	● Indexes of Comfortable and Easeful Public Transport (ICE-PT)
1-5. Major implementer	● MLIT, Railway Operators
1-6. Site	● Japan
1-7. Period	● From 2004-
1-8. Total cost	-

2. Summary

● MLIT has introduced the ICE-PT since March 2004 for promoting improvement in comfort and safety of public transport services.
● MLIT presents nine indexes by rail/bus operators in Tokyo and Osaka Metropolitan Areas every year.

3. Background and purposes

● Tokyo and Osaka are well known to be rail-oriented cities, and many rail services are provided by private rail operators, unlike other foreign economies.
● Until 1990's, in Tokyo, Government, Tokyo Metropolitan Government and railway operators concentrated in enhancing transport quantitative investment. As a result, in-vehicle congestion has been reduced. Also, railway networks have gradually developed due to this effort.
● At present, Japan faces rapid aging. An aged society demands measures for easy access such as facilitation via step-free. In addition, users demand safer and more secure environments in transport. Railway operators need to improve transport quality at the present stage.
● For promoting voluntary efforts of railway operators, MLIT has introduced the Indexes of Comfortable and Easeful Public Transport (ICE-PT) since March 2004. The ICE-PT intends to be used for so-called "benchmarking." Railway operators are expected to improve the quality of their service voluntarily, based on the monitoring of the benchmarking results.

4. Content of implementation

● Nine service indexes in ICE-PT are identified, and relevant data is collected from public transport operators.
● Nine service indexes are as follows.

(1) Rail in vehicle congestion rate in a peak hour
Average hourly rail in-vehicle congestion rate at the most congested rail section during a peak hour

(2) Share of step-free stations
Share of rail stations (over 5,000 passengers a day) with non-step routes

(3) Share of non-step buses
Share of non-step buses

(4) In-vehicle comfort index
Share of rail vehicles which have installed high performance air conditioners

(5) Availability of rail service information at platforms
Share of station platform which have installed LED devices displaying the service schedule, destination and other information

(6) Availability of rail service information in stations

Share of rail stations which have installed display boards or announce systems about the type of rail service, destination and others

(7) Availability of rail service information in vehicles

Share of rail vehicles which have installed display boards or announce systems about next stop and others

(8) Accessibility of rail passengers to staff at stations

Share of station platforms with station staff and communication devices between passengers and rail staffs

(9) Accessibility of rail passengers to staff in vehicles

Share of rail vehicles which have installed communication devices between passengers and rail staffs

- For promoting voluntary efforts of railway operators, MLIT has introduced the ICE-PT. Railway operators are expected to improve their quality of service voluntarily on the basis of monitoring the benchmarking results.

5. Outcome

- Railway operators promote voluntary improvement of quality services based on the results of monitoring (**Figure 2-29**).

Example of Monitoring (extracted): JR East Tokaido Line (Kawasaki-Shinagawa)

	Congestion rate in a peak hour	Rate of step-free station	In-vehicle comfort index	Share of station installed LED	Share of vehicle installed LED
2007	191%	62.5%	71.8%	100.0%	76.0%
2011	186%	75.0%	83.3%	100.0%	83.3%

Figure 2-29: Image of monitoring result (in Japanese)

Source: MLIT

6. Key success factors

[Setting effective implementation method]

- Comparing railway operators' performance and service quality encourages them to improve their services voluntarily. It also shows their process and progress via benchmarking. Railway operators and users can understand the status of progress in quality services.

1. Basic information

1-1. Economy	● Japan
1-2. Aspects of Quality Transport	●Reducing travel time ●Reducing congestion ●Seamless transfer ●Improving accessibility of transport facilities ●Alignment with development plan ●Regional development
1-3. Transportation mode	● Land transportation (rail)
1-4. Project name	● Improving Transport Hub
1-5. Major implementer	● JR East, Tokyu, Tokyo metro, UR
1-6. Site	● Shibuya, Japan
1-7. Period	●2005 (designated special urban renaissance zoon)-
1-8. Total cost	-

2. Summary

● Shibuya has 6 stations for 8 railway lines. Many passengers transfer from one line to another every day. Shibuya has developed commercial and business function, too. As a result, it become more complicated and people who come from outside Tokyo does not walk through the station easily. Shibuya faces problems not to secure comfort and safe zoon for pedestrian.
● The project for strengthening transport function and redeveloping commercial and business function has initiated since 2005.
● Tokyu station moved into underground and connected to Tokyo metro Fukutoshin line. Redevelopment will make vast spaces for bus terminal close to the stations.

3. Background and purposes

● There are 6 station for 8 railway lines in Shibuya in Tokyo. Many passengers transfer from one line to another every day. There is also the biggest bus terminal. Shibuya attracts many people from all over Japan because it has very popular commercial zoon. Recently business function also was developed. People comes to Shibuya more and more. As a result, it become more complicated (**Figure 2-30**). It is not so easy for people who come from outside Tokyo to walk through the station. Shibuya faces problems not to secure comfort and safe zoon for pedestrian. It is not only transport issues but also city development issues.

● To enhance function of transport hub and develop high quality commercial and business center, Shibuya was designated as special urban renaissance zoon in 2005. Special urban renaissance zoon was established for redeveloping high level usage under the special city planning law.

Figure 2-30: East gate of Shibuya Sta. before the project

東口バスターミナル

Source: MLIT

4. Content of implementation

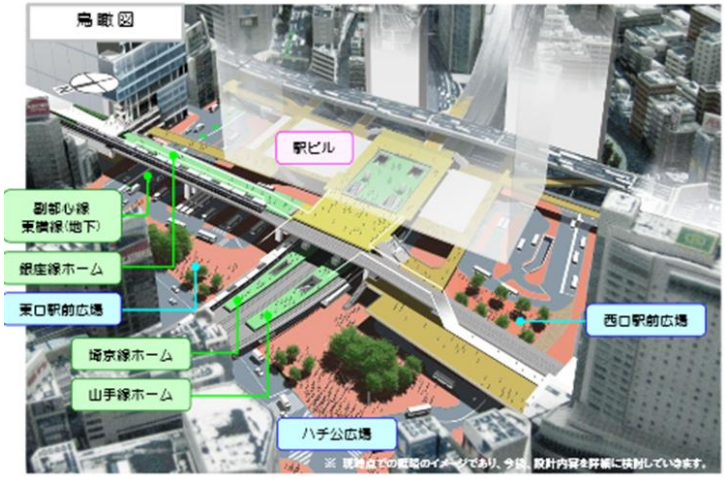
●Tokyu-Toyoko line connected in Shibuya was moved to underground station and connected to Tokyo metro Fukutoshin line directly. Before moving, Shibuya is starting station and terminal station of Tokyu-Toyoko line. Passengers who go to/come from other Tokyo area had to change from Tokyu-Toyoko line to Tokyo metro line or JR line. This transfer caused congestion in the stations. After moving, a part of passengers do not need to move between Tokyu line and other lines.

● Undergrounded Tokyu-Toyoko line secured space in the center of Shibuya. Commercial and business function will be relocated to this space in order to make comfort and safe pedestrian zoon.

5. Outcome

● Due to direct mutual operation between Tokyu and Tokyo metro, burden of commuters is alleviated. Transport function is connected to urban commercial facilities and Shibuya attracts many people from suburb area some distance away.

Figure 2-31: Future Shibuya after the project



Source: MLIT

6. Key success factors

[Setting effective implementation method]

● Special urban renaissance zone can ensure that every public organization inputs possible resources into designated projects. It realized establishment of cooperative organization involving private sector.

1. Basic information

1-1. Economy	● Japan
1-2. Aspects of Quality Transport	● Reducing traffic accidents ● Improving durability ● Life-cycle cost saving
1-3. Transportation mode	● Land transportation (rail)
1-4. Project name	● Introducing Aseismic Performance (Early Seismic Wave Detection Device and reinforcement)
1-5. Major implementer	● JR East
1-6. Site	● Japan
1-7. Period	-
1-8. Total cost	-

2. Summary

- JR East has introduced early seismic wave detection device to enhance aseismatic performance.
- When seismographs which have been set up along coastlines detect a P-wave (Primary wave), Shinkansen can reduce its speed and derail risk.
- JR East has also reinforced elevated Shinkansen tracks since the Great Hanshin-Awaji earthquake in 1995 and the Nigata Chuetsu earthquake in 2004.
- Although JR East invested in development of the early seismic wave detection device and reinforcement of tracks which involved expenditure, these facilities contribute to saving cost in the long run.

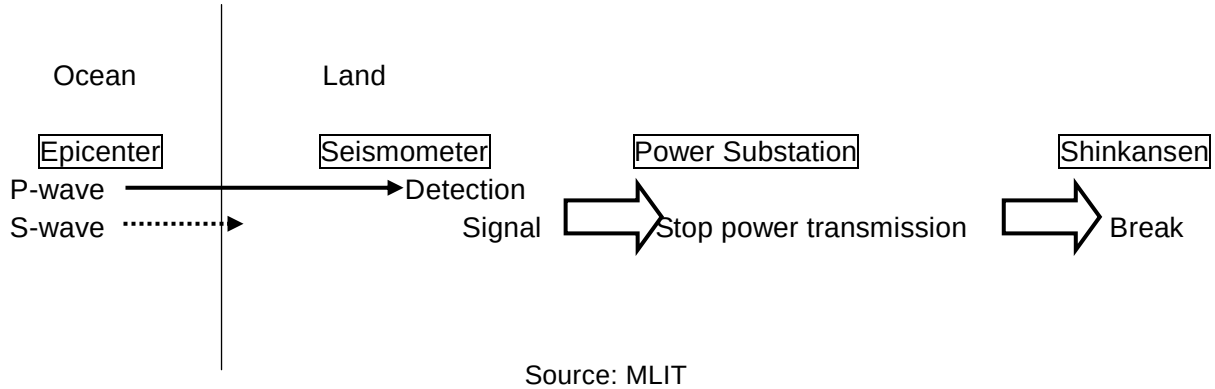
3. Background and purposes

- Shinkansen, in particular Tohoku Shinkansen runs along the coastline of the Pacific Ocean where many large earthquakes occur. JR East developed and set up early seismic wave detection devices along the coastline in order to reduce derail risk caused by earthquakes.
- The Great Hanshin-Awaji earthquake damaged railways and highways in Kobe. Some concrete pillars collapsed due to the earthquake. In 2005, Jyoetsu Shinkansen derailed due to Nigata Chuetsu earthquake. Having learnt a lesson from two huge earthquakes, JR East started reinforcing elevated railway tracks.

4. Content of implementation

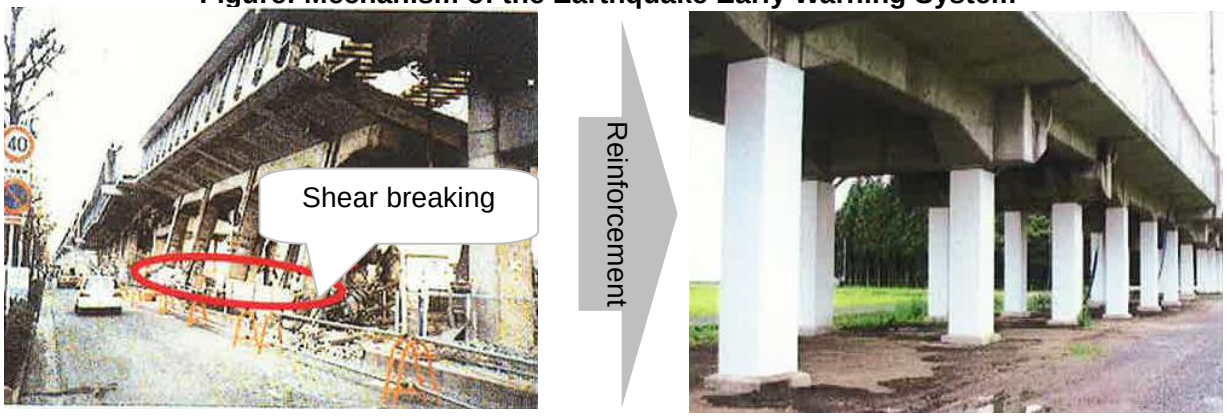
- Early seismic wave detection device detects P-waves which reach the coastline earlier than S-waves (**Figure 2-32**). Usually S-waves are stronger than P-waves. Immediately after this device detects a P-wave exceeding a certain level, it sends a signal to the power substation for Shinkansen. At the same time as power substation receives the signal, it stops the power transmission to Shinkansen. Shinkansen will execute emergency stop and start reducing speed around 3 or 4 seconds before S-wave (Secondary wave) reaches.
- JR East reinforced elevated railway tracks and bridges. This reinforcement reduces risk of derail and collapse, so it will result in saving restoration expenditure and enable continued operation.

Figure 2-32: Mechanism of the Earthquake Early Warning System



Source: MLIT

Figure 2-33: Elevated railway truck reinforced (before and after reinforcement)
Figure: Mechanism of the Earthquake Early Warning System



Source: MLIT

5. Outcome

- Introducing early seismic wave detection device and reinforcement of railway trucks and bridges reduce risks of derail and collapse. It ensures safety.
- It enables continuous operation as early as possible after earthquake and reduction of restoration expenditure even if damages occur. It reduces life-cycle cost in a long run as a result.

6. Key success factors

[Utilizing technology and know-how]

- Additional investment and expense for maintenance needs for introducing these advanced system and strengthening structure. However it improves resiliency as well as life-cycle cost with preventive measures in the long run.

1. Basic information

1-1. Economy	● Japan
1-2. Aspects of Quality Transport	● Reducing travel time ● Punctuality ● Reducing traffic accidents ● Reducing CO_2 emissions ● Saving fuels ● Human resources development
1-3. Transportation mode	● Land transportation (rail)
1-4. Project name	● Shinkansen-Japan's High-Speed Railway Systems
1-5. Major implementer	● Railway Operators
1-6. Site	● Japan
1-7. Period	● From 1964-
1-8. Total cost	-

2. Summary

● The Shinkansen was pioneered by Japan as the first of the world's high-speed railway systems. Since commencing operations in 1964, it has made tremendous contributions to the growth of Japan by connecting people, products, work and everyday lives.

● Its major characteristics include high safety and reliability levels achieved through comprehensive technologies and well-educated and well-trained staffs. It also contributes to the global environment through high-level environmental performance.

3. Background and purposes

● Japan's Shinkansen operation commenced in 1964 for connecting people, business and everyday lives. It also plays a role as booster for economic growth and regional development in Japan.

● Japan's Shinkansen has carried around 10 billion passengers for 50 years. It achieves very punctual operation and high-level environmental performance.

● Shinkansen network is as follows.

Name	Origin-Terminus	Length	Operation year	Maximum speed
➢ Tokaido Shinkansen	(Tokyo-Shin Osaka)	515.4km	1964	270km/h
➢ Sanyo Shinkansen	(Shin Osaka-Hakata)	553.7km	1972/1975	300km/h
➢ Kyushu Shinkansen	(Hakata-Kagoshima Chuo)	256.8km	2004/2011	260km/h
➢ Tohoku Shinkansen	(Tokyo-Shin Aomori)	674.9km	1982/2010	300km/h
➢ Joetsu Shinkansen	(Omiya-Niigata)	269.5km	1982	240km/h
➢ Hokuriku Shinkansen	(Takasaki-Kanazawa)	345.5km	1997/2015	260km/h

4. Content of implementation

● Safety and stability are maintained by comprehensive technologies, which range from carriages and control devices to operating management systems.

● By adopting high airtight, lightweight car bodies and small structural components, the Shinkansen further lowers environmental impacts and reduces energy consumption and CO2 emissions, as well as reduces construction costs.

● The Shinkansen is equipped with advanced technologies (ex. Early earthquake detection system and snow removing technologies, snow-melting systems) for flexibly responding to earthquakes and other natural disasters.

5. Outcome

- The Shinkansen maintains a superb safety record of “no passenger fatalities.”
- It achieves extremely high on-time operations with the average delay time per trip within one minute, even including weather-related delays.
- The Shinkansen reduces energy consumption and CO_2 emissions compared with automobiles and airplanes. It also meets strict noise regulations in Japan by innovative approaches to carriage and pantograph shapes as well as the use of lightweight carriages.
- Its early earthquake detection system senses the primary wave at an early stage and immediately halts the trains. The use of snow melting systems and other technologies for removing snow enables stable operations even in regions with heavy snow.

6. Key success factors

[Utilizing technology and know-how]

- The Shinkansen realizes highly safe and secure, green and reliable transport on the basis of cutting-edge technologies and advanced integration capabilities for combining these technologies.
- Maintenance technologies and systems have protected the safety and security of infrastructures for many years.

1. Basic information

1-1. Economy	● Japan
1-2. Aspects of Quality Transport	● User friendly device ● Providing information ● Reducing travel time ● Reducing congestion ● Reducing CO_2 emissions ● Saving fuels ● Promoting technology development
1-3. Transportation mode	● Land transportation (road and rail)
1-4. Project name	● ETC, ITS Spot and ETC 2.0
1-5. Major implementer	● MLIT
1-6. Site	● Japan
1-7. Period	●2014- (Operation)
1-8. Total cost	-

2. Summary

● ITS is a new transport system which is comprised of advanced information and telecommunications network for users, roads and vehicles. ITS contributes to solving problems such as traffic accidents and congestions. ITS consists of development areas such as advances in navigation systems, ETC, assistance for safe driving and so forth.

● ITS services have been developed step by step since the 1990s' when car navigation systems became popular. ITS has evolved via VICS, ETC and ITS Spot. At present ETC 2.0 provides smart service to cars and drivers.

3. Background and purposes

● Traffic accidents have increased, resulting in a death toll of about 5,000 persons per year. Additionally, traffic congestion in urban areas has caused economic losses amounting to 12 trillion yen, and time losses amounting to 5.6 billion person-hours. Major problems have surfaced with respect to transport safety and efficiency. Also, issues such as environmental deterioration along roads, disharmony with the global environment, and increased energy consumption are growing in severity and importance. Especially,

・About 30% of congestion on expressways occurred at toll gates.

・About 60% of congestion on expressways is caused by the spots at which pitches change.

・In expressways in urban areas, it is essential to guide the routes considering traffic information because of complex network of the roads.

・In the metropolitan expressway, 50,000 accidents of falling objects per year have occurred.

・The cost of labor to collect toll is high. Construction costs are high, and facilities need to be concentrated to limit toll collection expenses.

● ETC is a system which allows drivers to automatically pay tolls without stopping their vehicle at the toll booth. The system uses wireless communication between ETC on-board equipment installed in the vehicle and a roadside device placed at the collection point. Since starting in 1997, this system is now available on expressways around Japan. ETC communication technology is also used by private operators for non-stop passage through parking gates and ferry boarding, among others.

● VICS (Vehicle Information and Communication System) transmits road traffic data, such as congestion and traffic restrictions on a real-time basis, to onboard vehicle navigation units and displays data in the form of text, simple graphics and maps. The service started in Japan in April 1996, earlier than elsewhere in the world. VICS delivers information using three media: FM multiplex broadcasting, a radio wave beacon and an infrared beacon.

● ITS Spot services consist of three basic services that are made available as an all-in-one system

by high speed, high volume road-to-vehicle communications. The first is Wide-Range Road Traffic Information. By transmitting real-time road traffic information, car navigation systems can search wide-area expressways that cross prefectural borders, urban expressways and other roads, and select the fastest route based on the latest information. The second is safe Driving Support. ITS spots provide wide-area road traffic information on a regular basis including traffic safety issues for specific roads. In emergencies, they provide information that supports safe driving. The third is ETC. ITS spot services utilize the same technologies as ETC, therefore existing ETC services can be enjoyed with a compatible car navigation system. Other services include information on tourist sites and updated maps which are provided over the internet with some car navigation systems. 1,600 ITS Spots are installed on nationwide expressways in 2011.

- To alleviate congestion and improve safety, ETC 2.0 provides information services such as detouring assistance and safe driving assistance, route-based services such as incentives to detouring drivers and emerging services such as access control at parking lots.

4. Content of implementation

- ETC 2.0 can provide new route-based services as well as conventional ETC and current ITS Spot services.

Services provided by ETC 2.0 are as follows.

[Information service]

- Detouring assistance
  Real-time region-wide traffic information and pictures of congested road are provided.
- Safe driving assistance
  Locations of obstacles and the last car of the back-up and danger warnings are provided.
- Assistance in the event of disaster
  Upon occurrence of disaster, information on disaster occurrence and other useful information will be provided.

[Route-based service]

- Incentives to detouring drivers
- Overweight/oversized vehicles route monitoring with flexible permits
- Commercial fleet management by logistics companies

[Emerging service provided by private business]

- Access control at parking lots
- Payment at private parking lots
- Payment at drive thoughs
- Information about tourist destination

5. Outcome

- At the end of December 2011, there were about 34.24 million ETC-equipped vehicles. ETC users now account for 86.2% of all vehicles on expressways in Japan. The system has effectively eliminated congestion at toll gates.
- At the end of March 2011, over 30.13 million vehicles were equipped with VICS compatible onboard units.
- ITS spot services are available in about 1,600 places centering on expressways in Japan as of August 2011. With intercity expressways, an ITS spot is installed about every 10 to 15 km including about 90 locations before each junction, while with urban expressways, a spot is installed about every 4 km.
- Congestion in the center of Tokyo is expected to be reduced by incentives and construction of ring expressway.

6. Key success factors

[Utilizing technology and know-how]

- Integrated advanced technologies in cooperation with relevant companies and organizations

1. Basic information

1-1. Economy	● Japan
1-2. Aspects of Quality Transport	● User friendly device ● Improving accessibility of transport facilities ● Social considerations
1-3. Transportation mode	● Land transportation (road and rail)
1-4. Project name	● Improvement of Environment for Using Baby Buggy in Public Transport
1-5. Major implementer	● MLIT, Transport operator, Public facilities administrator
1-6. Site	● Japan
1-7. Period	● From 2014
1-8. Total cost	-

2. Summary

● By promoting easy accessibility for everyone in Japan, a parent/parents with a baby/babies can also easily enjoy going out. However, there are still some troubles which occur between baby buggy users and non-users in public transport.
● Previously there were no common rules and guidance on using baby buggies in public transport.
● With a view of introducing common voluntary rules for a parent/parents with a baby/babies when using baby buggies in public transport, MLIT organized a committee comprising transport operators, public facilities administrators, NGOs for child care and academics. In 2014, this committee published guidance and requests for ensuring safety in using baby buggies in public transport.

3. Background and purposes

● Government of Japan is promoting policy on transition from a society where only the parents bear child care to a society where the society as a whole supports child care. MLIT also supports development of barrier-free facilities in public transport. Previously, parents were not allowed to use baby buggies in some transport operators and had to fold it and hold the baby/babies due to lack of common rules or guidance. Although these facilities are meant to alleviate the burden of parents with a baby/babies, parents have to carry over 20 kg baggage including the baby buggy while folding it.
● The purpose is to show common rules or guidance for transport operators, passengers and baby buggy users In order to improve the environment for baby buggy users, parents and babies. As a result, a parent/parents with a baby/babies can now easily use baby buggies in public transport.

4. Content of implementation

● First of all, MLIT organized a committee to introduce voluntary rules or guidance on using baby buggies. The committee consisted of railway operators, bus operators, public facilities administrators and NGOs for child care.
● The committee has been held five times during one and a half years. In March 2014 this committee reached a conclusion and announced a common guideline. It also requested related operators and administrators to ensure that users of public transport know how to use baby buggies in public transport and how to take care of baby buggy users. A common logo has also been designed which shows if a baby buggy is allowed to be used in public transport or not (**Figure 2-34**). The committee conducted public relation activities to deepen the understanding in

using baby buggies.

Figure 2-34: Common Logo of using baby buggy

[Permit using baby buggy] **[Prohibit using baby buggy]**

[Train car with Common Logo]

Source: MLIT

5. Outcome

- The committee reviewed feedbacks to this policy. The review identified future challenges in making the policy well known. The committee also acknowledged the necessity of attaching some equipment for ensuring the safety of baby buggies.

6. Key success factors

[Setting effective implementation method]

- When drafting the policy to promote using baby buggies, opinions from many related operators and organizations were heard. Therefore the committee comprised many people with different backgrounds. MLIT also heard opinions through phones and e-mails. Based on these opinions, the committee was able to promote an effective campaign for deepening the understanding of using baby buggies.

1. Basic information

1-1. Economy	● Japan
1-2. Aspects of Quality Transport	● Better service ● Reducing travel time ● Reducing congestion ● Seamless transfer
1-3. Transportation mode	● Land transportation (road and rail)
1-4. Project name	● Mutual available transport smart card
1-5. Major implementer	● Railway Operators, Bus Operators
1-6. Site	● Japan
1-7. Period	●2013- (Operation)
1-8. Total cost	

2. Summary

- Transport smart card is a prepaid e-money card for riding on trains and buses as well as shopping. When user just touches his/her transport smart card to the ticket gate, the fare is automatically deducted from it.
- In 2013, 10 different transport smart cards issued by each railway operator can be used mutually all over Japan. It means users with any one of 10 major cards can ride on subway, railway and bus without cash.
- In 2001, JR East launched Suica as transport smart card available in only its Tokyo metropolitan area. This smart card is designed to meet Japanese transport situation such as very crowded station.

3. Background and purposes

- Transport smart card has been developed since launch of Suica in 2001. JR operators and private railway operators launched their own smart card in respective areas. Users need to use different cards for each area. In 2007, PASMO service was launched by private railway and bus in Tokyo metropolitan area where Suica is available. With a view to improving convenience for users, interchangeability of Suica and PASMO was initiated at the same time.
- Transport smart card is a prepaid e-money card for riding on trains and buses as well as shopping. There is no more need to buy a ticket from a vending machine. When passenger just touches his/her transport smart card to the ticket gate, the fare is automatically deducted from it.
- Due to very congested station, automatic ticket gate has to check ticket in a blink and pass 60 persons per one minute. Reliability should be realized in order to avoid congestion caused by errors and failure. Also, transport smart card is requested to be used as E-money and ID card.

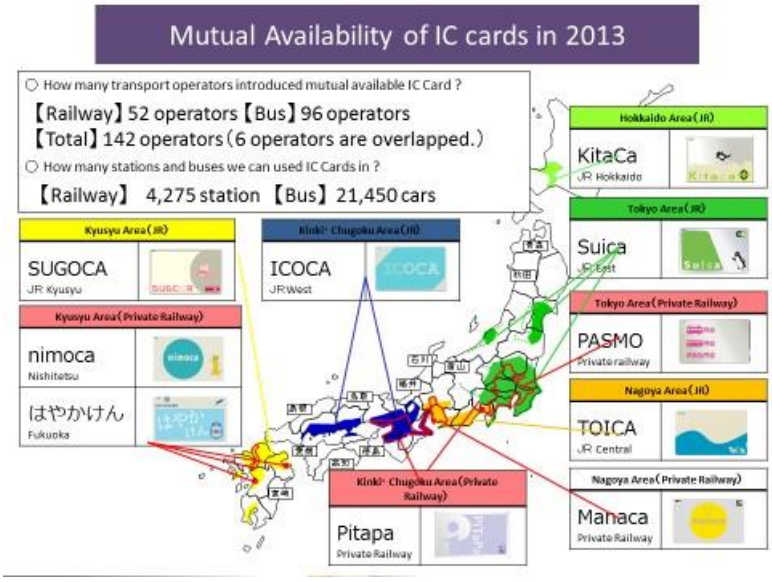
4. Content of implementation

- Transport smart card has been launched since 2001. Railway operators which issue 10 major transport smart cards voluntarily started talking about how to realize interchangeability. In 2013 10 major transport smart cards can be used in an interchangeable manner (**Figure 2-35**).Transport smart card in Japan realizes high speed processing time within 0.2 second per one passenger. It meets standard required to pass 60 persons per 1 minute through automatic ticket gate. For realizing this speed, contactless IC card system is adopted.
- Transport smart card has own individual number and high security function to prevent the data from impropriety. The user also can obtain a reissued card with the previous balance if he/she lost the card or has it stolen. And transport smart card is available not only in station/train/bus but also at store/vending machine/restaurant.

- Card reading/writing system -

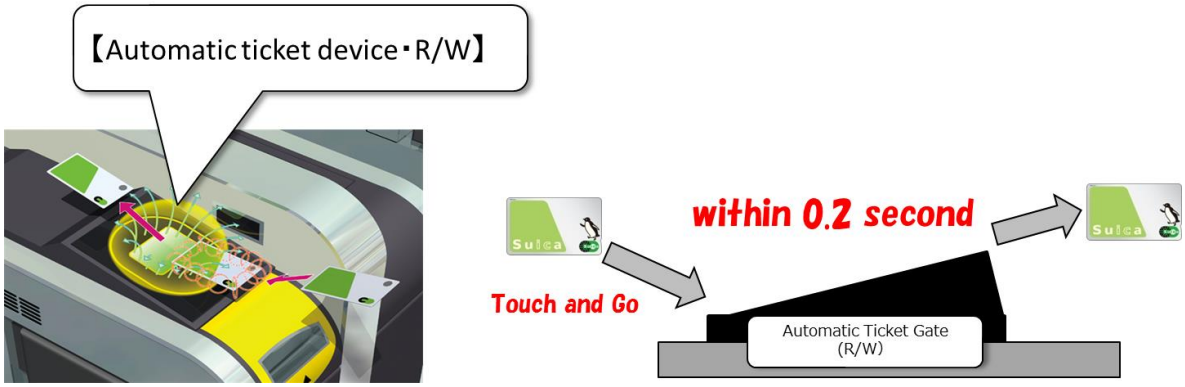
Automatic ticket gate communicates fare data to Transport smart Card through R/W by wireless (**Figure 2-36**). Within 0.2 second, processing from existence confirmation, certification, readout, judgment, data writing and data writing confirmation.

Figure 2-35: Mutual availability of IC cards in 2013



Source: MLIT

Figure 2-36: High speed processing of IC cards



Source: MLIT

5. Outcome

- 10 major transport smart cards can be used mutually and high speed processing alleviates congestion in station.
- Transport smart card becomes very popular in Japan and 97 million cards have been issued since 2001. In JR East, 90% of passengers use transport smart card in passing ticket gate of stations.

6. Key success factors

[Utilizing technology and know-how]

- Due to high speed processing time, passengers can use transport smart cards without frustration and without causing congestion.
- Highly secure system have received passengers' trust.

1. Basic information

1-1. Economy	● Japan
1-2. Aspects of Quality Transport	● Reducing traffic accidents ● Disaster risk reduction ● Life-cycle cost saving
1-3. Transportation mode	● Maritime transportation
1-4. Project name	● Port Preventive Maintenance Plan
1-5. Major implementer	● MLIT, Port Operators
1-6. Site	● Japan
1-7. Period	-
1-8. Total cost	-

2. Summary

● There are a lot of port facilities which were built in high economic growth period in Japan. These facilities face their deterioration due to overaging. Concerns over lowering safety and increasing maintenance cost has been serious.

● MLIT has been working on holding down life cycle cost of the facilities and prolonging functional life of the individual facility by undertaking improvement works systematically and efficiently under the Preventive maintenance Plan.

3. Background and purposes

● Japan has built a lot of port facilities for the high economic growth period. In 2014, around 10% of port facilities exceeded 50 years after the commencement of its operation. By 2034, its ratio will be around 60%.

● Concerns over lowering safety and increasing maintenance cost has been raised. It is difficult to find a deteriorate part in steel sheet and pipe piles under sea, the underside of the landing pier boards. There is a risk to fail to find collapses caused by degradation.

● It is required to prolong life expectancy and reduce maintenance cost of existing port facilities. With a view to promote this policy, MLIT has introduced the Preventive Maintenance Plan.

4. Content of implementation

● The Maintenance management plan is determined for respective facilities in a port by the Port Management Authority. It works for a core of preventive maintenance plan. It comprises “General Theory”, “Inspection Plan”, “Comprehensive Evaluation” and “Maintenance and Repair Plan”.

-“General Theory” defines a basic idea of maintenance management in service period.

-“Inspection Plan” shows schedule and contents of inspection based on prediction on deterioration.

-“Comprehensive Evaluation” decides policies of maintenance management based on results of repair and observation.

-“Maintenance and Repair Plan” identifies methods of repair and schedule of implementation.

● Port Management Authority conducted maintenance appropriately under the maintenance management plan for respective port facilities. However it was lack of views on comprehensive cost reduction and leveling expenditure. Therefore MLIT introduced Prevention Maintenance Plan in order to implement maintenance in a wider perspective.

● Preventive Maintenance Plan shows basic policy and countermeasures against deterioration in 5 years. MLIT and Port Management Authority make a draft on this plan through well

consultation. And this plan could determine to give up using a certain facility and concentrate the remaining facilities if necessary.

5. Outcome

- According to Preventive Maintenance Plan, Port Management Authority can conduct strategic stock management, which leads to improving safety while reducing cost of maintenance.

6. Key success factors

[Setting effective implementation method]

- Preventive maintenance Plan clarifies policy for strategic stock management in long term perspective.

2-7. Korea

(1) List of Cases

No.	Transportation mode	Project name	Aspects of Quality Transport
1	Land transportation (road)	● ITS	● Providing information ● Reducing traffic congestion ● Reducing traffic accidents
2	Land transportation (road)	● BRT	● Better transport facilities ● Reducing travel time ● Seamless transfer ● Reducing CO_2 emissions
3	Land transportation (road and rail)	● Transfer Center	● Better transport facilities ● Reducing travel time ● Seamless transfer
4	Land transportation (road and rail)	● One card, All Pass	● Better service ● Reducing travel time ● More transportation options ● Industrial development
5	All modes	● Green Transport	● Reducing CO_2 emissions ● Promoting technology development

(2) Cases

1. Basic information

1-1. Economy	● Republic of Korea
1-2. Aspects of Quality Transport	● Providing information ● Reducing traffic congestion ● Reducing traffic accidents
1-3. Transportation mode	● Land transportation (road)
1-4. Project name	● ITS
1-5. Major implementer	● MOLIT
1-6. Site	● Highway between Seoul and Suwon ● Highway between Seoul and Daejeon
1-7. Period	● Starting 2007
1-8. Total cost	● 10.46 billion won ($US110 million)

2. Summary

● The population and the number of vehicles are increasing in large cities such as Seoul. Roads are overcrowded and traffic accidents are serious social problems. MOLIT is implementing a smart highway Pilot Project using ITS on the highway connecting Seoul and Suwon and the next-generation ITS Pilot Project on the highway connecting Seoul and Daejeon. The expected outcomes are a reduction in traffic accidents, shortening of travel time because of fewer traffic accidents creating less traffic congestion, and reduction of CO_2 emissions through the resulting improvement in fuel efficiency.

● To secure a consistent funding level over multiple years, MOLIT implemented the Smart Highway Pilot Project and the Next-Generation ITS Pilot Project with private corporations as partners, thus reducing the financial burden.

3. Background and purposes

● Large cities such as Seoul are experiencing increases in population and the number of vehicles. Roads are overcrowded and there are many traffic accidents. MOLIT selected two highways, one connecting Seoul and Suwon and the other connecting Seoul and Daejeon. Traffic information is managed using IT so that traffic accident information is provided to vehicle drivers through traffic bulletin signs, car navigation systems, and the Internet. MOLIT is making an effort to use ITS to promote safe driving practices.

4. Contents of implementation

● It cost MOLIT 8.66 billion won (US$91 million) to implement the Smart Highway Pilot Project and the Next-Generation ITS Pilot Project on the highway between Seoul and Suwon from 2007 to 2014. The project uses ITS to promote safe driving practices utilizing the traffic information from the highway operating companies. In addition, starting 2014, MOLIT began implementing the Next-Generation ITS Pilot Project on the highway between Seoul and Daejeon based on the Smart Highway Pilot Project. It is planning to spend 1.8 billion won (US$19 million) for the project by 2017.

● To implement multiyear projects such as the Smart Highway Pilot Project and Next-Generation ITS Pilot Project, it is necessary to secure the requisite budget. MOLIT divided the roles between private corporations and reduced the financial burden for Smart Highway Pilot Project and Next-Generation ITS Pilot Project.

5. Outcome

- The Smart Highway Pilot Project on the highway between Seoul and Suwon was completed in 2014.ITS use is seen as having reduced the number of traffic accidents. The running speed improved 15% to 20% with less traffic congestion caused by traffic accidents. Travel time decreased as well. The social benefit was increase. Vehicle running speed improved on the Smart Highway Pilot Project due to ITS use; the fuel efficiency of vehicles is also improved; and CO_2 emissions were reduced. It benefitted the environmental protection as well.
- The Next-Generation ITS Pilot Project on the highway between Seoul and Daejeon started in 2014. It is anticipated to reduce the number of traffic accidents, shorten travel time due to less traffic congestion caused by traffic accidents, and reduce CO_2 emissions through vehicle fuel efficiency improvement, as was the case with the Smart Highway Pilot Project.

6. Key success factors

[Setting effective Implementation method]

- Roads on large cities in the Republic of Korea are overcrowded, and therefore, many traffic accidents occur. To use ITS, MOLIT worked on the highways connecting Seoul, the largest city, with Suwon and Daejeon. MOLIT started with the locations where the large effect can be expected such as reductions traffic accidents.

[Utilizing technology and know-how]

- There are many different technologies in the ITS field. MOLIT implemented the Smart Highway Pilot Project on the highway between Seoul and Suwon and the Next-Generation ITS Pilot Project on the highway between Seoul and Daejeon. The technologies used for those projects are the most advanced ITS technologies of traffic information displays, vehicle navigation systems, and Internet use.

[Promoting motivations among concerned parties]

- To utilize the effective ITS technologies in implementing the Smart Highway Pilot Project and the Next-Generation ITS Pilot Project, MOLIT divides the roles and shares them with the private corporations. By this role division between MOLIT and private corporations, the financial burdens for the Smart Highway Pilot Project and for the Next-Generation ITS Pilot Project were reduced.

1. Basic information

1-1. Economy	● Republic of Korea
1-2. Aspects of Quality Transport	● Better transport facilities ● Reducing travel time ● Seamless transfer ● Reducing CO_2 emissions
1-3. Transportation mode	● Land transportation (road)
1-4. Project name	● BRT
1-5. Major implementer	● Seoul
1-6. Site	● Seoul
1-7. Period	● Since 2004
1-8. Total cost	-

2. Summary

- BRT was introduced in Seoul in 2004 to mitigate traffic congestion and reduce CO_2 emissions. The modal shift from vehicle use was promoted.
- Currently there are 12 BRT lines with facilities for increased passenger convenience. Bus transport share increased; traffic congestion was mitigated.
- To introduce BRT, it is important to create the environment for on-time operation such as dedicated lanes and government support, facilities for increased passenger convenience, resolution of conflicting interests under top political leadership

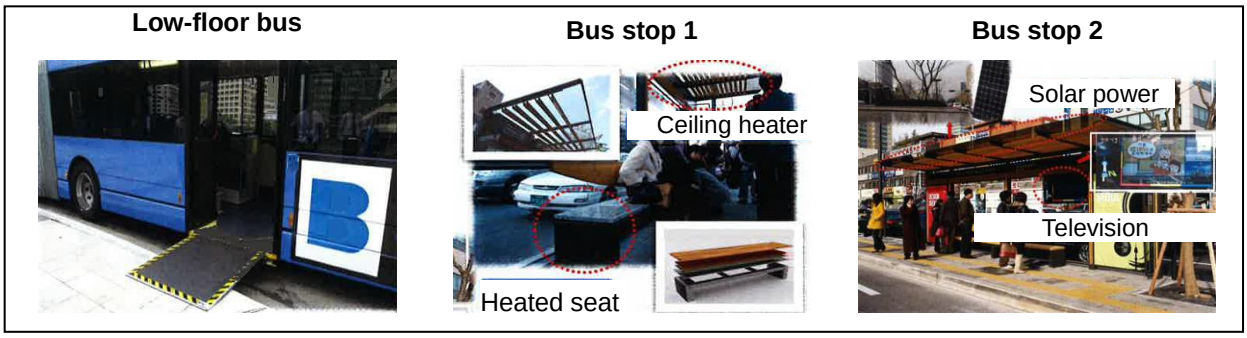
3. Background and purposes

- The City of Seoul covers 605km2 and has a population of 10.5 million. There are 9 subway lines with a total length of 433km. Suburban Seoul is well developed and the traffic between it and Seoul is active and busy. Subways from the suburban area were crowded with people coming to Seoul and vehicle traffic congestion was severe.
- To mitigate these conditions, under the leadership of then Mayor Lee Myung-bak, construction of BRT was begun in 2004 and it is now operating. This was to promote the modal shift from vehicles to buses to reduce traffic congestion and promote energy conservation to reduce CO_2 emissions. For construction of the Seoul BRT, 70% of the cost was paid by Seoul City, and 30% by the national government. Delegations from Pakistan, India, and Indonesia have visited Seoul to study BRT. Seoul has a policy to help other economies for BRT when requested.

4. Contents of implementation

- For Seoul BRT, the dedicated bus lane was built for buses to avoid traffic and run at a predictable speed. In the suburbs, buses run in the same lanes as the other vehicles. There are currently 12 lines with a total length of 115km.
- The Seoul BRT has low-floor buses that provide increased convenience for seniors and people with disabilities. In addition, the bus stops have signs that show bus arrival times and heated seats in the winte (**Figure 2-37**). Four transit centers connected to Seoul Station were built so that passengers can easily transfer to and from subways and taxis. At the Seoul Station Transit Center, about 820 buses come and go each hour and 50,000 passengers use it).

Figure 2-37: Seoul BRT: Low-floor bus - Bus stops



Source: Seoul City

Figure 2-38: Transit center at Seoul Station

Source: Seoul City

5. Outcome

- Looking at the change in Seoul over time of transport shares, bus share has increased slightly since 2004 when BRT was introduced, reaching 27.8% in 2009. Vehicle share has continued to decrease to 25.9% in 2009. This shows that the modal shift from vehicles to buses has steadily progressed since BRT was introduced in Seoul. This has relieved traffic congestion. Average vehicle travel speed, which was 15kph in 2004, had risen to 19kph in 2009

6. Key success factors

[Setting effective implementation method]

- Dedicated bus lanes were created for Seoul BRT. Buses can run at a predictable speed free of traffic congestion, creating the environment for the bus to run on time. Seoul BRT is only built where there are 3 or more lanes on each side to establish the dedicated bus lanes, as otherwise traffic congestion from vehicles using fewer lanes would occur. The existence of many wide roads could be one of the background reasons for BRT's introduction.
- The construction cost for Seoul BRT was paid by both Seoul and the national government. There were large costs for constructing such facilities as dedicated lanes and bus stops and for the purchase of buses.

[Utilizing technology and knowhow]

- To increase the level of convenience of Seoul BRT passengers, low-floor buses were purchased that are easier for elderly and disabled passengers to get on and off. Displays show bus arrival times and there are electrically heated seats. The transit center is connected to the station so that passengers can easily transfer to and from subways and taxis.

[Promoting motivations among concerned parties]

- Bus ridership changed after BRT was introduced in Seoul. It appears that the bus business needed to be reviewed. Then-Mayor Lee Myong-bak aimed at mitigating traffic congestion and reducing CO_2 emissions. He provided strong leadership to resolve the conflicts of interest over the bus business and he introduced BRT.

1. Basic information

1-1. Economy	● Republic of Korea
1-2. Aspects of Quality Transport	● Reducing travel time ● Seamless transfer
1-3. Transportation mode	● Land transportation (road and rail)
1-4. Project name	● Transfer Center
1-5. Major implementer	● MOLIT
1-6. Site	● Seoul Station, Cheongnyangni Station, Gaehwa station, Dobongsan Station, Dongdaegu Station
1-7. Period	● Since 2006
1-8. Total cost	-

2. Summary

- Korea promotes construction of transit centers for railway and bus lines to increase the ease of use of public transport. There are three types of transit centers depending on the roles of the national government, local government and private sector.
- Four urban transit centers, five transit centers in the metropolitan area and seven combined transit centers were selected.
- MOLIT evaluated that the transit centers shortened transfer time by 30%.

3. Background and purposes

- MOLIT is working to enhance the connectivity of different transport modes by constructing transit centers for ease of use of railways and buses to promote the modal shift from individual use of vehicles to public transport by raising the convenience level. The Korea Transport Institute (KOTI) has studied the construction of transit centers since 2006. It supports MOLIT's transit center construction planning.
- The three types of transit centers are urban transit centers built by the local government, such as in Seoul, the metropolitan area transit centers jointly built by the national and local governments, and the combined transit centers that are built with the private sector leading.

4. Contents of implementation

- Choosing the place for urban transit centers, planning, financing, construction and operation, are all done based on the city planning laws of the local governments such as Seoul. Their main focus is construction of bus stops (**Figure 2-39**). For the metropolitan transit center, based on the Metropolitan Transport System Planning Act , the national government selects the location and provides 30% of the funding. The local government does planning, construction and operation, paying the remaining 70% of the cost. This is mainly for building the bus and rail transit center close to the existing station. Lastly, the combined transit centers are based on the National Integrated Transport System Efficiency Act. The national government provides less than 10% of the capital. The private company selects the site, does the planning and pays more than 90% of the cost of building and operating the infrastructure. The local government must approve. For the combined transit center construction, the private company is required to pay for the construction of facilities for the transit center near the station. However, there are some preferential treatment conditions such as tax relief and relaxation of land use regulations about building capacity so that the company can earn revenue by providing commercial premises such as office spaces.

Figure 2-39: Overview of transit centers

		Urban transit center	Metropolitan transit center	Combined transit center
Legal basis		● City planning laws	● Metropolitan Transport System Planning Act	● National Integrated Transport System Efficiency Act
Paying for the cost		● 100% by local government	● 30% by national government ● 70% from local government	● Less than 10% by national government ● More than 90% by private sector
Role division	National government	-	● Location selection	● Financing
	Local government	● Location selection ● Planning ● Financing ● Construction, operation	● Planning ● Financing ● Construction, operation	● Approval
	Private sector	-	-	● Location selection ● Planning ● Financing ● Construction, operation
Primary facilities to be built		● Bus stops	● Transit facility of railway and bus near the station	● Transit facility of railway and bus near the station ● Commercial facilities such as office buildings
Major case studies		● Seoul Station ● Cheongnyangni Station	● Gaehwa station ● Dobongsan Station	● Dongdaegu Station

Source: Seamless Transport (transit center in Korea), Korea Transport Institute, March 2014

5. Outcome

● MOLIT examined the effect of transit centers. Friendly design for ease of transfer by the rail and bus passengers and concierge service for passengers enabled transfer times to be shortened by 30%. It is recognized that the convenience was improved.

6. Key success factors

[Promoting motivations among concerned parties]

● There are three types of transit center for railways and bus lines to improve the convenience for the use of public transport, depending on the differing roles of the national government, local government or private corporations. Transit centers can be constructed differently according to each project's objectives and funding capabilities.

1. Basic information

1-1. Economy	● Republic of Korea
1-2. Aspects of Quality Transport	● Better service ● Reducing travel time ● More transportation options ● Industrial development
1-3. Transportation mode	● Land transportation (road and rail)
1-4. Project name	● One Card, All Pass
1-5. Major implementer	● MOLIT
1-6. Site	● Nationwide
1-7. Period	● Starting 2007
1-8. Total cost	● 9.6 billion won (US$101 million)

2. Summary

- IC cards for transportation have been available in Korea since 1998. However, each area and each means of transportation needed different cards. Beginning in 2007, after developing the standardized requirements, MOLIT developed the one transport card. It has been in use since June 2014.
- MOLIT gathered stakeholders to develop the one transport card. It convinced the transport operators and local governments that had opposed it, by gaining the support of the public. MOLIT also provided the subsidy to buy and install the one transport card readers to promote the card use.

3. Background and purposes

- When a user of rail, public transport, highways, etc. uses an IC card for payment of the fare, the card is read by a card reader at the point of use. The card can be used to pay at shops in stations or highway service areas. This can make shopping faster and easier.
- In 1998, transportation system IC cards became available and widely used in Korea due to their convenience. However, there was no standardization between areas or transport means, so that people had to buy tickets or pay tolls with cash. From 2007, MOLIT developed the one transport card to work with all of the nationwide bus lines, highway buses, subways, trains and highway toll booths. By standardizing the transportation system IC card requirements, it could also be used for shopping at retail stores. The card became available in June 2014.

4. Contents of implementation

- Starting in 2007, MOLIT gathered public transport operators and other stakeholders to develop the one transport card as the standard transportation system IC card. In 2009 it began subsidizing the cost of the transport card reader. From 2013, MOLIT signed memoranda of understanding with public transport operators and major local governments such as Seoul to introduce the one transport card (**Figure 2-40**).
- Some public transport operators and local governments opposed the introduction of the one transport card, concerned that they would lose users, as their existing users could use public transport in other areas or use other means of transport. However, by appealing strongly about the convenience of the one transport card to the parliament and the media, MOLIT gained the support. Corporations and local governments that opposed it ended up cooperating.

Figure 2-40: History of the one transport card development, availability, and use

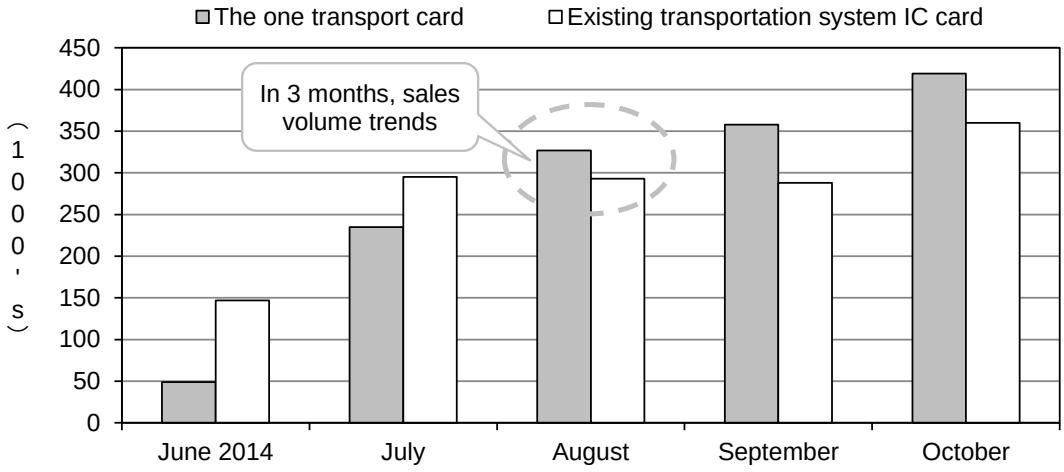
2007 - 2009	2009 - 2013	June – Dec. 2013	June 2014
■ The one transport card in development □Security functions □Card	■The one transport card ready for use □Card reader purchase subsidized with MOLIT funds	■The one transport card spread □MOU with 17 local governments ➔Convinces reluctant public transport operators/local governments	■Launch of The one transport card □Nationwide use begins with many different modes of transport

Source: "Travel all over the nation with one transportation card" (MOLIT 2015)

5. Outcome

- MOLIT researched the level of customer satisfaction with the one transport card, which began in June 2014 and is not yet well known. The convenience of being able to travel long distances and to transfer between different transportation means is highly valued. 90% of the respondents answered that they were satisfied. Sales of T-Money surpassed the volume of existing transportation system IC cards by August 2014. It is forecast that the one transport card may be widely used in the near future (**Figure 2-41**).

Figure 2-41: Change in monthly sales for the one transport card and existing transportation system IC cards



Source: "Travel all over the nation with one transportation card" (MOLIT 2015)

- MOLIT has proposed a transportation system IC card that can be used commonly throughout the APEC economies based on the one transport card's high evaluation. Additionally, MOLIT is supporting the one transport card use in foreign economies.

6. Key success factors

[Utilizing technology and know-how]

- Existing transportation system IC cards in Korea were not interoperable. They varied in their standards by area and by transportation means. Passengers or highway users needed to purchase tickets with cash to transfer to different means of transportation or pay cash for highway use. MOLIT gathered the stakeholders such as public transport operators and developed the one transport card as a standard transportation system IC card. MOLIT is promoting its nationwide use.

[Promoting motivations among concerned parties]

- With the nationwide spread of the one transport card, public transport operators incurred costs to upgrade their existing systems to the new system. MOLIT reduced the cost burden of the public transport operators by providing subsidies to purchase the one transport card readers.
- There was some opposition to the one transport card for nationwide use out of concern with losing the existing customers. MOLIT appealed strongly about the convenience of the one transport card and gained the support of the public. MOLIT gained cooperation from the public transport operators and local governments that had originally opposed it.

1. Basic information

1-1. Economy	● Republic of Korea
1-2. Aspects of Quality Transport	● Reducing CO_2 emissions ● Promoting technology development
1-3. Transportation mode	● All modes
1-4. Project name	● Green Transport
1-5. Major implementer	● MOLIT
1-6. Site	● Nationwide
1-7. Period	● Since 2010
1-8. Total cost	-

2. Summary

● Korea promotes green transport with the aim of reducing CO_2 emissions in the transport sector. MOLIT monitors progress by setting the annual execution plan.

● MOLIT is working on improving transport demand control, non-motorized transport such as bicycling and walking, building high speed mass transit, and development of technology related to green transport. Building high-speed mass transport and raising the environmental awareness of people and corporations are seen as important.

3. Background and purposes

● In Korea, the Framework Act on Low Carbon, Green Growth was enacted in 2010. It is aiming at economic growth while reducing the environmental load, such as by reducing greenhouse gas emissions. The government is working on technology for reducing the environmental load and promoting clean energy. The transport sector is a very important area in the Framework Act on Low Carbon, Green Growth. Korea has issued the "4th Comprehensive National Territorial Plan Corrective Plan (2011-2020)" that has the plan to distribute the government agencies performing the capital functions from Seoul to eleven cities such as Sejong City. In the transport sector, smart transport utilizing IT and shifting from individual vehicles to the public transport modes of rail and bus are described, so that green transport with the reduced environmental load can be realized. In Korea, the green transport goal is to reduce transport sector CO_2 emissions by 34.4% from the Business as Usual case by 2020.

● In Korea, the Sustainable Transport and Logistics Development Act was enacted in 2012 to promote green transport. MOLIT does progress management by establishing an annual execution plan based on the five-year plan.

4. Contents of implementation

● To promote green transport, MOLIT is working on improving the transport demand control, promoting non-motorized transport such as bicycles and walking, building high speed mass transport, and developing technology related to green transport **(Figure 2-42)**. In the promotion of green transport, MOLIT perceives that construction of high-speed mass transport, which will facilitate the modal shift from individual vehicle use to public transport such as rail and bus, is important, along with education of the general public and corporations for environmental awareness.

Figure 2-42: Major green transport efforts

Effort/work	Contents
(I) Improving transport demand control	● Introduction of congestion charges ● Promotion of car sharing and eco-driving ● Promotion of home office commute to reduce the commute traffic volume ● Introduction of ITS, use IT widely on road and railway cars ● Promotion of bypass roads to reduce congestion at highway tollgates ● Development of traffic information center that integrates land transport, sea transport and air traffic
(II) Promotion of non-motorized transport	● Promotion of connectivity bicycles with mass transit ➢ Bicycle to be brought on railcars ➢ Build bicycle parking adjacent stations and bus stops ● Build the environment for safe bicycle road network, pedestrian-friendly roads
(III) Building high speed mass transport system	● Improving the competitiveness of buses ➢ Promotion of the use of the M bus which connects multiple cities in the Seoul metropolitan area ➢ Extend BRT lines in Seoul ● Building railways ➢ Extend lines ➢ Increase high speed rail
(IV) Technology development of green transport	● Green vehicles ● Technology development for new transport modes ➢ Superconducting maglev train connecting Incheon International Airport and Seoul ➢ Wireless low floor tram

Source: Green Transport Strategy of Korea, MOLIT, March 2014

5. Outcome

● MOLIT is promoting green transport to reduce CO_2 emissions by 34.3% from the Business as Usual case by 2020. Energy conservation will provide US$9 billion in cost savings. Reduction of the societal cost, such as environmental load, will save US$16 billion. In addition, it is forecast that this will create 1.4 million jobs from 2011 to 2020.

6. Key success factors

[Promoting motivations among concerned parties]

● Korea is aiming for low carbon green growth. In the transport sector. The target was set for CO_2 emission reduction. MOLIT promotes the green transport based on the Low Carbon Green Growth Basic Law. Its efforts include improving the transport demand control, promotion of non-motorized transport such as bicycles and walking, building high speed mass transport, and technology development regarding green transport.

● CO_2 emission sources in the transport sector, such as vehicle and buses, are diverse. To reduce CO_2 emissions, the people and corporations need to be aware of green transport and act on it. For this, MOLIT sees education of environmental awareness of people and corporations as important to the promotion of green transport.

2-8. Malaysia

(1) List of Cases

No.	Transportation mode	Project name	Aspects of Quality Transport
1	Land transportation (road)	● Traffic Data Collection Station	● Reducing traffic congestion ● Reducing CO_2 emissions
2	Land transportation (road)	● ASEAN NCAP	● Reducing traffic accidents ● Promoting technology development
3	Land transportation (rail)	● Electrified Double Tracking and Purchase of Electric Railcars	● Reducing travel time ● Disaster risk reduction
4	Land transportation (rail)	● Klang Valley Mass Rapid Transit (KVMRT)	● User friendly device ● Reducing travel time ● Seamless transfer ● Job creation ● Industrial development ● Alignment with Development Plan
5	Land transportation (road and rail)	● Urban Transportation in the NKRA	● Better service ● More transportation options ● Seamless transfer

(2) Cases

1. Basic information

1-1. Economy	● Malaysia
1-2. Aspects of Quality Transport	● Reducing traffic congestion ● Reducing CO_2 emissions
1-3. Transportation mode	● Land transportation (road)
1-4. Project name	● Traffic Data Collection Station
1-5. Major implementer	● MOW
1-6. Site	● Major roads
1-7. Period	● Since 2008
1-8. Total cost	-

2. Summary

- MOW placed automated continuous traffic data collection stations at 90 locations along the major roads. MOW receives the traffic data to develop the traffic infrastructure construction plans.
- MOW has been able to establish an effective traffic infrastructure construction plan based on the traffic data, on top of making the work more efficient by removing the need for manual work by employees. However, there is a maintenance cost to repair traffic data collection stations, and the traffic data system is becoming obsolete.

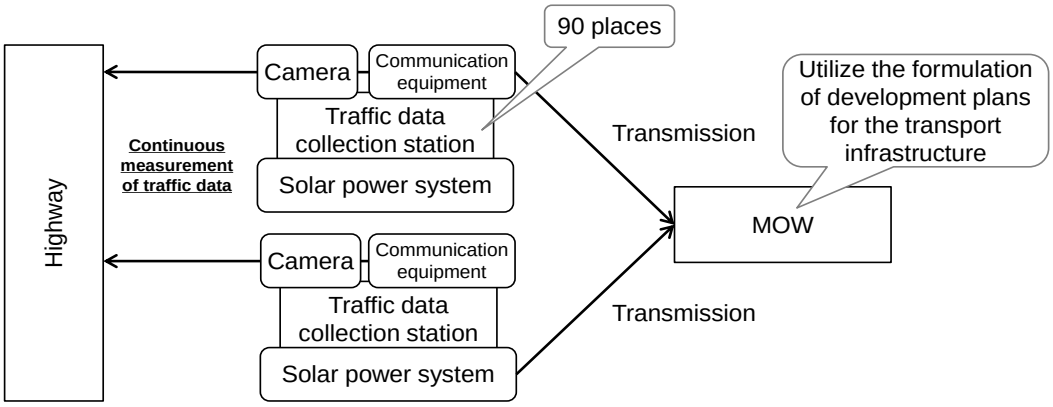
3. Background and purposes

- MOW has installed traffic data collection stations along the major roads. MOW bases the traffic infrastructure construction plan for roads to facilitate the smooth flow of traffic on data collected from the collection stations. The aim is to reduce traffic congestion, collisions and vehicle exhaust pollution, including CO_2 emissions.
- MOW began installing traffic data collection stations in 2008. They are installed in 90 locations along the major roads in the Malay Peninsula, Sabah, and Sarawak.

4. Contents of implementation

- At the 90 automated traffic data collection stations along the major roads in the Malay Peninsula, Sabah, and Sarawak, traffic data is continuously collected using cameras and sent by telecommunication devices to the MOW control center. This is utilized to create the plan for improving the traffic infrastructure on these roads **(Figures 2-43)**. One traffic data collection station camera can monitor up to 8 lanes. It records the data of traffic volume by vehicle type, speed, direction of travel, and lane usage, at 0.1-second intervals.
- The traffic data collection stations have built-in solar power systems. Thus, the power for the cameras and telecommunication devices is supplied by self-generation. The traffic data monitoring system is a customization of software that Malaysia purchased from a foreign corporation.

Figure 2-43: Traffic data collection system



Source: MOW

Figure 2-44: Example of compiled traffic data from Malaysia MOW

Date	Day	SOUTH				Total	NORTH				Total	Both Direction
		Vehicle Classification					Vehicle Classification					
		Class1	Class2	Class3	Class4		Class1	Class2	Class3	Class4		
14/1/2013	MONDAY	2763	724	758	685	4930	2926	579	1205	233	4943	9873
15/1/2013	TUESDAY	2610	730	807	773	4920	2906	588	1156	258	4908	9828
16/1/2013	WEDNESDAY	2750	787	773	568	4878	2736	573	1119	209	4637	9515
17/1/2013	THURSDAY	2684	727	878	617	4906	2825	545	1139	264	4773	9679
18/1/2013	FRIDAY	3036	805	806	594	5241	3233	626	973	316	5148	10389
19/1/2013	SATURDAY	4059	838	944	615	6456	3926	720	733	252	5631	12087
20/1/2013	SUNDAY	3642	577	711	547	5477	4802	539	819	269	6429	11906
21/1/2013	MONDAY	2828	734	935	473	4970	3156	630	975	311	5072	10042
22/1/2013	TUESDAY	2628	722	907	380	4637	2752	540	1012	218	4522	9159
23/1/2013	WEDNESDAY	2844	740	867	962	5413	2924	518	1137	365	4944	10357
24/1/2013	THURSDAY	3173	654	821	563	5211	3443	508	1047	271	5269	10480
25/1/2013	FRIDAY	3334	804	1010	918	6066	3381	591	1161	351	5484	11550
26/1/2013	SATURDAY	4554	787	990	1172	7503	4020	547	1106	366	6039	13542
27/1/2013	SUNDAY	4461	563	584	1029	6637	5429	403	1056	415	7303	13940
28/1/2013	MONDAY	3210	674	782	1162	5828	4455	528	1257	705	6945	12773
29/1/2013	TUESDAY	1003	369	363	311	2046	1000	226	634	218	2078	4124
		49579	11235	12936	11369	85119	53914	8661	16529	5021	84125	169244

Source: MOW

5. Outcome

-

6. Key success factors

[Setting effective implementation method]

- The large volume of traffic data generated from the continuous collection by the traffic data collection stations can be used by MOW to implement the effective plan for construction of traffic infrastructure such as roads that match the actual traffic flow.

[Utilizing technology and knowhow]

- Traffic data collection stations have cameras and telecommunication devices built in so that traffic data is continuously collected. MOW employees do not have to manually record the traffic data. This increases the work efficiency. In addition, the traffic data collection stations are equipped with solar power systems that supply power for the cameras and telecommunication devices, thus conserving energy.
- However, the equipment at the traffic data collection stations wears out over time and this can increase maintenance costs. In addition, IT technology progress is rapid and, after a time, the traffic data collection system might become obsolete.

1. Basic information

1-1. Economy	● Malaysia
1-2. Aspects of Quality Transport	● Reducing traffic accidents ● Promoting technology development
1-3. Transportation mode	● Land transportation (road)
1-4. Project name	● ASEAN NCAP
1-5. Major implementer	● MIROS
1-6. Site	● Nationwide
1-7. Period	● Since 2011
1-8. Total cost	-

2. Summary

- Based on the United Nations decision, ASEAN established ASEAN NCAP in 2011. It evaluates vehicle safety primarily by MIROS.
- ASEAN NCAP established the evaluation process for child and adult vehicle-collision protection. It ranks the vehicle collision safety performance. In the rankings of 30 makes of automobiles with high sales in ASEAN Member States, Japanese and American automobiles received high evaluations.

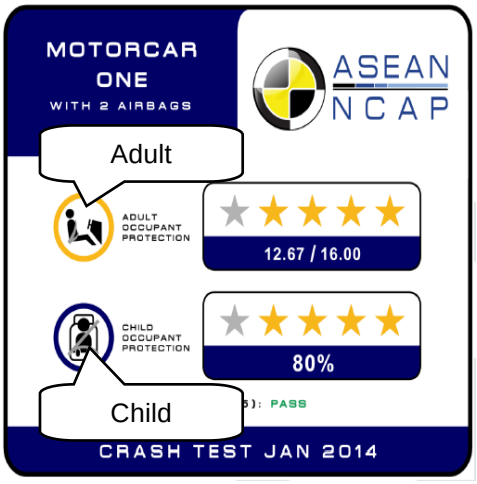
3. Background and purposes

- In 2010, the United Nations issued the “United Nations Decade of Action for Road Safety (2011-2020).” This aims to reduce the number of traffic accident deaths by half by 2020 through improving vehicle safety. The United Nations Decade of Action for Road Safety plan included the global promotion of vehicle safety evaluation. ASEAN established ASEAN NCAP in 2011 to do the evaluation of vehicle safety. MIROS, the research institute of MOT, has taken the lead role in ranking the vehicle collision safety performance. ASEAN NCAP has signed the MOU for cooperation in 2011 with Global NCAP, which does the worldwide evaluation of vehicle safety. It cooperates with JNCAP of Japan as well. In addition, JARI provides the technical support and JASTI and Kyowa Electronic Instruments Co. have participated as suppliers.

4. Contents of implementation

- ASEAN NCAP establishes the method for evaluating adult and child vehicle collision protection features in cooperation with Global NCAP and JNCAP. It ranks the vehicle collision performance and issues the plate with the ranking (**Figure 2-45**). ASEAN NCAP tested 20 models with high sales in ASEAN Member States. It ranked the vehicle collision safety performance of 8 types in the first test, and 11 types in the second test. It is planning the third test to rank the collision safety performance of the remaining 11 models.
- ASEAN NCAP ranks vehicle collision safety performance on a scale of 1 to 5 stars, with five stars being the highest. For adults, it also lists the total point score. For children, it shows a percentage. In the first two tests, Japanese cars such as Honda City, Toyota Prius, Honda Civic, and Subaru XV and American cars such as Ford Fiesta received high rankings **(Figure 2-45)**.

Figure 2-45: Plate to rank collision safety performance

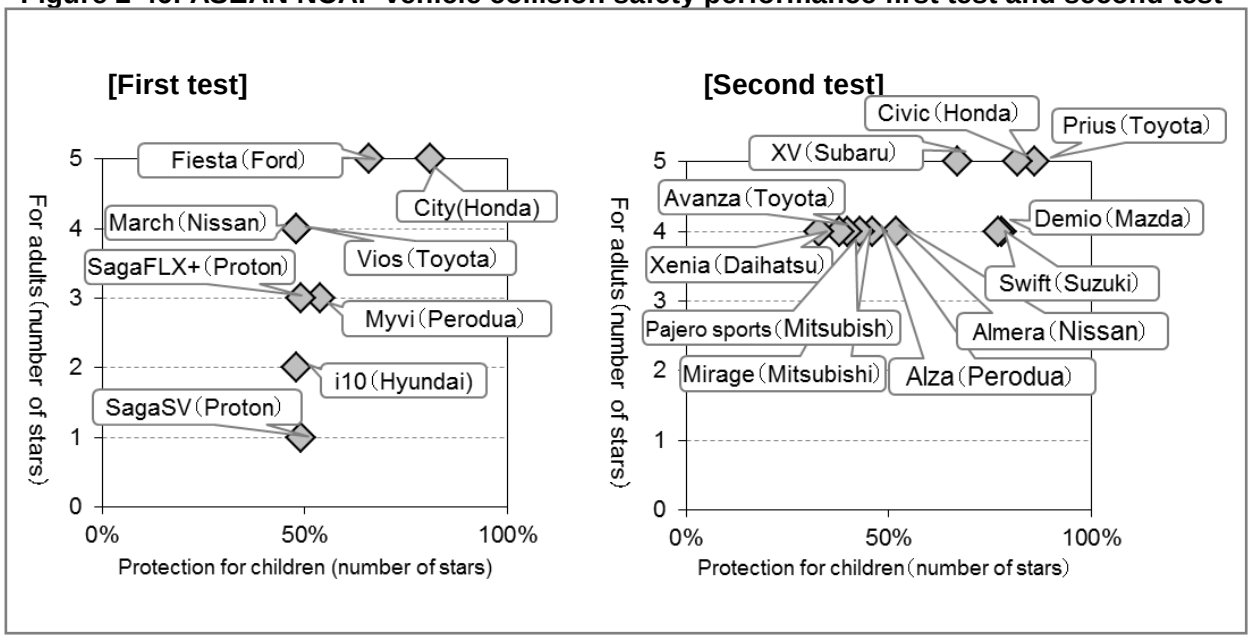


Source: MIROS

5. Outcome

- ASEAN NCAP ranks vehicle collision safety performance on a scale of 1 to 5 stars, with five stars being the highest. For adults, it also lists the total point score. For children, it shows a percentage. In the first two tests, Japanese cars such as Honda City, Toyota Prius, Honda Civic, and Subaru XV and American cars such as Ford Fiesta received high rankings **(Figure 2-46)**.

Figure 2-46: ASEAN NCAP vehicle collision safety performance first test and second test



Source: MIROS

6. Key success factors

[Utilizing technology and knowhow]

- ASEAN NCAP is the research institute for MOT. MIROS has technology and knowhow of vehicle safety evaluation. The vehicle collision safety performance ranking was performed mainly led by MIROS. ASEAN NCAP in cooperation with Global NCAP and JNCAP sets the method of evaluation of child and adult collision protection features based on the globally advanced evaluation method.

[Promoting motivations among concerned parties]

- ASEAN NCAP is established and operated based on the “United Nations Decade of Action for Road Safety (2011-2020)" formulated by the United Nations.

1. Basic information

1-1. Economy	● Malaysia
1-2. Aspects of Quality Transport	● Reducing travel time ● Disaster risk reduction
1-3. Transportation mode	● Land transportation (rail)
1-4. Project name	● Electrified Double Tracking and Purchase of Electric Railcars
1-5. Major implementer	● Malayan Railways Limited (KTMB)
1-6. Site	● Padang Besar, Ipoh, Kuala Lumpur, Rawa, Gema, Seremban, Johor Bahru
1-7. Period	● 2008 - 2014
1-8. Total cost	● 12.485 billion ringgit (US$4 billion)

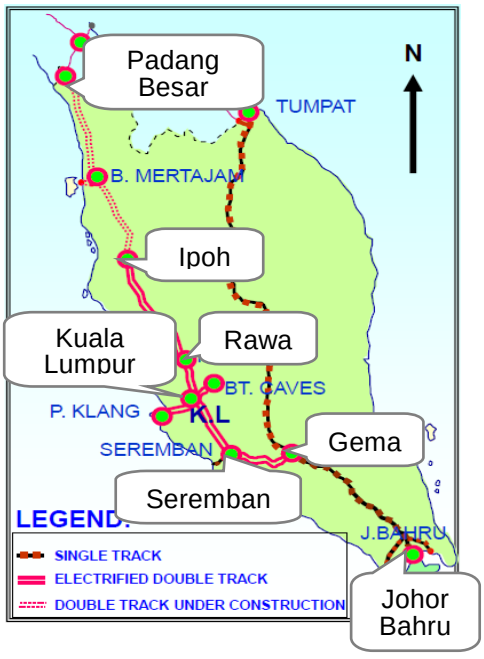
2. Summary

- KTMB is working on the Electrified Double Track Project and the purchase of electric railcars. The level of convenience will increase by increasing the speed and byrunning extra trains.
- The western part of the Malay Peninsula has electrified double tracks. For the Padang Besar - Ipoh section in the northern region, electrified double tracks are well advanced. However, the eastern portion still has only single tracks.
- KTMB signed the contract with Zhu Zhou Electric Locomotives Co., Ltd. to purchase 10 six-car sets of electric railcars. A test delivery is scheduled for January 2015.

3. Background and purposes

- KTMB does construction and operation of railways in the Malayan Peninsula. In order for passengers to travel in less time, it is implementing the electrified double tracking project (EDTP) and introducing the electric railcars to increase the level of convenience. KTMB has already finished the electric double tracking of 436km and is now working on another 337km of the same, with 801km of single track line to be completed. KTMB introduced electric railcars in 1995 on the line connecting Kuala Lumpur to its suburbs, and 120,000 people are using the service, with 259 runs per day.

Figure 2-47: Status of KTMB electrification and double tracking



Source: KTMB

4. Contents of implementation

- **Figure 2-48** shows KTMB's major double track and electrified double track lines. The section between Ipoh and Gemas in the eastern Malay Peninsula is completed. For Pandang Besar to Ipoh in the northern Malay Peninsula, the electrification and double tracking started in 2008. The total distance is 329km. The cost is 12.485 billion ringgit (US$4 billion). The planned completion

date is November 2014 **(Figure 2-49)**. The section between Tumpat and Johor Bahru in the eastern Malay Peninsula is still single track.

Figure 2-48: Major sections of KTMB electrified double tracking

Section	Overview
Ipoh - Rawang	● Total distance: 179km ● Number of stations: 14 ● Completion: 2007
Seremban - Gemas	● Total distance: 98km ● Number of new stations: 6 ● Completion: July 2013

Source: KTMB

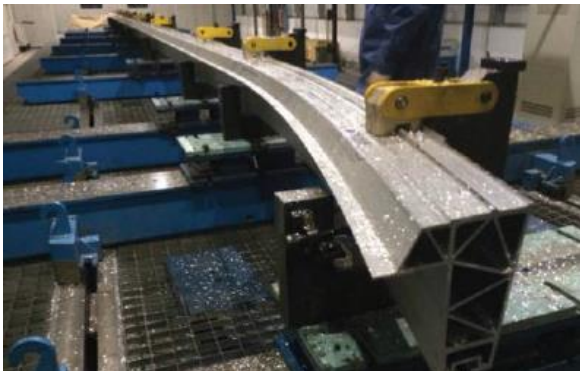
Figure 2-49: Overview of Padang Besar - Ipoh electrified double tracking

Section overview	● Total distance: 329km ● Number of stations: 23 stations ● Period: 2008 to November 2014
Contract overview	● Vendor: MMC-Gamuda Joint Venture Sdn Bhd ● Project cost: RM12.485 billion (US$4 billion)

Source: KTMB

● KTMB is promoting the introduction of electric railcars. In 2013, it signed the contract to purchase 10 six-car sets from Zhu Zhou Electric Locomotives Co Ltd. (China) for US$160 million. In 2013, KTMB finalized the design of electric railcars to purchase from Zhu Zhou Electric Locomotives Co Ltd. A test delivery is planned for January 2015.

Figure 2-50: Electric railcars in production at Zhu Zhou Electric Locomotives Co Ltd



Source: KTMB

5. Outcome

-

6. Key success factors

[Setting effective implementation method]

● KTMB works on the electrification, double tracking and use of electric railcars in an incremental fashion according to the need and ability to pay the cost.

1. Basic information

1-1. Economy	● Malaysia
1-2. Aspects of Quality Transport	● User friendly device ● Reducing travel time ● Seamless transfer ● Job creation ● Industrial development ● Alignment with Development Plan
1-3. Transportation mode	● Land transportation (rail)
1-4. Project name	● Klang Valley Mass Rapid Transit (KVMRT)
1-5. Major implementer	● MRT
1-6. Site	● Kota Damansara - Kuala Lumpur Central Station - Kajang
1-7. Period	● 2011 - 2017
1-8. Total cost	● US$6.6 billion

2. Summary

- Malaysia recognizes development of Metropolitan Kuala Lumpur and Klang Valley as an area of national importance. MRT promotes the construction of KVMRT connecting Kuala Lumpur with Kota Damansara in the Klang Valley and Kajang. It plans to open in 2017.
- MRT is connected to other transport modes and this service to raise the convenience of passengers.
- KVMT divided the construction into 85 work steps. Orders were already placed for 69 work steps costing about US$6.6 billion.

3. Background and purposes

- Malaysia established NKRA in 2009 as the nationally important areas, along with the government reform program to move Malaysia forward to become an advanced, united, and just society. Development of Metropolitan Kuala Lumpur and the Klang Valley is included in the NKRA. In Malaysia, the target is announced that they will make Metropolitan Kuala Lumpur and the Klang Valley one of the top 20 most vibrant areas in the world. In the next 10 years, GNI is estimated to increase by US$60 billion and 300,000 jobs will be created through the development of Metropolitan Kuala Lumpur and the Klang Valley.
- In the Klang Valley, railway construction is lagging in Kota Damansara, to the northwest of Kuala Lumpur, and Kajang, to the southeast of Kuala Lumpur. Residents travel to Kuala Lumpur by bus or individual vehicle. MRT, which was established by MOF, works on the construction of KVMRT connecting Kota Damansara, Kuala Lumpur and Kajang. The planned opening is 2017. When KVMRT is finished, a high volume of passengers can travel quickly between Kota Damansara, Kuala Lumpur and Kajang. It is expected that economic activity will pick up and Metropolitan Kuala Lumpur and Klang Valley development will be accelerated.

4. Contents of implementation

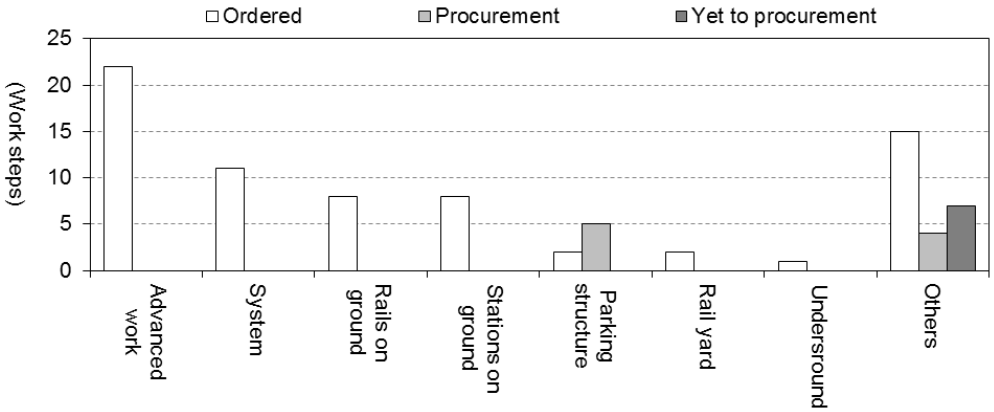
- The total length of KVMRT is 51km. There are 31 stations. It is planned to construct 16 park-and-ride locations for connectivity with vehicle use. Kuala Lumpur Central Station is the nodal point for the monorail and the railway connecting the LRT and the suburbs and LRT KVMRT goes to Kuala Lumpur Central Station and Pasar Senen Station. It provides connectivity to other transport modes including buses and taxis. In addition, a single IC card can be seamlessly used across different transport modes. This simplifies the experience for riders, raising the level of convenience (**Figure 2-51**).

Figure 2-51: Major services improving the convenience of KVMRT passengers

Source: Malaysia MOT

- Construction of KVMRT is divided into 85 work steps. Orders have already been placed totaling US$6.6 billion for 69 of the work steps. Nine work steps are in the middle of procurement for construction of parking structures and other construction work. Procurement for 7 work steps is still not implemented. KVMRT started construction in 2011. The surface construction in the northern part is planned to be completed by the end of 2016. The aboveground and underground construction are to be completed by July 2017 **(Figure 2-52)**.

Figure 2-52: Order status for construction by KVMRT



Source: Malaysia MOT

5. Outcome

-

6. Key success factors

[Setting effective implementation method]

- KVMRT connects Kuala Lumpur with Kajang and Kota Damansara, where railway construction is lagging. At the same time it improves the level of convenience by building park-and-ride and by mutual operation at the nodal point of the monorail.

[Utilizing technology and knowhow]

- KVMRT improves the convenience level by use of IC card which simplified payment of transport fares.

[Promoting motivations among concerned parties]

- KVMRT is being built according to the Metropolitan Kuala Lumpur and Klang Valley Development Plan of NKRA.

1. Basic information

1-1. Economy	● Malaysia
1-2. Aspects of Quality Transport	● Better service ● More transportation options ● Seamless transfer
1-3. Transportation mode	● Land transportation (road and rail)
1-4. Project name	● Urban Transportation in the NKRA
1-5. Major implementer	● MOT, Transport operators
1-6. Site	● Urban areas
1-7. Period	● 2008 - 2015
1-8. Total cost	-

2. Summary

- Malaysia announced that urban transport improvement is one of the nationally important areas. MOT works on improving the modal share of public transport by raising the convenience level of urban transport in conjunction with the transport operators.
- Malaysia announced the goal to raise the share of urban public transport to bring it up to 25% of urban transport by 2012. This was not achieved. The goal was reset to 25% by 2015. Work is being done on rail, bus and taxi, promotion of connectivity of various transport modes, and management of traveler needs.

3. Background and purposes

- Malaysia established NKRA in 2009 as the nationally important areas, along with the government reform program to move Malaysia forward to become an advanced, united, and just society. In the urban areas such as Kuala Lumpur, while traffic demands are increasing, public transport construction is lagging. Improving the urban transportation is one of the NKRA. The issues and challenges include mitigating traffic congestion, securing the transport means in the suburbs where public transport construction is lagging and improving the level of convenience for urban transport.
- MOT, in cooperation with urban transport operators, is working to improve the convenience level in order to improve the urban transport system, so that the share of public transport in the transport sector increases. MOT constructs bus lines and railways, promoting connectivity with public transport, and works to make the transport network more satisfactory.

4. Contents of implementation

- MOT holds weekly meetings with urban transport operators. By strengthening the cooperation between transport operators, it works to improve the level of convenience to lead to an increase in the share of public transport in the transport sector. MOT set the target for 2010 to 2012 for the transport share of urban public transport to increase from 10% in 2008 to 25% in 2012. It promoted bus and railway construction, transportation connectivity and enhancement of the transport network **(Figure 2-53)**. The share of urban public transport in the transport sector in Malaysia did improve, however, the share was 20% in 2012. It did not accomplish the target of 25%.

Figure 2-53: Major projects to improve the public transport share between 2010 and 2012

Area	Contents
Bus construction	● Increase bus lines, number of buses and bus stops ● Express commuter bus between urban area and suburbs
Railway construction	● Increase LRT cars, extra trains during the peak hours ● Increase number of railcars between urban area and suburbs and run extra trains during the peak hours
Promote connectivity among different transport modes	● Construct stations which are nodal points for various transport modes ● Construct parking at stations ● Introduce one way tickets
Enhancement of transport network	● Entry restrictions in urban areas for large vehicles ● Use performance monitoring hub system control which controls the bus routes and running times

Source: Malaysia MOT

5. Outcome

● MOT did not achieve the goal of urban public transport share to be 25% by 2012. It kept working on achieving the transport share of urban public transport to become 25% by 2015. MOT has weekly meetings with urban transport operators and works on building of railway, bus, and taxi, promoting the connectivity between various modes, and management of travel needs **(Figure 2-54)**.

Figure 2-54: Major projects for urban public transport share improvement in 2013-2015

Sector	Contents
Railway construction	● Enhancement of the railway network in urban and suburban areas ● Extension of LRT ● Monorail extension
Bus construction	● BRT introduction ● Enhance suburban bus network system
Taxi construction	● Introduction of taxi service central control system ● New taxi business model
Promote connectivity among different transport modes	● Construction of overpasses ● Automatic fare payment system introduction ● Construction of railway stations in urban areas and suburbs ● Introduction of park-and-ride
Travel needs management	● Parking lot management ● Traveler concierge desk setup

Source: Malaysia MOT

6. Key success factors

[Setting effective implementation method]

● MOT works with urban transport operators to improve the urban transport system. Various transport operators collaborate to raise the level of convenience of urban transport.

[Promotion of motivations among concerned parties]

● Improvement of urban transport is implemented based on NKRA.

2-9. Mexico

(1) List of Cases

No.	Transportation mode	Project name	Aspects of Quality Transport
1	Land transportation (road)	● Ecovia	● Better transport facilities ● Preferred fare system ● Reducing travel time ● Seamless transfer ● Reducing CO_2 emissions
2	Maritime transportation	● EcoPort of Ensenada	● Reducing CO_2 emissions ● Reducing air pollution ● Reducing noise ● Protecting regional environment ● Saving fuel

(2) Cases

1. Basic information

1-1. Economy	● United States of Mexico
1-2. Aspects of Quality Transport	● Better transport facilities ● Preferred fare system ● Reducing travel time ● Seamless transfer ● Reducing CO_2 emissions
1-3. Transportation mode	● Land transportation (road)
1-4. Project name	● Ecovia
1-5. Major implementer	● Secretariat of Communications and Transportation (SCT)
1-6. Site	● Monterrey (Nuevo Leon State)
1-7. Period	● From 2011
1-8. Total cost	● 1.9 billion pesos (US $117.8 million)

2. Summary

● In Monterrey, SCT was the major implementer of the BRT called Ecovia, which is fueled by CNG. This began in 2011. The average speed is 30 km/hr running in the dedicated lane. This is twice as fast as the public bus.

● The high convenience of Ecovia has been well received and ridership was more than forecast. The travel time for passengers was halved. This promoted the modal shift. The annual CO_2 emission reduction is 16,000t-CO_2.

3. Background and purposes

● Monterrey in the State of Nuevo León is located in the northeast of the United States of Mexico. It has a population of 1.14 million. After Mexico City, It is one of the largest cities comparable to Guadalajara. Ecovia is the BRT running 30km from the east to the west sides of Monterrey. SCT was the major implementer of Ecovia, which began in 2011. Ecovia enables people to move faster than automobile traffic and reduces CO_2 emissions by promoting the modal shift away from automobiles.

Figure 2-55: Ecovia route map

Source: Ecovia

4. Contents of implementation

● Ecovia BRT is 30.1km in length, connecting the east and west sides of Monterrey with 39 stations, 2 of which are transfer points to subway lines 1 and 2. Three stations are transfer points to scheduled buses. Ecovia is fueled with CNG, which has low CO_2 emissions. It runs in a dedicated lane. The average running speed is 30 km/hr, which is twice as fast as regular scheduled buses. SCT utilized the World Bank GEF to pay for the design of Ecovia, UTTP of the IBRD and support from the CTF to acquire land and pay for the construction.

Figure 2-56: Ecovia, low floor bus

Source：World Bank

- The Ecovia bus stops are equipped with air conditioners and Wi-Fi services. In addition, the bus is designed with a low floor so that people with disabilities can access it more comfortably. The Ecovia fare is higher than the subway fare. However, riders do not have to pay when transferring to the subway. With these features, it is highly convenient for passengers.

5. Outcome

- According to the World Bank, the fare for Ecovia is higher than the subway fare. However, the high degree of convenience has received a good evaluation, leading to higher ridership than forecast. SCT sees the Ecovia project as a success for having cut transport time in half and for enabling the reduction of annual CO_2 emissions by 16,000t-CO_2 through the modal shift from automobiles.

6. Key success factors

[Utilizing technology and know-how]

- The convenience of Ecovia was increased by using the low-floor bus, air conditioning, Wi-Fi service at bus stops, and free transfers to subways.

[Promoting motivations among concerned parties]

- SCT actively used the World Bank GEF, IBRD's UTTP and CTF in order to pay for design, land acquisition, and construction. This reduced the financial burden.

1. Basic information

1-1. Economy	● United States of Mexico
1-2. Aspects of Quality Transport	● Reducing CO_2 emissions ● Reducing air pollution ● Reducing noise ● Protecting regional environment ● Saving fuel
1-3. Transportation mode	● Maritime transportation
1-4. Project name	● EcoPort of Ensenada
1-5. Major implementer	● Port Authority of Ensenada
1-6. Site	● Port of Ensenada
1-7. Period	● 2015 – 2018
1-8. Total cost	-

2. Summary

● In Mexico, the goal of reducing CO_2 emissions was announced. The port sector such as the Port of Ensenada is joining in the effort to reduce its CO_2 emissions.
● The Port of Ensenada is working on environmental protection work such as solar power generation so that it will be certified by Lloyd's Register of the UK Classification Society as a Green EcoPort.

3. Background and purposes

● First among the emerging economies, Mexico submitted the goal to reduce CO_2 emissions by 25% by 2030 to the UN Climate Change Treaty secretariat in March 2015. In Mexico, the green port policy was announced, in which CO_2 emissions from ports are to be reduced. Mexico is working to realize sustainable ports, starting with the Port of Ensenada.

4. Contents of implementation

● The Port of Ensenada is located in the north of Mexico, on the Pacific Coast in the state of Baja California. It is an important port for cargo ships, fishing boats and cruise ships.
● Every 2 years, Lloyd's Register of the UK Classification Society certifies ports with small environmental footprints as Green EcoPorts. The Port of Ensenada is in the running to be the first Green EcoPort in Latin America, as it has a solar power system, is introducing a water treatment system, has decided how to develop a protocol for dealing with hazardous wastes, and practices ecosystem protection. The Port of Ensenada also has a plan to promote air and water quality, noise reduction, and waste processing.

5. Outcome

● With the Port of Ensenada aiming for certification as a Green EcoPort, it is more actively working to protect the environment. CO_2 emission reduction is expected in Mexico, and the port's efforts will benefit the achievement this goal.
● The Port of Ensenada will become better known with certification as a Green EcoPort. Environmental protection activities of the Port of Ensenada are expected to spread to other ports

as well. With this, CO_2 emissions in ports can be expected to decrease.

6. Key success factors

[Setting effective implementation method]

- The Port of Ensenada strives for its environmental protection activities to realize the sustainable port, based on the Green EcoPorts standard of Lloyd's Register of the UK Classification Society.

[Promoting motivations among concerned parties]

- Mexico has announced the reduction goal of CO_2 emissions. It is making efforts to reduce CO_2 emissions in the port category such as at the Port of Ensenada.

2-10. New Zealand

(1) List of Cases

No.	Transportation mode	Project name	Aspects of Quality Transport
1	Land transportation (road)	● Total Mobility Scheme	● More transportation options
2	Land transport (road and rail)	● Safer Journeys	● Reducing traffic accidents
3	Land transportation (rail)	● Auckland Electrification Project	● Seamless transfer ● Strengthening security ● Improving accessibility of transport facilities ● Reducing CO_2 emissions ● Saving fuels ● Disaster risk reduction

(2) Cases

1. Basic information

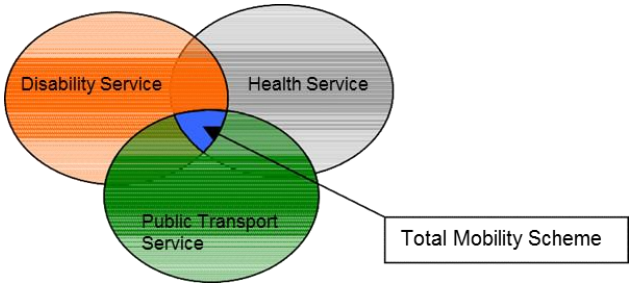
1-1. Economy	● New Zealand
1-2. Aspects of Quality Transport	● More transportation options
1-3. Transportation mode	● Land transportation (road)
1-4. Project name	● Total Mobility Scheme
1-5. Major implementer	● Managed and operated by mobility coordinators in regional councils
1-6. Site	● National scheme
1-7. Period	● Ongoing
1-8. Total cost	-

2. Summary

- The Total Mobility scheme is a national scheme that assists people with impairments to enhance their community participation by accessing appropriate transport.
- Funded in partnership by local and central government, the Total Mobility scheme subsidises taxi services to people with serious mobility constraints that prevent them from using public transport. It provides:
  - Vouchers that discount the normal taxi fare by 50%
  - Funding to help purchase and install wheelchair hoists in taxi vans
  - Payment to the owner of the vehicle for every hoist trip made

3. Background and purposes

- The Disabled Persons Assembly initiated the Scheme in the early 1980s, and effectively lobbied central government and local authorities to contribute funding to the Scheme as part of passenger transport services.
- The scheme is founded on the central tenet that people with impairments who are unable to use buses, trains or ferries as a result of their disability should be assisted with a subsidised alternative by local and central government. This reflects the legislative requirement under the Land Transport Management Act 2003 for local and central government to consider the needs of the transport disadvantaged, and is reinforced by the NZTS (2002).



Source: “Total Mobility Scheme Review” (MOT)

- The scheme is primarily a transport service, and is no more a social, health or disability service than any other type of transport service. Any person would be at risk of social isolation and adverse health outcomes if they did not have adequate access to appropriate transport. The scheme provides its members with access to transport and the means to participate in their communities in whatever way they choose.

4. Content of implementation

- The Scheme provides a transport service by way of taxi vouchers to Scheme members that provide a 50% subsidy (in most regions) off a normal taxi fare. The Scheme also provides funding assistance for the purchase and installation of wheelchair hoists in taxi vans.
- The scheme is provided throughout New Zealand. However, provision of the Scheme is usually limited to urban areas that operate bus, train, and/or ferry services, and taxi services. Further,

the subsidised alternative provided by the Scheme has always been a taxi service, and is therefore limited to areas that provide taxi services.

- In most regions, local authorities (usually regional councils) manage and operate the Scheme. The NZTA reimburses regional councils between 40-60 percent of the cost of discounted taxi fares and 60 percent of the cost of fitting taxi vans with wheelchair hoists and 100 percent of wheelchair hoist payments.
- There are approximately 43,000 registered members of the Scheme around the economy.

5. Outcome

- Total Mobility scheme forms a relatively small portion of the national transport spend but for people with disabilities it is a key support service.
- The Scheme assists improved mobility and access for people with impairments, so they can better participate in their community.
- However, there is no legal requirement to provide a taxi service that caters specifically for those with disability issues. In short, it is up to the particular company, in conjunction with the local regional council as the funder of the Total Mobility schemes, whether it also provides wheelchair accessible taxis.

Source: “Total Mobility Scheme - a guide for local authorities” (MOT)

6. Key success factors

[Setting effective implementation method]

- Numerous stakeholders have been involved in Total Mobility reviews, including users, transport providers, assessment agencies, disability organisations and local and central government.

[Promoting motivations among concerned parties]

- Funding and operation of the scheme taken up by local authorities, and costs subsidised by central government.
- Maximum subsidized fares are determined by taking into account New Zealand Travel survey data which provides information on the average trip distance by householders in different centers.
- The NZTA encourages regional councils to consider aligning their administrative systems and methods of trip allocation but also recognizes that the administrative systems, databases and processes of councils do vary.
- Regional councils adjust and limit entitlement through various mechanisms to ensure the Scheme operates within council operating budgets.

1. Basic information

1-1. Economy	● New Zealand
1-2. Aspects of Quality Transport	● Reducing traffic accidents
1-3. Transportation mode	● Land transport (road and rail)
1-4. Project name	● Safer Journeys
1-5. Major implementer	● National Road Safety Committee (made up of a variety of government agencies and departments).
1-6. Site	● New Zealand
1-7. Period	● 2010 - Ongoing
1-8. Total cost	-

2. Summary

● Launched in 2010, “Safer Journeys” is a strategy designed to guide New Zealand’s efforts to improve road safety from 2010-2020.

● The vision for Safer Journeys is “A safe road system increasingly free of death and serious injury”. To achieve this, it takes a Safe System approach, looking across the entire road system to improve safety by creating safer roads and roadsides, safer speeds, safer vehicles and safer road use. Within these categories, it sets a number of areas of concern where action is needed.

3. Background and purposes

● Despite substantial progress over the last 30 years, New Zealand still lags behind many other economies in road safety. Every year, hundreds are killed on our roads and nearly 2,900 people are seriously injured. Approximately 13,000 New Zealanders suffer minor injuries as a result of road crashes. We also know that the level of road death and injury suffered by our young people is especially high.

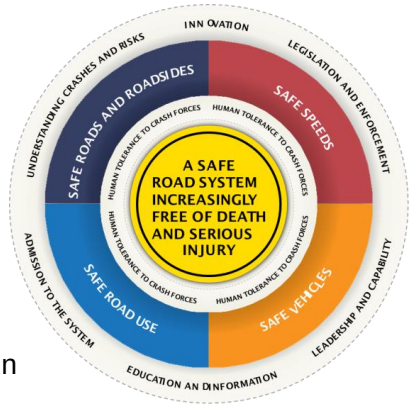
● These numbers reflect lives lost and ruined in what are mostly preventable crashes, but they do not show the effect of these crashes on families, the wider community and the health system. Road crashes can also have an economic impact - the annual social cost of crashes is estimated to be US$3.8 billion.

4. Content of implementation

● The Safer Journeys strategy was developed by the National Road Safety Committee (NRSC). The NRSC is a group of government agencies with responsibilities for implementing the Safer Journeys strategy and Safer Journeys action plans. More widely, the NRSC is the principal public sector forum for communicating, co-ordinating and agreeing upon top level strategy between agencies on road safety issues.

● The NRSC members include the Ministry of Transport, NZ Transport Agency, Police and the Accident Compensation Corporation. NRSC associate members include Local Government NZ, the Energy Efficiency and Conservation Authority, the Ministries of Justice, Health, Education and the Ministry of Business, Innovation and Employment (Department of Labour).

● Safer Journeys are implemented through a series of action plans. These plans are set out the actions the people are to take in all sectors with their own perspectives, timelines for actions and responsibility for implementing them. They are also in detail how progress is monitored and actions evaluated.



5. Outcome

- In 2011 the NRSC launched the first Safer Journeys Action Plan (for 2011-2012). This has been followed by the second Safer Journeys Action Plan (for 2013-2015). The focus of both action plans is on those initiatives that will have the greatest impact in reducing crashes and trauma.
- The 2013-2015 Safer Journeys Action Plan identifies four strategic actions which aim to address the greatest challenges to creating a truly safe road system and are intended to be transformative. There are areas where progress has been slow, or where long standing barriers need to be removed. They require joint will, cross agency collaboration, reprioritisation of effort and investment and wider partnerships to be successful. The four strategic actions are:
  - Develop and implement a safer speed programme (a speed management programme
  - Undertake Safe System signature projects
  - Ensure that BAC limits reflect risk (options for blood alcohol concentration limits for various classes of driver to reflect risk)
  - Accelerating the exit of less safe vehicles (a vehicle fleet programme looking at the exit of less safe vehicles from New Zealand).

6. Key success factors

[Setting effective implementation method]

- Four elements that can have impacts on improving safety were identified through the Safer Journeys. Also, the partner agencies that belong to the NRSC, have formed action plans, key indicators, monitoring systems to lead outcomes.

[Promoting motivations among concerned parties]

- Under the Safe System approach, all system designers must share the responsibility for road safety outcomes. System designers include planners, engineers, policy makers, enforcement officers, vehicle manufacturers and importers.
- Ultimately, road safety is the responsibility of all New Zealanders. This action plan should also be a guide for local communities, private companies and other organisations.

1. Basic information

1-1. Economy	● New Zealand
1-2. Aspects of Quality Transport	● Seamless transfer ● Strengthening security ● Improving accessibility of transport facilities ● Reducing CO_2 emissions ● Saving fuels ● Disaster risk reduction
1-3. Transportation mode	● Land transportation (rail)
1-4. Project name	● Auckland Electrification Project
1-5. Major implementer	● Auckland Transport (Auckland Council), Kiwi Rail
1-6. Site	● Auckland
1-7. Period	● 2011 - 2015 (construction)
1-8. Total cost	● US$590 million (trains and depot)

2. Summary

● The Auckland Electrification Project is an upgrading project focusing on preparing the Auckland rail system for electric trains.
● The upgrade enabled the railway to transport a larger number of passengers through improved services at faster and higher frequency in more efficient ways.
● The project brought about significant improvement of safety as well as energy efficiency.

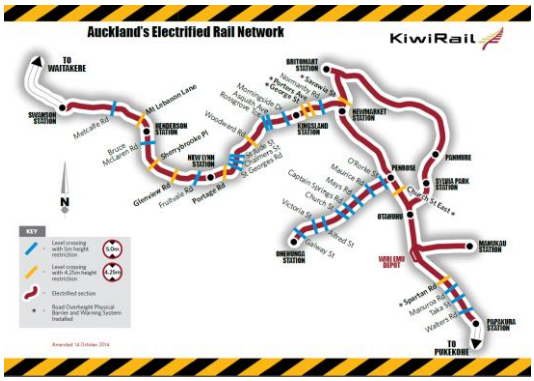
Source: Auckland Transport

3. Background and purposes

● Rail plays an important role in Auckland's transport system, particularly in providing for travel to and from the CBD. Since Britomart (Auckland's downtown station) opened in 2003, Auckland's rail patronage has increased rapidly from 2.5 million trips per year to 11 million trips per year in 2014.
● Electrification would be a vital step towards creating a modern and sustainable passenger transport network, as the former railway system was operated with approximately 30 year old, second handed locomotive hauled diesel trains. It meant quieter and more reliable train services, allowing rail to take a more prominent role in the region's transport mix.

4. Content of implementation

● The electrification extends from Papakura to Swanson, including the Onehunga and Manukau links. The project involved the installation of 57 new electric trains, 3,500 foundations and masts, carrying 560km of overhead lines across 175km of railway tracks.
● Safety systems are installed according to electrification; such as Automatic Train Protection system, an onboard CCTV camera operated continuously in all cars, feature obstacle detection attached to all doors of the trains, emergency call points throughout the train that allow passengers to communicate directly with the train crew in the event of an incident.



Source: Kiwi Rail

● A maintenance and stabling facility for the new electric trains was opened. The purpose-built

facility comprises a maintenance building, rail track sidings, stabling for 28 trains and a train wash and platform for cleaning. There is also a locally-operated points system so all train movements can be controlled on-site.

Source: Auckland Transport

5. Outcome

- The project has been almost completed. The first of the electric trains began operating in Auckland on 28 April 2014, and are expected to be operating on all lines by mid to late 2015.
- The project has bought about the following outcomes;
  - Carbon footprint was reduced. The electrified trains produce no air pollution from them as there are no exhaust fumes.
  - The systems employ 25kV power supply, which runs the trains in the very quiet way both externally and internally - an important consideration for people living and working near the rail network.
  - The trains have wider doors than the former trains making passenger flow on and off the trains easier and faster and easier for people with disabilities.
  - Wheelchair users and others who are mobility impaired became able to use automatic ramps on the central carriage doors providing a seamless transition between the platform and the train.
- Once the full fleet is in service, combined with timetable improvements, the trains are expected to transport passengers to their destinations quicker. They will be able to shave approximately 10 minutes off travel from Papakura to Britomart.

6. Key success factors

[Utilizing technology and know-how]

- The trains are environmentally friendly, energy-efficient, quieter, and produce no air pollution. To provide improvements to efficiency each train has regenerative braking, allowing energy to be produced by the train and fed back into the 25kV supply - a recovery of up to 20% of the energy used.
- Passenger safety has been dramatically improved with newly installed systems mentioned above (see 4. Content of implementation).

[Promoting motivations among concerned parties]

- MOT funded an initial cost of US$590 million through NZTA to Auckland Council. The funding package gives the Auckland region more independence and flexibility around how they run services, while passengers can look forward to faster and more reliable electric trains.

2-11. Papua New Guinea

(1) List of Cases

No.	Transportation mode	Project name	Aspects of Quality Transport
1	Land transportation (road and rail)	● Improvements to Land Transport Services or Establishment of Road Traffic Authority (RTA)	● Enhancing manner ● Reducing traffic accidents ● Strengthening security

(2) Cases

1. Basic information

1-1. Economy	● Papua New Guinea
1-2. Aspects of Quality Transport	● Enhancing manner ● Reducing traffic accidents ● Strengthening security
1-3. Transportation mode	● Land transportation (road and rail)
1-4. Project name	● Improvements to Land Transport Services or Establishment of Road Traffic Authority (RTA)
1-5. Major implementer	● DOT, RTA, NRSC
1-6. Site	● Nationwide
1-7. Period	● From 2014
1-8. Total cost	● K8.4 million (US$ 3 million)

2. Summary

● DOT addresses to establish RTA through merger of NRSC and Land Transport Division. RTA plays as a one-stop regulatory body of traffic safety policy.

3. Background and purposes

● For enforcing safety standards, prosecuting breaches and overseeing the transport services to the public comprehensively, DOT aims to establish RTA through merger of NRSC and Land Transport Division of DOT. With establishment of RTA, it is expected that traffic safety and secure will be improved.

4. Contents of implementation

● Since 2014, DOT addresses the establishment of RTA. The missions of RTA are as follows:
(1) Establish a framework for coordinated licensing system for drivers and motor vehicles and a consistent uniform approach to National responsibility on Vehicle licensing
(2) Improve the performance of the public transport system
(3) Improve the management of the Regulatory Framework
● The budget of RTA was requested at K8.4 million (US$ 3 million), but not decided. And the board members of RTA will be appointed.

5. Outcome

● RTA will plan and introduce coordinated licensing system and manage the regulatory framework as a one-stop regulatory body. Improvements of traffic manner and effective operation of traffic safety policy are expected, which leads to reducing traffic accidents and strengthening security.

6. Key success factors

[Setting effective implementation method]
● DOT combines NRSC and Land Transport Division into RTA, in order to consolidate dispersed capability of traffic safety policy. RTA will play as a one-stop regulatory body.

2-12. Peru

(1) List of Cases

No.	Transportation mode	Project name	Aspects of Quality Transport
1	Land transportation (road)	● South Inter-Oceanic Route, Section 4	● Reducing travel time ● Reducing congestion ● Reducing CO_2 emissions ● Debt sustainability
2	Maritime transportation	● Ore Concentrate Loading Terminal in the Callao Port Terminal	● Reducing congestion ● Work efficiency ● Reducing air pollution ● Reducing noise ● Protecting regional environment

(2) Cases

1. Basic information

1-1. Economy	● Peru
1-2. Aspects of Quality Transport	● Reducing travel time ● Reducing congestion ● Reducing CO_2 emissions ● Debt sustainability
1-3. Transportation mode	● Land transportation (road)
1-4. Project name	● South Inter-Oceanic Route, Section 4
1-5. Major implementer	● Intersur Concesiones S.A
1-6. Site	● Southern Peru
1-7. Period	● 2005-2030
1-8. Total cost	● US$ 678 million

2. Summary

● This project was planned and implemented with the aim to improve connectivity between Brazilian cities and/or markets with Peruvian ports, along the Pacific coast. The project aims to allow increment the commercial transport by reducing costs and time for import/export goods in both economies.

● South Inter-Oceanic Route - Section 4 has 305 km. long of two lanes paved road from Azangaro to Inambari Bridge by the ocean in Peru.

● The road starts at 3,850 m.s.l. high, rises up to 4,872 m.s.l. and descends to 371 m.s.l. at Inambari Bridge, crossing over the Andes Mountains.

Figure 2-57: The Location of the Project

Source: Intersur Concesiones S.A

3. Background and purposes

● The South Inter-Oceanic Route, Peru - Brazil is a highly prioritized infrastructure project with significant importance for Peru, in order to facilitate the economic integral relationship between Peru and Brazil.

● In April 30th, 2004, the Law N° 28214 of Peru came in effective as to rationalize the implementation of the Peru-Brazil South Inter-Oceanic Route as a national interest and public necessity.

● In January 19th, 2005, the government of Peru signed a long term concession contract for rehabilitation, improvement, operation and maintenance 2,586 km. road with 5 Sections, including the Section 4 of 305.9 km, to an international biding.

● In August 4th, 2005, the government of Peru and Intersur Concesiones S.A signed on a 25 year BOT Contract for the 305.9 km of Section 4.

4. Contents of implementation

● South Inter-Oceanic Route, Section 4 is a 305 km long of two lanes paved road from Azangaro in Peru to Inambari Bridge by the ocean in Peru crossover the Andes Mountains. There are infrastructures built on the road together with the road construction as follows.

➢ 46 bridges of approximately 1,100m long in total

- 14 short bridges
- 7 tunnels of 2,220m length in total.

5. Outcome

- The project improved the quality of the road with geometry paved and landslides reduced, which in turn shortened travelling time.
- Before being paved South Inter-Oceanic Road - Section IV, people spent around 18 hours to travel through Azangaro to Inambari Bridge. Furthermore, the traveling time depended on whether conditions and landslides that could damage the road and stop the traffic. Currently, the traveling time take only about 6 hours.
- Other problems were the steep gradient and short turning curves that restricted the long and heavy trucks traffic, which in turn led them to make several travels to transport heavy shipments. Nowadays, the gradients became less steep and turning curves wider, and trucks can transport heavy shipments easier.
- Last but not least, the shipments from Brazil toward the Peruvian coast were very costly and with high risks. Currently, the transport between Azangaro and Inambari Bridge is more efficient, taking less time and cost.

Figure 2-58: The Paved Road

Source: Intersur Concesiones S.A

6. Key success factors

[Setting effective implementation method]

- Close supervision and prompt action to correct each and every incident emerged.

[Utilizing technologies and know-how]

- The pavements, bridges, tunnels and all structures designed in the project were developed and built by specialist engineers with wide experience in roads sector.
- The concessionaire is constituted by three leading companies in the development of transportation projects worldwide, with high standards of quality control.

[Promotion of incentives among concerned parties]

- It was essential to work hand in hand with the local population, as well as the development of community workshops to mitigate the social impacts of the project.

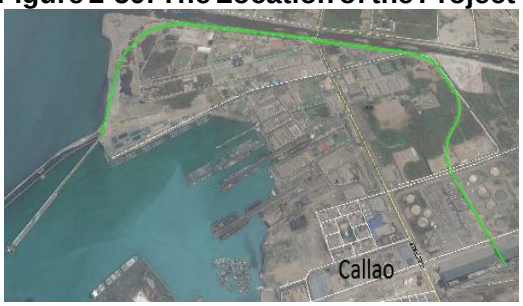
1. Basic information

1-1. Economy	● Peru
1-2. Aspects of Quality Transport	● Reducing congestion ● Work efficiency ● Reducing air pollution ● Reducing noise ● Protecting regional environment
1-3. Transportation mode	● Maritime transportation
1-4. Project name	● Ore Concentrate Loading Terminal in the Callao Port Terminal
1-5. Major implementer	● Transportadora Callao S.A.
1-6. Site	● Callao, Peru
1-7. Period	● A 20 year Concession Agreement signed on January 28, 2011 ● Operation began on May 23, 2014
1-8. Total cost	● US$ 113 million

2. Summary

- The project began as a Private Initiative (PI), then the Ministry of Transport and Communications subscribed a concession transport contract with Transportadora Callao S.A to improve the safety and environmental performance in the Callao port, the most important port for Peruvian economy.
- The mineral concentrates shipping terminal of the Callao port was upgraded with airtight conveyor belt system and ship loading infrastructure installed. This upgrading has significantly reduced pollutions, operation time and export cost.

Figure 2-59: The Location of the Project



Source: Transportadora Callao S.A.

3. Background and purposes

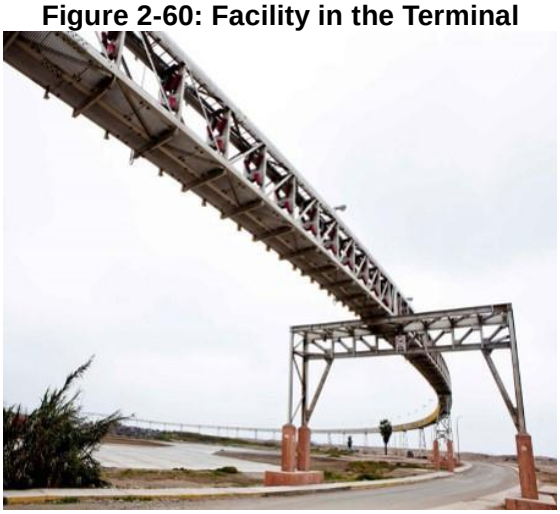
- In the past, above 2.5 million tons of ore concentrates were exported every year through the port of Callao, transporting by trucks, copper, zinc and lead concentrates from nearby specialized warehousing facilities to a multi-purpose pier.
- That export method generated numerous health risks and problems for the population of Callao and exporters in general. The transport, one truck at a time and the operation of ore concentrates using front loaders in the open air, generated air and water pollution, major traffic congestions, delinquency, inefficient and high cost shipments for ore concentrate exporters and delays for importers and exporters of other products due to bottlenecks in the port during these operations.
- Against a backdrop of issues stated above, a new environmentally friendly system that could handle the growing volumes of ore concentrates to be exported through Callao in the coming years was needed.

4. Contents of implementation

- The project consists of the following installations:
  - Open access and control room: centrally located and physically connected to ore warehousing businesses through enclosed auxiliary conveyor belts. Ore concentrates are received from these warehouses on a forty meter long sacrifice conveyor belt equipped with a scale and metal detector/remover.

- Tubular conveyor belt: a 3.2 km airtight conveyor belt that runs through industrial areas, away from the population, installed at a minimum height of six meters above the ground. It has a capacity of 2,300 metric tons per hour, a diameter of 0.4 meters and works at a speed of 4 to 5 meters per second.
- Transfer tower: completely enclosed and located in the shore at the end of the tubular belt, it houses a chute for conveying the concentrates to a third conveyor belt.
- Tripper gallery and conveyor belt: it is a 500 meter long, enclosed conveyor belt that runs from the shore and into the pier alongside a 300 meter concrete vehicular access. It is equipped with a tripper car that transfers the concentrates to the next and final conveyor belt.

Figure 2-60: Facility in the Terminal



Source: Transportadora Callao S.A.

- Pier: it is a 220 meter long and 21 meters wide concrete structure, mounted atop 93 tubular steel piles. It is prepared to receive vessels of up to 60 thousand DWT.
- Ship loader installed on the pier: it is a linear travelling ship loader mounted on rails and equipped with a tripper conveyor to elevate the material to the loader boom. This design allows the boom to be positioned over each hold of the ship, managed by a single operator with remote control, and without the need to reposition the vessel. It has a telescopic loading spout with a trimming spoon that directs the free falling cargo to the corners of the holds.
- Electric Sub-Stations: all this equipment is powered by electricity which is distributed and regulated by four electric substations located along the path of the project's infrastructure.

5. Outcome

- Transportadora Callao S.A. has been operating over a year, transporting and embarking about 3.3 million tons of concentrates, in more than 180 vessels. This helps to reduce dead time by exporters and waiting times for ships arriving into Callao have been significantly reduced, as well as:
  - Loading times have improved five times compared with the previous system.
  - The construction of an exclusive pier for ore concentrate exports has meant that vessels' waiting times to enter the harbor have reduced, from an average of eight days to only one day.

6. Key success factors

[Setting effective implementation method]

- Close supervision and prompt action to correct an each and every incident was a key.

[Utilizing technologies and know-how]

- The best available technology was used. Final engineering design and construction was entrusted to a world class builder after completing a careful selection process that involved seven participants.

2-13. The Philippines

(1) List of Cases

No.	Transportation mode	Project name	Aspects of Quality Transport
1	Land transportation (road)	● Traffic Accident Database	● Reducing traffic accidents
2	Land transportation (road)	● Clean Fleet Management Toolkit with Low Environmental Impact	● Reducing CO_2 emissions ● Reducing air pollution ● Saving fuels ● Improving work efficiency ● Industrial development
3	Land transportation (road)	● E-Trike Introduction	● Reducing CO_2 emissions ● Saving fuels ● Industrial development ● Debt sustainability
4	Maritime transportation	● Power Supply from the Shore to Ro-Ro Ships	● Reducing CO_2 emissions ● Saving fuels

(2) Cases

1. Basic information

1-1. Economy	● The Philippines
1-2. Aspects of Quality Transport	● Reducing traffic accidents
1-3. Transportation mode	● Land transportation (road)
1-4. Project name	● Traffic Accident Database
1-5. Major implementer	● DOTC, Road Board, PNP, DOH, DOST, DPWH, Cebu City
1-6. Site	● 2015: Major cities (Manila, Cebu, etc.) ● 2016: Nationwide
1-7. Period	● 2015 onward
1-8. Total cost	-

2. Summary

● The Philippines is developing and operating the traffic accident database for relevant ministries and local governments to centrally manage the data about traffic accidents. DOTC is managing development and operation of the database system.

● Operation of the traffic accident database began in Metro Manila and Cebu City. After identifying the locations where there are frequent traffic accidents, consideration is given to the effective traffic accident prevention measures, for instance, securing the traffic safety of elementary school students in Cebu by providing information about points near elementary schools where traffic accidents frequently occur during the times students are traveling to and from school.

3. Background and purposes

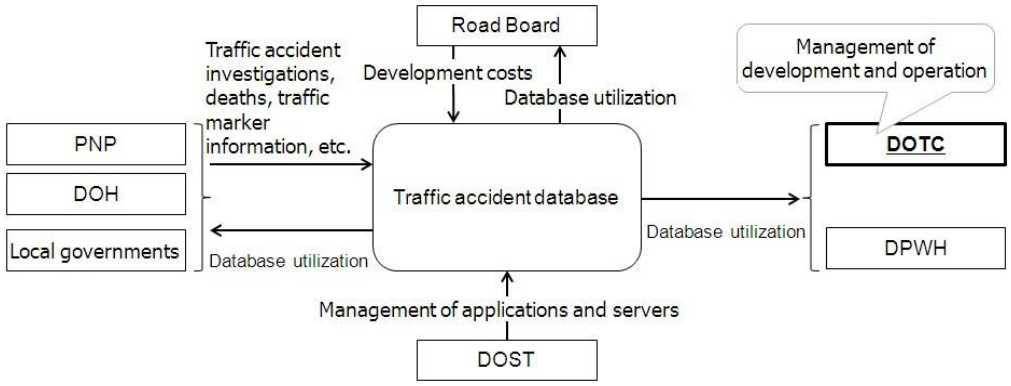
● In the Philippines, traffic accident data are separately collected and managed by DOTC, PNP, DOH, DPWH, and local governments, and therefore it is difficult to see the comprehensive nationwide picture of traffic accidents. Moreover, the local governments, such as Cebu, would collect the data about traffic accidents and report them by telephone. The staff would write memos manually. This method lacked sufficient reliability or speed.

● With the support of the World Bank, DOTC in conjunction with DOST is developing the National Road Safety Initiative, a centralized traffic accident information database, in conjunction with the Road Board, PNP, DOH, DPWH and local governments. The cross-agency Road Board funds road maintenance and management. The comprehensive nationwide picture of traffic accident status can be rapidly and accurately seen by PNP, DOH, DPWH and local governments using this database. Therefore, planning for the effective traffic accident response is expected to be promoted. The traffic accident database began operating in Metro Manila and Cebu. In 2015 it began operations in other major cities. It is scheduled to be deployed nationwide in 2016.

4. Contents of implementation

● DOTC developed and is managing the operation of the national traffic accident database. The Road Board pays its expenses. DOST manages the applications and servers. PNP enters the accident investigation data. DOH enters the data about traffic accident deaths. Local governments enter information about traffic markings (**Figure 2-61**). DOTC and the DPWH use the traffic accident database, along with PNP, DOH and the local governments that enter the traffic accident data. This can be used to plan the effective traffic accident response measures and gain a correct understanding of the status of traffic accidents nationwide.

Figure 2-61: Scheme of development and operation of the traffic accident database

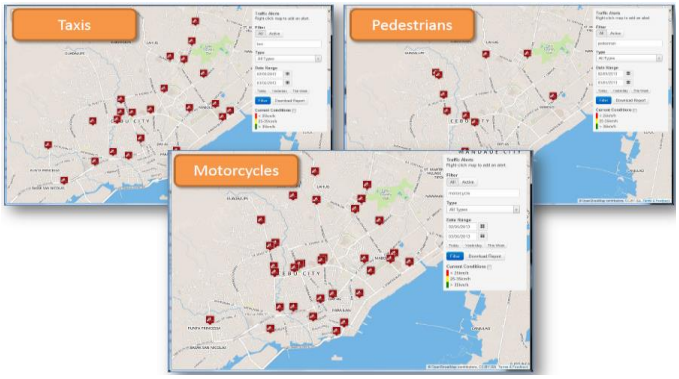


Source: Compiled from DOTC materials

5. Outcome

- Metro Manila's and Cebu's traffic accident databases have been operational since 2013. In that time, data for about 20,000 traffic accidents has been entered. With the traffic accident database, it is possible to map the occurrences and locations of traffic accidents in Metro Manila and Cebu by transportation mode. It is possible to identify the locations where there is a high probability of frequent traffic accidents. The system can analyze traffic accidents by type of accident and estimated damage to generate statistical information. The effective traffic accident response measures corresponding to the occurrence of accidents can be considered.
- By analyzing the traffic accidents occurring around elementary schools at the times when schoolchildren are traveling to and from school, Cebu is highlighting the locations where traffic accidents frequently occur. Cebu is working to secure the safety of the elementary school students by actively disseminating information about the locations near elementary schools where traffic accidents frequently occur (**Figure 2-62**).

Figure 2-62: Display of occurrences of traffic accidents by traffic mode based on the traffic accident database (example: Cebu)



Source: Created from DOTC materials

6. Key success factors

[Utilizing technology and know-how]

- Centrally managed traffic accident data simplifies the understanding of the nationwide picture of traffic accidents and the analysis of their causes. It is necessary to utilize this for planning the effective traffic accident measures and monitoring their effectiveness. The Philippines traffic accident database centrally manages traffic accident data that had been separately managed by different agencies. It informs the traffic accident response measures such as securing elementary school students' traffic safety, by providing comprehensive information about where traffic accidents frequently occur on the roads they use when traveling to and from school.

1. Basic information

1-1. Economy	● The Philippines
1-2. Aspects of Quality Transport	● Reducing CO_2 emissions ● Reducing air pollution ● Saving fuels ● Improving work efficiency ● Industrial development
1-3. Transportation mode	● Land transportation (road)
1-4. Project name	● Clean Fleet Management Toolkit with Low Environmental Impact
1-5. Major implementer	● ADB, DOTC, DOE, DOF, Mandaluyong City
1-6. Site	● Mandaluyong
1-7. Period	● Since 2006
1-8. Total cost	-

2. Summary

● In collaboration with TNT, UNEP developed the Vehicle Management Toolkit with Low Environmental Impact to manage the amount of fuel consumption by vehicles. Four steps and 14 items make up a spreadsheet and 18 tools were prepared.
● PBE collaborated with CAI-Asia in The Philippines to spread the use of the Toolkit. Meralco did a pilot project with the Toolkit and improved fuel efficiency and reduced air pollutants and CO_2 emissions.

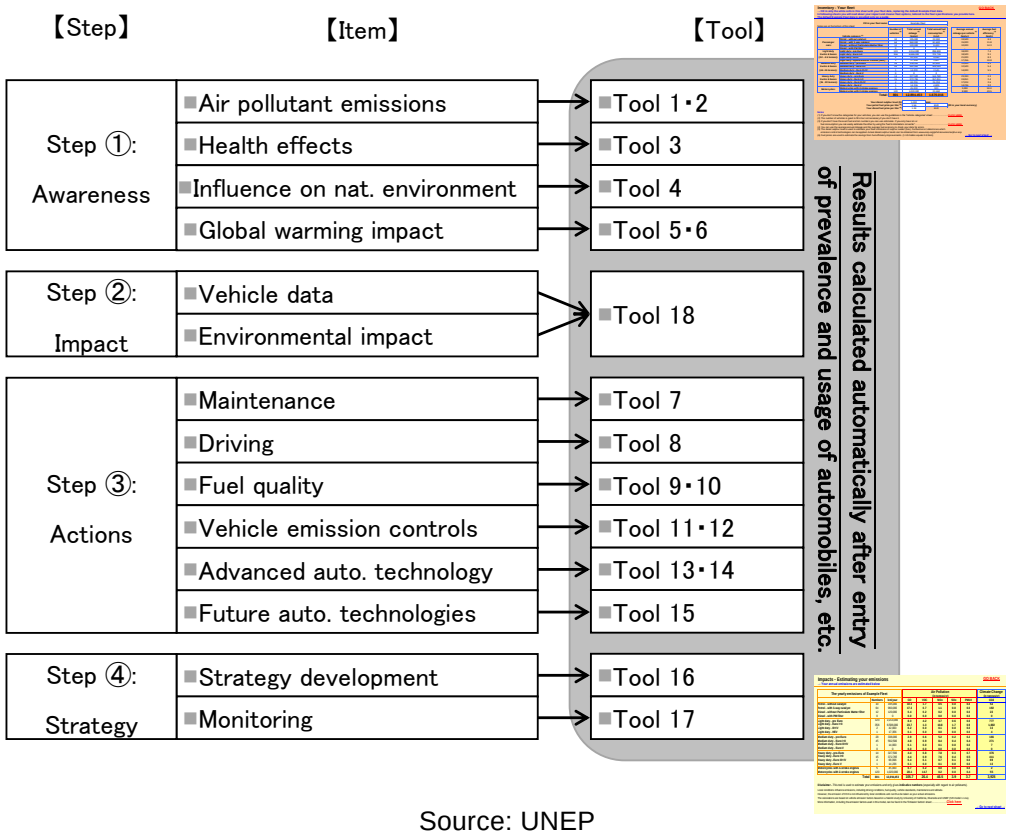
3. Background and purposes

● In cooperation with TNT, a Netherlands-based global logistics company, the United Nations Environment Program (UNEP) deals with the improvement of air pollution. UNEP is developing the Clean Fleet Management Toolkit to control the amount of fuel consumed by vehicles. Transport companies can use the Toolkit to take an effective environmental response, knowing the current status of the environmental impact of the fleet.
● CAI-Asia, established by the ADB, holds better air quality (BAQ) workshops, where approaches for reducing air pollution in Asian economies are discussed. At BAQ 2008 CAI-Asia invited transport companies from the Philippines and Indonesia and introduced the Toolkit to disseminate its use. Philippine Business for the Environment (PBE) is made up of corporations interested in environmental sustainability. PBE is the secretariat for the BAQ. BAQ's purpose is to disseminate the toolkit in collaboration with CAI-Asia because the Toolkit will help reduce environmental impacts. Meralco is a major the Philippines logistics corporation and is interested in the Toolkit. With the support of CAI-Asia, it is using the Toolkit on a trial basis. Japanese automotive manufacturers such as Isuzu and Honda participate in PBE. They cooperate with CAI-Asia to promote the Toolkit in the Philippines to support effective vehicle management by the client corporations and to promote Eco-Drive.

4. Contents of implementation

● The Toolkit has four steps and 18 items for vehicle management (**Figure 2-63**). There are 18 spreadsheets in the Toolkit. When the vehicle status is entered, the environmental impact and the effect of the environmental response are automatically calculated.
● TNT developed the Toolkit with UNEP and started using it in Turkey in 2006. In 2009, UNEP had a clean-fleet strategy workshop. The transport corporations that participated provided in advance the calculated data using the Toolkit, and they discussed effective vehicle management methods.

Figure 2-63: Toolkit structure



Source: UNEP

5. Outcome

- Meralco, a participant in PBE, received support from CAI-Asia and experimented with the kit in 2009 for effective vehicle management. Meralco established a team to utilize the Toolkit. It collects data, analyzes the issues, sets the targets, discusses the strategy, executes and monitors it. Meralco targets improvements in fuel cost, CO_2 emissions, repair costs, fleet utilization, productivity, regulatory compliance and corporate image as the goals for utilization of the Toolkit.
- An effective environmental response was done, including low environmental impact driving, improvement of vehicle maintenance and management and understanding of the environmental impact by vehicle type and size. Meralco improved the fuel efficiency of the total fleet by 16.6% between 2008 and 2009. Reductions in air pollutant emissions were 1.5% ~ 6%. Reduction of CO_2 emissions was 9.9%. Meralco reduced the fuel cost by fuel efficiency improvements, contributing to increases in revenue.

6. Key success factors

[Setting effective process]

- It is important to have a system to reduce the burden on transport companies that use the Clean Fleet Management Toolkit with Low Environmental Impact. The Toolkit has 18 spreadsheet tools. When vehicle data is entered, the environmental impact and response effect are automatically calculated.

[Utilizing technology and know-how]

- It is important to prepare the support for transport companies being able to easily use the Toolkit in daily operations and also to understand the transport business. The Toolkit is supported by UNEP, developed in cooperation with the global logistics company TNT. In the Philippines CAI-Asia is supporting use of the toolkit.

[Promoting motivations among concerned parties]

- To encourage wide use of the Toolkit, it is important to show the effect of fuel efficiency on fuel costs when the Toolkit is used by transport companies. With Meralco, the Toolkit was used and the fuel efficiency increased, which saved fuel costs while reducing air pollutant and CO_2 emissions. This was widely introduced through the CAI-Asia website.

1. Basic information

1-1. Economy	● The Philippines
1-2. Aspects of Quality Transport	● Reducing CO_2 emissions ● Saving fuels ● Industrial development ● Debt sustainability
1-3. Transportation mode	● Land transportation (road)
1-4. Project name	● E-Trike Introduction
1-5. Major implementer	● ADB, DOTC, DOE, DOF, City of Mandaluyong
1-6. Site	● Mandaluyong
1-7. Period	● Since 2012
1-8. Total cost	-

2. Summary

- ADB is introducing the electric trike in the urban areas of The Philippines. Trikes are a popular transportation means. In 2011, 20 E-Trikes were introduced. 100,000 E-Trikes will be deployed between 2012 and 2016.
- In the pilot project in 2011, ADB purchased and distributed E-Trikes free of charge. ADB will continue to support the project, with plans for it becoming commercially viable from 2012 on.
- ADB is planning to demonstrate to E-Trike users the benefits of increased revenue and reduction of fuel costs and CO_2 emissions.

3. Background and purposes

- In the urban areas of the Philippines, buses, jitneys, and trikes, which are tricycle cars, are well developed forms of public transportation. However most of these vehicles use the old-style engine. Out of these, there are 3.5 million trikes. Trikes are a popular means of transportation for short distances at low cost. However, they are the source of a great deal of air pollution and GHG.
- ADB is working on low-pollution fuel promotion in addition to upgrades of public transportation for the transport sector global warming response. ADB is located in the City of Mandaluyong in the Manila metropolitan area. It collaborates with the Philippines' government agencies DOTC, DOE, the Department of Finance (DOF) and Mandaluyong to reduce the environmental impact from trike exhaust. Beginning in 2011, a trike with a lithium-ion (Li-ion) battery, which are batteries used for laptop computers and mobile phones, the E-Trike is the electrically powered trike with no air pollutants or GHG. ADB has introduced 20 E-Trikes in 2011 in Mandaluyong to see the outcome. From 2012 to 2016, ADB plans to introduce 100,000 E-Trikes, including in areas other than Mandaluyong.

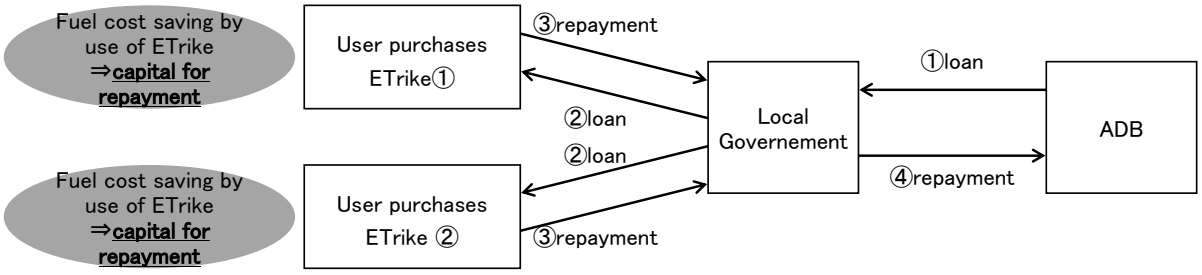
4. Contents of implementation

- In the 2011 pilot project, ADB purchased E-Trikes. DOTC registered them, DOE made the plan, and DOF was in charge of dealing with the funding with ADB. Mandaluyong is managing the entire project. ADB explained to trike users about the low environmental impact and reduced fuel cost of E-Trikes, then provided 20 of them free of charge. Four charging stations were installed. The E-Trike used the Li-ion battery with parts produced in China and assembled in

the Philippines, thus contributing to the local electric vehicle industry.

- Starting in 2012, the E-Trike project will expand to areas outside of Mandaluyong. ADB will give low-interest loans to local governments to purchase E-Trikes. E-Trike users will pay off the loans to the local governments out of their fuel cost savings. The plan is for this to become a viable business model (**Figure 2-64**). The cost of an E-Trike will rise due to the expense of Li-ion batteries, but it is estimated that the cost can be recouped from two years of fuel savings.

Figure 2-64: E-Trike use after 2012



Source: Interview with ADB

5. Outcome

- In 2011, ridership and revenue increased in the E-Trike pilot project by appealing to the environmental consciousness of the riders and the reduction of fuel costs for riders. Air pollution and GHG were reduced.
- ADB has estimated the effect of the E-Trike starting in 2012. The annual fuel cost reduction for introducing E-Trike will be 185 million pesos (US$4.7 million). CO_2 emissions will be reduced by 400,000t.

6. Key success factors

[Setting effective implementation method]

- It was important that the introduction of the E-Trike was led by the government sector. In the future, it is likely the private sector will be able to generate revenue independently and grow the market. To jump-start the market, ADB purchased and gave away E-Trikes in 2011, but from 2012 on it will promote the purchase of E-Trikes through loans to local governments and move the E-Trike into the private market.

[Utilizing technology and know-how]

- It is important for ASEAN economies to produce E-Trike parts in their own economies and sell them so that the electric vehicle industry can grow. Currently in the Philippines, parts of the Li-ion battery are imported from China. But as the E-Trike becomes widely used, the electric vehicle industry will be stimulated to the degree that the parts can be produced domestically,

[Promoting motivations among concerned parties]

- For the E-Trike to become a viable business, it is important to show trike users that it leads to increased revenue and is environmentally sustainable. For this, ADB is saying that the extra cost of the E-Trike, compared to the regular trike, can be recouped with the savings in fuel cost. Additionally, deploying 100,000 E-Trikes will reduce the burden of fuel costs on society and reduce CO_2 emissions.

1. Basic information

1-1. Economy	● The Philippines
1-2. Aspects of Quality Transport	● Reducing CO_2 emissions ● Saving fuels
1-3. Transportation mode	● Maritime transportation
1-4. Project name	● Power Supply from the Shore to Ro-Ro Ships
1-5. Major implementer	● PPA, Port of Cagayan De Oro
1-6. Site	● Port of Cagayan De Oro
1-7. Period	● Since 2007
1-8. Total cost	-

2. Summary

● Starting in 2007, power from hydro-generation was supplied to Ro-Ros berthed in the Port of Cagayan De Oro to reduce the power produced with diesel generators.
● PPA built the power supply system from shore to the ships in the Port of Cagayan De Oro.
● PPA funds the construction from the electricity payments by maritime transport companies that berth Ro-Ros in the port. This has reduced the fuel cost of the companies.

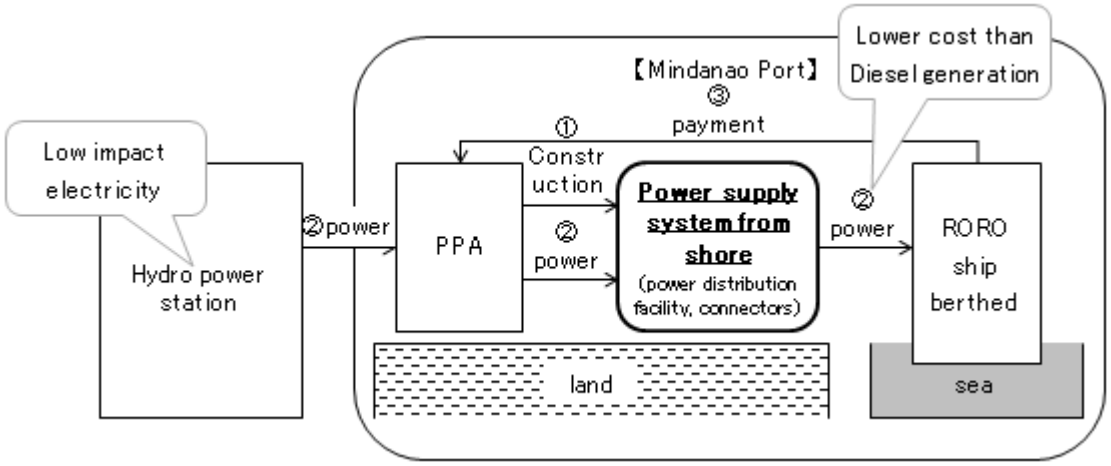
3. Background and purposes

● Cagayan De Oro is located north of Mindanao Island. Cargo totaling 3.66 million tons and 1.06 million passengers passed through the port in 2009. It is the 3rd largest government-managed port after Manila and Cebu. ("Port of Cagayan De Oro Transport Status", MLIT 2011) The Port of Cagayan De Oro is managed by PPA.
● Ships need electricity for telecommunications and other functions even in port. Conventionally, this power has been generated onboard with diesel fuel. Maritime companies with ships in Cagayan De Oro requested PPA to help reduce their fuel costs by supplying inexpensive power from shore. The power supply of Cagayan De Oro comes from hydro generators on Mindanao. PPA started supplying power to the Ro-Ros from shore starting in 2007. It has not only reduced the diesel fuel cost for the maritime corporations but also reduced the environmental impact by using renewable hydro-generation. PPA is looking at the possibility of expanding this system to other ports.

4. Contents of implementation and outcome

● PPA built the substation and distribution system and connections for Ro-Ros in the Port of Cagayan De Oro for power from hydro-generation (**Figure 2-65**). Maritime companies pay PPA for the electricity.
● These payments cover the cost of building the new infrastructure. In addition the cost of power generation for the Ro-Ros has been reduced. The new system is very popular. PPA also reduced overall GHG emissions from power generation.

Figure 2-65: Port of Cagayan De Oro power supply system from shore



Source: Created from PPA materials.

5. Key success factors

[Setting effective implementation method]

- In the shoreline power supply system it is important to supply power with low environmental impact to replace onboard diesel generation. The power supply system from shore to the Ro-Ros in the Port of Cagayan De Oro is from renewable hydro-generation on Mindanao Island.

[Utilizing technology and know-how]

- Utilization of hydro-generation is a major emphasis for the Clean Development Mechanism (CDM), which is the approach to reduce GHG emissions through international cooperation. The power supply system from shore to the Ro-Ros can receive cooperation from supporting organizations such as JICA if it is determined to qualify for the CDM.

[Promoting motivations among concerned parties]

- It is important to set a usage fee that can cover the cost of the infrastructure for the transmission, distribution and connection of hydro-generated power, but that is low enough so that transport companies have an incentive to replace power generated by diesel fuel. This is the case at the Port of Cagayan De Oro.

2-14. Singapore

(1) List of Cases

No.	Transportation mode	Project name	Aspects of Quality Transport
1	Land transportation (road and rail)	● Land Transport Master Plan 2013	● Better service ● Reducing travel time ● More transportation options ● Reducing traffic accidents ● Improving accessibility of transport facilities ● Reducing CO_2 emissions ● Reducing air pollution ● Reducing noise
2	Land transportation (road and rail)	● Smart Mobility 2030	● Providing information ● Punctuality ● Reducing traffic congestion ● Reducing traffic accidents ● Promoting technology development
3	Maritime transportation	● Maritime Singapore Green Initiative	● Reducing CO_2 emissions ● Reducing air pollution ● Saving fuels ● Promoting technology development

(2) Cases

1. Basic information

1-1. Economy	● Singapore
1-2. Aspects of Quality Transport	● Better service ● Reducing travel time ● More transportation means ● Reducing traffic accidents ● Improving accessibility of transport facilities ● Reducing CO_2 emissions ● Reducing air pollution ● Reducing noise
1-3. Transportation mode	● Land transportation (road and rail)
1-4. Project name	● Land Transport Master Plan 2013
1-5. Major implementer	● LTA
1-6. Site	● Nationwide
1-7. Period	● 2013 - 2030
1-8. Total cost	-

2. Summary

● In 2013, Singapore updated the Land Transport Master Plan. Its aim is to create a more people-centred land transport system.
● Many of the Land Transport Master Plan 2013 key initiatives are about user convenience, as seen in the expansion of the rail network and bus routes to improve the public transport system for citizens.

3. Background and purposes

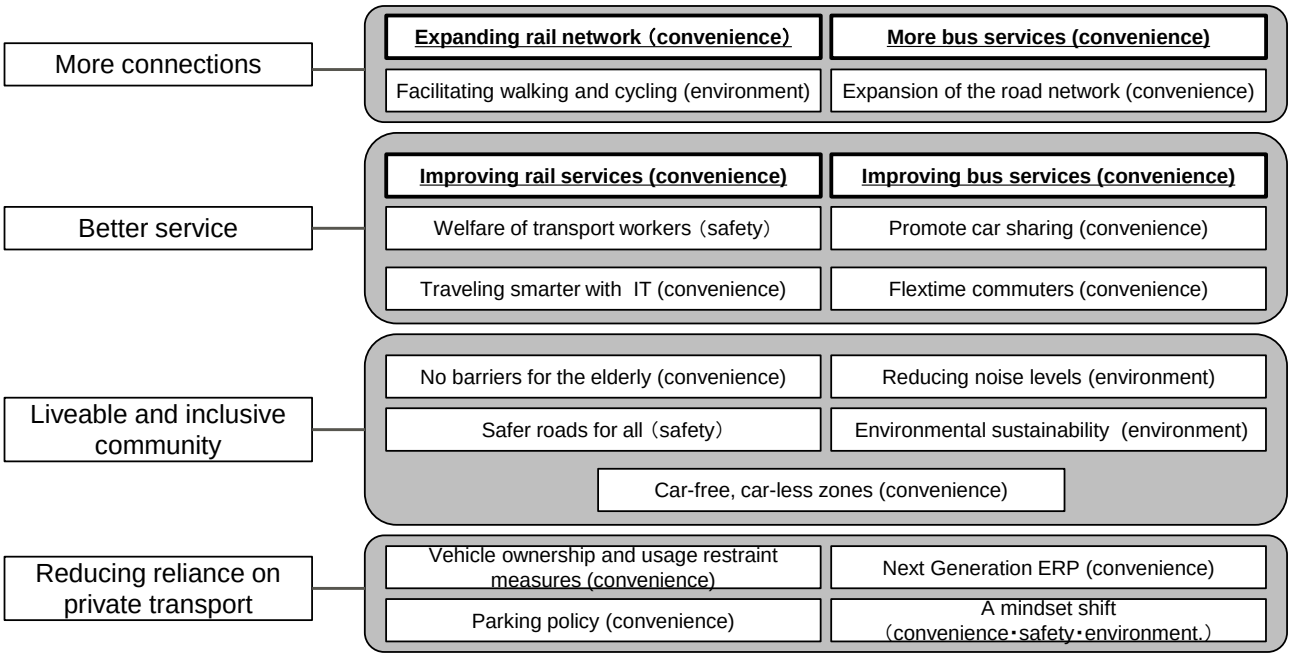
● In 2008, Singapore launched the Land Transport Master Plan. For Singapore to realise its aspirations to be a thriving global city, its transport infrastructure is critical. The transport system must support economic growth, a bigger population, higher expectations, and more diverse lifestyles. With this in mind, Singapore embarked on a comprehensive Land Transport Review in 2006 soliciting contributions from a broad spectrum of people including students, workers, employers, commuters, transport operators, and experts. The culmination of this effort is a Land Transport Master Plan to build and develop a more people-centred transport system that is technologically intelligent, yet engagingly human.
● In the updated Land Transport Master Plan 2013, the goals are for 80% of households to be within a 10-minute walk of a subway or railway station, travel time by public transport for distances less than 20 km to be under 60 minutes, and for 75% of travel at peak traffic times to be able to be accomplished using public transport. Under those goals, the following key initiatives were announced.
  -More Connections
  -Better Service
  -Liveable and Inclusive Community
  -Reducing Reliance On Private Transport

4. Major Policies

● The following figure shows 19 key initiatives under the Land Transport Master Plan 2013. There are 14 key initiatives under user convenience, 3 under safety, and 4 under the environment. It can be said that the Land Transport Master Plan 2013 places a high value on user convenience (**Figure 2-66**).
● Based on the Land Transport Master Plan 2013, LTA places especially high importance on

extension of the railway network and bus routes to improve convenience for subway and bus riders. By 2030, five new subway lines are to be constructed and there are plans to purchase 100 new railcars. The plan is to build 40 new bus routes and purchase 800 or more buses.

Figure 2-66: Land Transport Master Plan 2013 initiatives



Note: Bolded items show LTA's priorities.
Source: Created from the Land Transport Master Plan, LTA

5. Key success factors

[Utilizing technology and know-how]

- The goals of the Land Transport Master Plan 2013 are shortening the distance between the households and subway and train stations and shortening the travel time when using public transport. It places a high value on improving user convenience. The Land Transport Master Plan 2013 has announced many key initiatives for extending the railway network and bus routes.

1. Basic information

1-1. Economy	● Singapore
1-2. Aspects of Quality Transport	● Providing information ● Punctuality ● Reducing traffic congestion ● Reducing traffic accidents ● Promoting technology development
1-3. Transportation mode	● Land transportation (road and rail)
1-4. Project name	● Smart Mobility 2030
1-5. Major implementer	● LTA
1-6. Site	● Nationwide
1-7. Period	● 2014 - 2030
1-8. Total cost	-

2. Summary

● LTA and the Intelligent Transportation Society Singapore (ITSS) reviewed the first ITS master plan and formulated "Smart Mobility 2030," This plan consolidates perspectives from both the Authority and the industry, paving the way for a more comprehensive and sustainable ITS ecosystem in Singapore.

● Smart Mobility 2030 includes the latest ITS initiatives and technological advancements from ITS-related corporations and places emphasis on ITS solutions to manage traffic more efficiently.

3. Background and purposes

● Singapore's first ITS Master Plan was developed in 2006. The changing social and economic landscape over recent years has brought about new transportation challenges. The evolution of smart mobile devices in recent years has also provided new opportunities. In the past, ITS was often reliant on infrastructure. Today greater emphasis is placed on data collection, analytics and the availability of relevant information on-the-move. On top of this, advancement in transport technologies has also enabled us to better optimize the transportation network and enhance user's experience. Therefore Singapore has reviewed its ITS Master Plan so that we can effectively tap on these technological advancements and map out the overall direction for future ITS developments.

● The planned time frame for "Smart Mobility 2030" is from 2014 to 2030. Its key strategies are the proliferation of ITS solutions through developing and adopting standards, implementing ITS with innovative smart mobility solutions, and establishing close partnerships between the public and private sectors. The following are the four focal areas to leverage ITS initiatives:

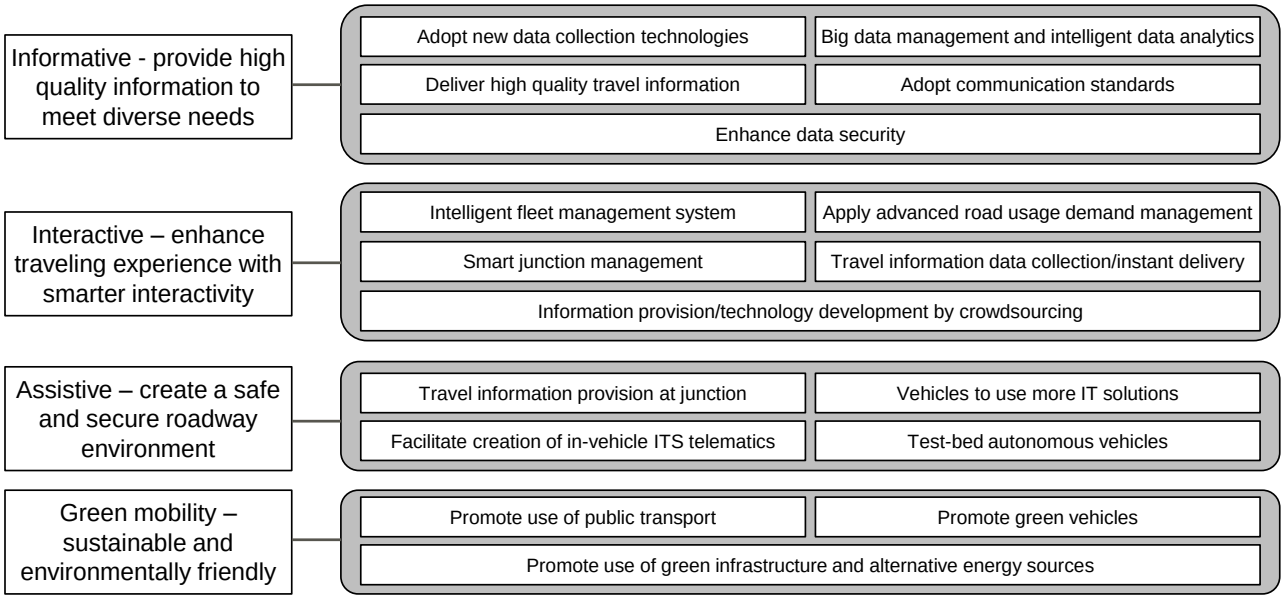
-Informative - provide high quality information to meet diverse needs
-Interactive - enhance traveling experience with smarter interactivity
-Assistive - create a safe and secure roadway environment
-Green Mobility - sustainable and environmentally friendly ITS

4. Development and Major Policies

● Smart Mobility 2030 is jointly launched by LTA and ITSS, Singapore's society of ITS-related corporations. It includes ITS-related technologies that could be offered by these corporations by 2030.

● The outline of Smart Mobility 2030 is shown in the **Figure 2-67**. The data management initiative was the first to be listed based on the latest technological advancements in ITS.

Figure 2-67: Outline of Smart Mobility 2030



Source：Smart Mobility 2030 by LTA

5. Key success factors

[Setting effective Implementation method]

- Technology related to ITS is advancing rapidly. Developing an ITS plan requires a grasp of the trends in deliverable technological developments taking place in ITS-related corporations. For this reason, LTA joined with ITSS to incorporate ITS technologies that can be delivered in 2030.

[Utilizing technology and know-how]

- LTA launched Smart Mobility 2030 to keep pace with technological advancements in ITS. In the past, ITS focused on infrastructure-related implementations, under Smart Mobility 2030 greater emphasis is placed on management and monitoring of vehicle travel data.

1. Basic information

1-1. Economy	● Singapore
1-2. Aspects of Quality Transport	● Reducing CO_2 emissions ● Reducing air pollution ● Saving fuels ● Promoting technology development
1-3. Transportation mode	● Maritime transportation
1-4. Project name	● Maritime Singapore Green Initiative
1-5. Major implementer	● MPA
1-6. Site	● Nationwide
1-7. Period	● 2011 - 2016
1-8. Total cost	● SS$100 million (US$75 million)

2. Summary

● MPA implemented the Maritime Singapore Green Initiative from 2011 to 2016, comprising (1) the Green Ship Programme, (2) Green Port Programme and (3) Green Technology Programme. MPA provides grants to maritime transport companies that work to reduce their environmental impact.

3. Background and purposes

● In 2011, MPA pledged to invest up to SGD100 million over a five-year period to support its Maritime Singapore Green Initiative (MSGI), which comprises the Green Ship, Green Port, and Green Technology programmes. These are voluntary programmes designed to recognise and incentivise maritime companies to adopt clean and green shipping practices to meet IMO conventions. Maritime companies were also invited to take the Maritime Singapore Green Pledge to indicate their commitment in promoting clean and sustainable shipping in Singapore.

4. Contents of implementation

[(1) Green Ship Programme]

● The Green Ship Programme encourages shipowners of Singapore vessels to adopt energy-efficient ship designs that reduce emissions and energy consumption. To qualify, ship owners must prove that the energy efficiency design of the ship exceeds IMO's requirements on EEDI for that particular ship type and size. The Green Ship Programme also encourages ships to reduce sulphur oxide (SO_x) emissions via the installation of approved scrubber technology. To qualify for incentives relating to the adopt of energy efficient ship designs, ship owners can submit a copy of the International Energy Efficiency (IEE) Certificate or pre-verification report as proof that the attained EEDI of the ship exceeds the IMO's requirements on EEDI for that particular ship type and size (at the time when the incentives are to be applied). To qualify for incentives relating to the adoption of approved SO_x scrubber technology, ship owners are to make an application to MPA. The application is to include supporting documents showing the installation of the scrubber and the emission reductions achieved.

[(2) Green Port Programme]

● The Green Port Programme encourages ocean-going ships calling at the Port of Singapore to reduce the emission of pollutants like sulphur oxides and nitrogen oxides via reduction of port dues whether at berth or throughout the vessel's port stay. The Green Port Programme is only valid for ocean-going ships. The port dues reduction is not applicable to harbour or pleasure craft. Ships currently under annual port dues scheme may participate and enjoy the port dues reduction if the ship uses approved abatement/scrubber technology or burn clean fuels for every call to Singapore. To participate in the Green Port Programme, shipowners/charterers must perform the following:

  ➢ A. Register owned/chartered ships under the Green Port Programme fleet. A one-time

registration via Marinet is required for all ships.

- B. Make a declaration for every port call. Prior to arrival into Singapore Port Limits, the master, owner or agent must make a declaration through the latest version of the Electronic Pre-Arrival Notification (ePAN) or the manual Notification of Arrival (NOA). Annex B of the Green Port Programme annexes shows the relevant portion of the ePAN pertaining to the Green Port Programme declaration.
- C. Maintain relevant records. Supporting documents should be kept for a period of 1 year from the time of declaration and be made available to MPA upon request.

● To qualify for the 25% reduction in port dues, the following must be adhered to:

- Ships using approved abatement/scrubber technology should maintain its use throughout the port stay (from point of entry into Singapore Port Limits till point of exit).
- Ships burning clean fuels should initiative the switch to clean fuels for the main engine and auxiliary engine before entering Singapore Port Limits. The use of clean fuels should be maintained throughout the port stay to qualify for the concession.

● To qualify for the 15% reduction in port dues, the following must be adhered to:

- Ships using approved abatement/scrubber technology should maintain its use while at berth to qualify for the port dues reduction.
- Ships burning clean fuels should initiate the switch to clean fuels for the main and/or auxiliary engine within 1 hour after completion of berthing. The use of clean fuel should be maintained throughout while the ship is at berth. The switch over from clean fuels should only be initiated 1 hour before unberthing.

[(3) Green Technology Programme]

● The Green Technology Programme aims to help local maritime companies develop and adopt green technologies via a co-fund scheme. The Green Technology Programme is open to Singapore-registered companies engaging in maritime-related businesses such as terminal operations, ship operations and harbour craft operations. Where projects involve ships or harbour craft, the ships or harbour craft must be Singapore-registered and must remain under the Singapore Registry of Ships for a specified period upon completion of the project. Projects should also meet the following criteria:

● Have verifiable emissions (SO_x, NO_x, CO_2) reduction results that comply with industry performance guidelines.

● Have not been commonly deployed in the maritime industry.

● Should be type approved where relevant.

● Have system integration design and retrofitting or installation done in Singapore.

5. Outcome

● Since its launch, the Maritime Singapore Green Initiative has garnered huge support from the maritime community. As at the end of January 2015, 90 companies had signed the Maritime Singapore Green Pledge; 206 Singapore-flagged ships qualified for the Green Ship programme; companies that have enjoyed port dues concessions under the Green Port programme include Maersk Line, Hoegh Autoliners, Ocean Tankers, Wallenius Wilhelmsen Logistics and Hanjin Shipping; 21 projects have been approved under the Green Technology programme.

6. Key success factors

[Promoting motivations among concerned parties]

● There are various sources of environmental impact in the maritime transport sector. For efforts to be effective, it is important to promote varied programmes to reduce environmental impact. Under the Maritime Singapore Green Initiative, reduction of the environmental impact relating to ships and ports is promoted through the Green Ship Programme and the Green Port Programme. The Green Technology Programme promotes environmental protection by providing grants to maritime business corporations developing technologies to reduce environmental impact.

2-15. Chinese Taipei

(1) List of Cases

No.	Transportation mode	Project name	Aspects of Quality Transport
1	Land transportation (road)	● Vehicle Cleaning Pool	● User friendly device ● Reducing air pollution
2	Land transportation (road)	● i^3 Travel Project	● Reducing CO_2 emissions ● Reducing air pollution ● Reducing noise ● Protecting regional environment ● Promoting technology development
3	Land transportation (road)	● YouBike	● Better service (transport and shopping) ● Better transport facilities ● User friendly device ● Preferred fare system ● Enhancing manner ● Reducing CO_2 emissions
4	Land transportation (road)	● Connected-Vehicle Technology Development and Its Demonstration in Road Safety and Mobility	● Providing information ● Reducing traffic congestion ● Reducing traffic accidents ● Promoting technology development
5	Land transportation (rail)	● TRA Rapid Transit Systematization Project	● Better service (transport and shopping) ● Better transport facilities ● User friendly device ● Reducing travel time ● Reducing congestion ● Seamless transfer

(2) Cases

1. Basic information

1-1. Economy	● Chinese Taipei
1-2. Aspects of Quality Transport	● User friendly device ● Reducing air pollution
1-3. Transportation mode	● Land transportation (road)
1-4. Project name	● Vehicle Cleaning Pool
1-5. Major implementer	● Taiwan International Ports Corp.
1-6. Site	● Kaohsiung Port
1-7. Period	● From July 2009
1-8. Total cost	● NT$ 32 million (US$1 million)

2. Summary

- Kaohsiung Port is facing air pollution caused by the fugitive particulate pollutants on the surface of trucks. Since July 2009, Kaohsiung Port has introduced a vehicle cleaning pool which is an automatic car wash system
- Vehicles can pass the vehicle cleaning pool for a short time. It is mandated to go through the vehicle cleaning pools by the guideline of the Environmental Protection Administration

3. Background and purposes

- Docks No. 48 to No. 56 in Zhongdao Commercial Port of Kaohsiung Port are the loading areas for large bulk and sundry goods. The types of goods are mainly coal, scrap iron, wood dust, gravel and cement clinker that produce particle pollution; most of the goods are transported to other places by truck. Nearly 100,000 trucks enter or leave the Port every year.
- As a result, the fugitive particulate pollutants on the surface of trucks affect the air quality at the Port, the export processing zone and the neighboring communities. It is necessary for Kaohsiung Port to reduce air pollution caused by vehicles in the port.

4. Content of implementation

- In order to reduce fugitive dust pollution caused by vehicles entering and leaving Kaohsiung Port and to meet the requirements of the Guidelines for Fugitive Sources Control and Management established by the Environmental Protection Administration, in July 2009 the Kaohsiung branch of TIPC set up 4 qualified automatic car wash systems (vehicle cleaning pools) at the exit of the loading area for large bulk and sundry goods in Zhongdao Commercial Port, at a cost of NT$ 32 million (US$ 1 million) (**Figure 2-68**). The body shell and tires of a vehicle must be washed with high-pressure water jet equipment before leaving the Port.

Figure 2-68: Vehicle cleaning pools in Kaohsiung Port

Source: MOTC

5. Outcome

- It is mandatory for all vehicles entering and leaving Kaohsiung Port are to be washed by the vehicle cleaning pools. 99% of the vehicles go through the vehicle cleaning pools to remove surface fugitive particulate pollutants, with the result that air pollution is being mitigated around the Kaohsiung Port.

6. Key success factors

[Utilizing technology and know-how]

- To remove fugitive particulate pollutants on surface of vehicles, Kaohsiung Port has introduced the vehicle cleaning pool, which is an automatic car wash system. Therefore, vehicles entering and leaving Kaohsiung Port can pass through the vehicle cleaning pool in a short time.

[Promoting motivations among concerned parties]

- The guideline of the Environmental Protection Administration mandates all vehicles entering and leaving Kaohsiung Port to go through the vehicle cleaning pools.

1. Basic information

1-1. Economy	● Chinese Taipei
1-2. Aspects of Quality Transport	● Reducing CO_2 emissions ● Reducing air pollution ● Reducing noise ● Protecting regional environment ● Promoting technology development
1-3. Transportation mode	● Land transportation (road)
1-4. Project name	● i^3 Travel Project
1-5. Major implementer	● Ministry of Transportation and Communications (MOTC)
1-6. Site	● Sun Moon Lake in Nantou County
1-7. Period	● From February 2011- December 2014
1-8. Total cost	● US$ 6.7 million (including external investment)

2. Summary

● The number of tourists in Sun Moon Lake has been increasing, which causes regional environmental problems. The i^3 Travel Project offered location-based service transportation and travel information with seamless public transportation

● With the i^3 Travel Project, the modal split of private transportation means fell and CO_2 emissions was reduced

3. Background and purposes

● In recent years, more and more people emphasize leisure activities, resulting in cars flooding scenic areas almost every holiday. For example, the number of tourists visiting Sun Moon Lake in 2011 was only 5.33 million, but in 2012 it exceeded 8 million. However, this significant increase in visitors has not only caused serious traffic congestion, but has also resulted in the gradual deterioration of air quality, and it is likely to reduce the overall quality of tourism services in the Sun Moon Lake area in the future.

● The Institute of Transportation, MOTC, has proposed the i^3 Travel Project - Loving Travel project to solve the problems currently faced and to plan future developments by cooperating with the Administration of the Sun Moon Lake National Scenic Area. The main ideas of the i^3 Travel Project are to be innovative, intelligent, and interesting, which means the project expects to offer tourists “innovative” thought and “intelligent” information services to make the travel experience more “interesting”.

4. Content of implementation

● Since February 2011 to December 2014, the i^3 Travel Project offered location-based service transportation and travel information with seamless public transportation as follows. Its total cost was US$ 6.7 million, including external investments.

(I) Smart electric vehicle sharing services (**Figure 2-69**)

- High-quality electric vehicles (iQ-EV) are used through a sharing scheme to allow tourists in the lake area to experience the beauty of Sun Moon Lake. Each electric vehicle is equipped with Advanced Navi Services (ANS), which use the concept of information services in future cars to develop an exclusive travel navigation system aimed at the characteristics of tours at

Sun Moon Lake.

(II) Electric buses for new low-carbon lake services

- Electric buses thus replaced the original diesel lake buses. The buses are also equipped with multimedia audio tours and dynamic information display systems, allowing Sun Moon Lake National Scenic Area to become the first National Scenic Area in Chinese Taipei to make complete use of electric buses.

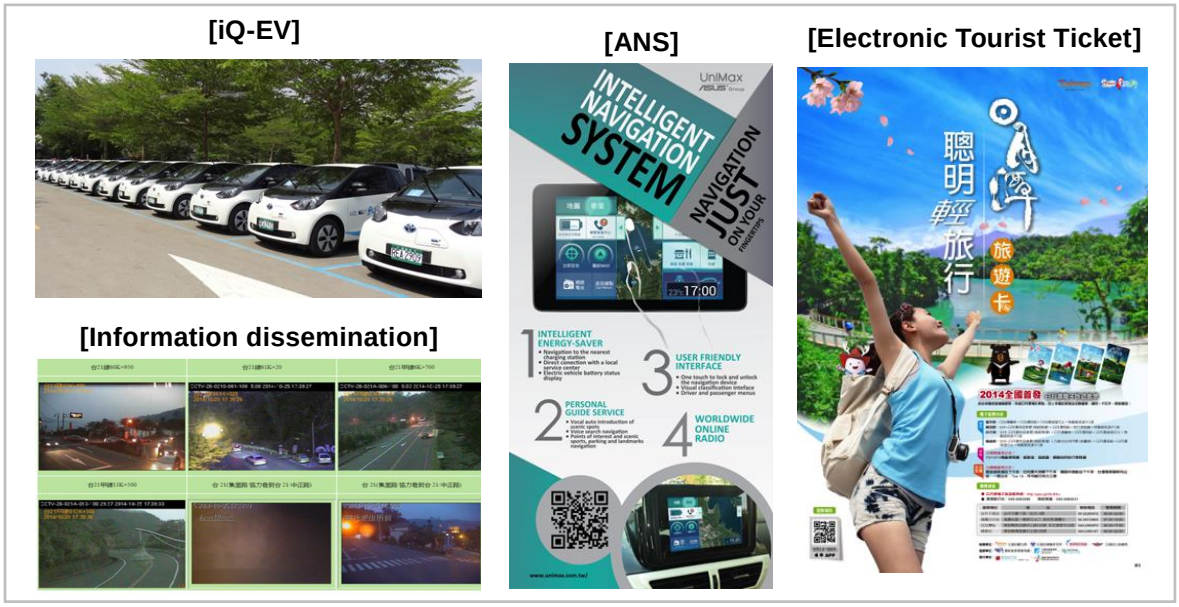
(III) Seamless information dissemination platform (**Figure 2-69**)

- This measure effectively facilitates the execution of traffic control measures and evacuation operations for large-scale activities.

(IV) Innovative services for Sun Moon Lake low-carbon tourism (**Figure 2-69**)

- A single electronic ticket combines various transportation systems, attractions, and featured local businesses to construct solutions for smart transportation and low-carbon tourism.

Figure 2-69: Pictures of the i3 Travel Project



Source: MOTC

5. Outcome

- The modal split of private transportation means in the Sun Moon Lake fell to 34% from 41.7%. With the low-carbon transportation system in the i^3 Travel Project, 96,000t-CO_2 was reduced. It is estimated that CO_2 emissions will be reduced by 670,000t-CO_2 per year by 2020 if the low-carbon transportation system is promoted.

6. Key success factors

[Utilizing technology and know-how]

- The i^3 Travel Project established convenient smartphone app services that are easy to use. In addition, each electric vehicle at Sun Moon Lake is equipped with ANS that can provide location-based multimedia information services for tourists, creating a safe and in-depth tourism site.
- Chinese Taipei's largest electronic ticketing system, EasyCard, has been introduced in the i^3 Travel Project. In addition to allowing tourists to use the various low-carbon transportation tools conveniently, the i^3 Travel Project also integrated high-quality medium- and small-sized businesses in the Sun Moon Lake area to help expand the exceptional special services available locally.

1. Basic information

1-1. Economy	● Chinese Taipei
1-2. Aspects of Quality Transport	● Better service (transport and shopping) ● Better transport facilities ● User friendly device ● Preferred fare system ● Enhancing manner ● Reducing CO_2 emissions
1-3. Transportation mode	● Land transportation (road)
1-4. Project name	● YouBike
1-5. Major implementer	● Taipei City
1-6. Site	● Taipei
1-7. Period	● From December 2012 - December 2018
1-8. Total cost	● NT$ 308.2 million (US$ 10 million)

2. Summary

● Taipei City has introduced YouBike which is a bike-sharing system for low carbon urban transportation. Taipei City has been improving convenience of YouBike such as increasing rental kiosks and setting a clear fare system.

● YouBike registers over 70,000 pick-ups per day, and 90% of users are positive about YouBike.

3. Background and purposes

● The climate has changed rapidly in recent years; all economies in the world are paying more attention than before to environmental protection and sustainable development issues such as carbon reduction. Therefore, encouraging public transport and reducing the use of private motorized vehicles is an important issue for the city's carbon reduction efforts.

● Taipei already has convenient public transport systems, such as the metro and bus systems. In order to make the public transport network even better, Taipei promoted a public bike trial project called YouBike in 2009.

4. Content of implementation

● YouBike is a bike-sharing system in Taipei City. YouBike, which can be easily registered to rent and can also be rented and returned to any station, provides automatic service 24 hours a day. As of 2014, there are 196 stations and 6,406 bikes in Taipei City. Taipei City conducted a three-year demonstration program of YouBike. During the period no thefts were reported and all bikes were in good condition.

Figure 2-70: Rental kiosk of YouBike

Source: MOTC

● As residents need nearby rental kiosks of YouBike for better use, Taipei City has set a policy to increase the rental kiosks from 162 at first to 300 rental kiosks within 250 to 300 meters. Taipei City set a clear YouBike fare system of NT$10 (US$ 0.3) per 30 minutes for easy understanding by

residents. Taipei City set a lower rate (NT$ 5 (US$ 0.15)) for the first 30 minutes of YouBike to promote its use.

5. Outcome

- YouBike registers over 70,000 pick-ups per day. On average, every YouBike gets over 12 pick-ups daily. YouBike is likely the most extensively used and most user-friendly bike sharing system in the world.
- An opinion poll revealed that Taipei residents are very supportive of YouBike: over 90% of the users give YouBike a positive rating. YouBike is also very popular among international tourists. YouBike, as an eco-friendly means of transport, has become one of the best practices in the world.

6. Key success factors

[Setting effective implementation method]

- Taipei City has been increasing rental kiosks of YouBike for easy access. The number of rental kiosks of YouBike will be increased from 162 to 300.

[Promoting motivations among concerned parties]

- To promote YouBike use by residents, Taipei City has set a clear fare system: NT$ 10 (US$ 0.3) per 30 minutes and a lower rate (NT$ 5 (US$ 0.15) for the first 30 minutes, in order to increase use over short distances.

1. Basic information

1-1. Economy	● Chinese Taipei
1-2. Aspects of Quality Transport	● Providing information ● Reducing traffic congestion ● Reducing traffic accidents ● Promoting technology development
1-3. Transportation mode	● Land transportation (road)
1-4. Project name	● Connected-Vehicle Technology Development and Its Demonstration in Road Safety and Mobility
1-5. Major implementer	● Ministry of Transportation and Communications (MOTC), Ministry of Economic Affairs (MOEA), Industrial Technology Research Institute (ITRI), Institute of Transportation (IOT)
1-6. Site	● Hsinchu City, Keelung City
1-7. Period	● February 2013 - December 2015
1-8. Total cost	● US$3 million

2. Summary

● MOTC and MOEA have been promoting the IoT-based cooperative ITS. In Hsinchu City and Keelung City, Institute of Transportation and ITRI have been conducting pilot projects by adopting WAVE/DSRC communication technology for vehicle-to-infrastructure (V2I) operations.

● With these projects, service quality and efficiency of bus operations have been improved. As a result, usage of private vehicles has been reduced, bringing environmental improvements.

3. Background and purposes

● The goals of the national transportation policy are to establish a smooth and convenient transportation system to provide safe and seamless high-quality transportation services and to create an energy-efficient and clean transportation environment. ITS further enhances the effectiveness of existing transportation systems through the use of information and communication technologies, providing benefits to the economy, society, and environment. This meets our vision of “establishing a living environment with human-oriented and sustainable smart transportation”.

● Recently, IoT-based cooperative ITS has been the future international trend in ITS development. Coordinated vehicle/infrastructure network operations are formed by vehicle-to-infrastructure (V2I), cloud computing, and big data processes. MOTC and MOEA will work together to respond to these trends and to coordinate with existing research and development outcomes to integrate the V2I operations of cooperative ITS in pursuit of safer, smarter, and cleaner transportation. ICT technology and applications are being developed to enable the connected vehicles and V2I to operate and demonstrate pilot projects in urban areas and freeways, particularly in the application of transit signal priority for bus operation in Hsinchu City and V2X operation in Keelung City.

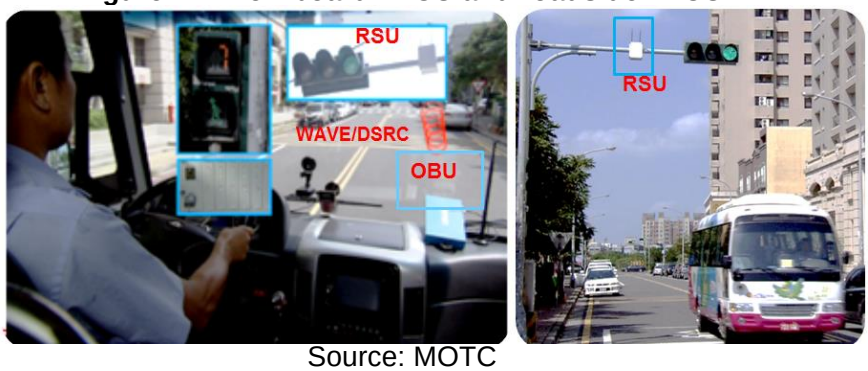
4. Content of implementation

● Wireless access in vehicular environments/dedicated short range communications (WAVE/DSRC) technology has been adopted by ITRI to develop WAVE/DSRC Communication Units (IWCU), and IWCUs have been used in Hsinchu City for transit signal-priority operations (**Figure 2-71**). Once a bus approaches the on-board IWCU’s trigger distance to the intersection, which is around 100 meters, the roadside IWCU sends a notification to the traffic signal controllers to activate its signal priority operations. Signal priority operation is based on

green-time-extension, red-time-reduction, or do nothing, depending on the current traffic signal phases.

- In Keelung City, V2I applications have been developed. Two categories of information will be processed and generated for safety, comfort, and efficient driving in this demonstration site: traffic-based information services and safety-based information services (**Figure 2-71**). Traffic-based information services include dynamic route guidance, travel time information, incident and accident information, and CCTV video; while safety-based information services provide real-time information on road construction, roads with high accident rates, traffic ahead, and traffic signal timing phase. The benefits of adopting V2I technology for pedestrians and motorcycles are also considered and performed in this pilot project.

Figure 2-71: on-board IWCU and roadside IWCU



Source: MOTC

Source: MOTC

5. Outcome

- The results of DSRC-based transit signal priority for bus operations in Hsinchu City have demonstrated the capability of DSRC to improve the service quality and efficiency of bus operations, and are also beneficial to the environment due to the increase in bus ridership, which consequentially reduces the usage of private vehicles.

6. Key success factors

[Utilizing technology and know-how]

- ITRI has developed WAVE/DSRC-based devices and V2I applications with the support of MOTC and MOEA.

1. Basic information

1-1. Economy	● Chinese Taipei
1-2. Aspects of Quality Transport	● Better service (transport and shopping) ● Better transport facilities ● User friendly device ● Reducing travel time ● Reducing congestion ● Seamless transfer
1-3. Transportation mode	● Land transportation (rail)
1-4. Project name	● TRA Rapid Transit Systematization Project
1-5. Major implementer	● Taiwan Railway Administration (TRA),MOTC
1-6. Site	● Western Line in Metropolitan Area
1-7. Period	● 2001 - 2017
1-8. Total cost	● NT$ 265.9 billion

2. Summary

● To meet commuters' great needs, TRA conducted the TRA Rapid Transit Systematization Project to reduce commuting time and improve utility.
● In the TRA Rapid Transit Systematization Project, TRA new facilities such as stations and trains while improving transfer facilities

3. Background and purposes

● TRA offers rapid transit services for commuters. From the business perspective, TRA should attract more short-distance customers and strengthen its transportation capacity in the western metropolitan region. It requires less new investment to strengthen the existing Western Line than to construct a new metropolitan MRT system.
● The TRA Rapid Transit Systematization Project includes railway elevation construction projects for the Western Line and improvement projects for its branch lines.

4. Content of implementation

● The TRA Rapid Transit Systematization Project took place from 2001 to 2017. It cost NT$ 265.9 billion. In the TRA Rapid Transit Systematization Project, TRA conducted the following measures (**Figure 2-72**):
(I) Establishing new stations to shorten the average distance between stations
(II) Increasing train services during rush hours
(III) Establishing one-hour commuting zones in metropolitan areas
(IV) Improving transfer facilities between TRA stations and other transportation means
(V) Promoting business functions at stations

Figure 2-72: Establishing new stations

[New station]

[New commuter train]

[Transfer facilities]

Source: MOTC

5. Outcome

- With the TRA Rapid Transit Systematization Project, people have a shorter commute in the western metropolitan area. This draws people to the western metropolitan area, which promotes regional development.

6. Key success factors

[Utilizing technology and know-how]

- The TRA Rapid Transit Systematization Project introduced new facilities such as stations and trains to reduce commuting time in the western metropolitan areas. It also improved transfer facilities for better connections with other transportation means.

2-16. Thailand

(1) List of Cases

No.	Transportation mode	Project name	Aspects of Quality Transport
1	Land transportation (road)	● Q Mark	● Reducing traffic accidents ● Reducing CO_2 emissions ● Reducing air pollution ● Saving fuels ● Improving work efficiency ● Industrial development
2	Land transportation (road)	● Improve the Stability of Buses	● Reducing traffic accidents
3	Land transportation (rail)	● Construction of Railway	● Reducing travel time ● More transportation options ● Reducing traffic accidents ● Reducing CO_2 emissions
4	Air transportation	● Gate Hold Manager (management at the time of aircraft takeoff)	● Reducing travel time ● Reducing CO_2 emissions ● Saving fuels

(2) Cases

1. Basic information	
1-1. Economy	● Thailand
1-2. Aspects of Quality Transport	● Reducing traffic accidents ● Reducing CO_2 emissions ● Reducing air pollution ● Saving fuels ● Improving work efficiency ● Industrial development
1-3. Transportation mode	● Land transportation (road)
1-4. Project name	● Q Mark
1-5. Major implementer	● MOT
1-6. Site	● Nationwide
1-7. Period	● Starting 2009
1-8. Total cost	-

2. Summary

● Truck transportation is the fundamental means of logistics in Thailand. MOT started to use the Q Mark in 2009 as a trucking certification system.
● The Q-Mark certification organization has committee members from Thai Transportation and Logistic Association and universities. They inspect items in 5 categories: the organization that does trucking in the logistics company, transport work, human resources, vehicles, and responsibility to the customer.
● Currently 214 companies have obtained the Q Mark. This represents 14% of the total number of logistics companies. The issue is how to promote this to small to midmarket logistics corporations that have difficulty investing the necessary resources.

3. Background and purposes

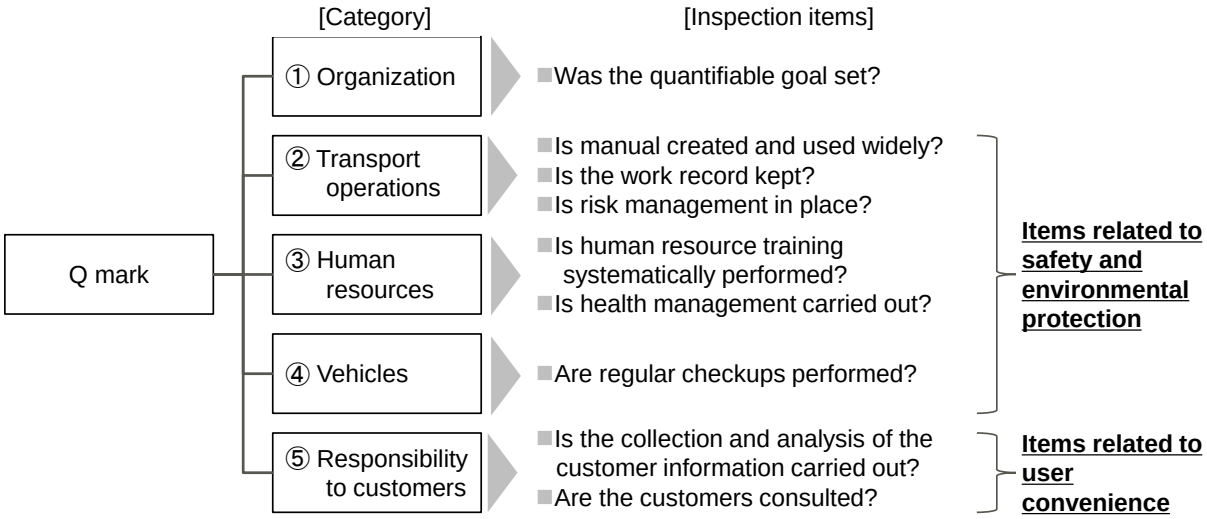
● Truck transport is the foundation of logistics in Thailand, with its advanced road development. For socioeconomic revitalization, it is important to improve trucking services. In 2009, MOT began using the Q Mark to certify trucking services and has been encouraging logistics companies to gain Q Mark certification.
● Small businesses to midmarket corporations make up 80% of logistics companies in Thailand. They tend to prioritize immediate profit over improvements in the trucking services that could require investment. Knowing this, MOT designed the certification system that logistics companies could accept by consulting with them and by explaining the effectiveness of obtaining the Q Mark and how it can benefit them.

4. Contents of implementation

● MOT established the certification organizations to inspect the logistics companies' trucking services. Experts from the trucking association and universities work as committee members, while MOT does overall supervision. A Q-Mark certification organization first inspects the trucking services of logistics companies as a test. After MOT confirms the quality of the inspection, it can become an official certification agency.
● Five categories are inspected for the logistics company's trucking service to receive the Q Mark: "organization," "transport work" regarding safety and environmental protection, "human resources," "vehicles" and "responsibility to customers," which is related to the convenience for cargo owners (**Figure 2-73**).
● There is a shortage of Q-Mark certification organizations. It is only possible to inspect 40 to 50 companies in the logistics industry a year to certify their trucking services. MOT is working on increasing the number of certification organizations. Currently, there are eight Q-Mark certification organizations undergoing test inspections of trucking services. It is expected that

they will become authorized certification organizations after confirmation by MOT.

Figure 2-73: Q Mark inspection categories and items



Source：Created from response by MOT to survey questionnaires

5. Outcome

- Currently, 214 companies have obtained the Q Mark, which is about 14% of the logistics companies. However, the small to midmarket logistics companies are not stepping up to improve trucking services, due to the potential for large investment. Their adoption rate of the Q Mark is slow. MOT recognizes that it is important to work with them to gain Q Mark certification in order to promote wider use of the Q Mark in the future.

6. Key success factors

[Setting effective implementation method]

- The quality of trucking services varies. For the effective use of the Q Mark, it is important to do a multifaceted review of the logistics company. Five categories are inspected for the logistics company's trucking service to receive the Q Mark: organization, transport work, human resources, vehicles and responsibility to customers in order to examine the convenience for cargo owners, cargo safety and environmental protection.

[Utilizing technology and know-how]

- It is important to utilize the know-how of experts who have hands on knowledge of the work, in order to inspect the logistics companies' trucking services for Q-Mark certification. Q-Mark certification organizations inspect logistics companies' trucking services with well-informed committee members such as the ones from trucking associations and from universities who can do the appropriate inspection.

[Promotion of motivation among concerned parties]

- Since there are many small to midmarket logistics companies in Thailand, it is important to raise the awareness about the quality of logistics companies' trucking services. At the same time, it is also important is to design the certification system that is not difficult for them to accept. MOT consults with logistics companies and explains the effectiveness of and the way to utilize the Q Mark, in addition to working on inspection items and the inspection method.

1. Basic information

1-1. Economy	● Thailand
1-2. Aspects of Quality Transport	● Reducing traffic accidents
1-3. Transportation mode	● Land transportation (road)
1-4. Project name	● Improve the Stability of Buses
1-5. Major implementer	● MOT
1-6. Site	● Nationwide
1-7. Period	● 2012
1-8. Total cost	● 170 million baht

2. Summary

● In Thailand, many traffic accidents occur due to bus rollovers. MOT started testing the stability of new large buses (coaches) in 2012. The coach is examined on a slope. Only the ones that pass the test may be licensed to operate commercially.
● To prepare for the testing coach stability, MOT consulted with coach operators and automotive manufacturers. The cost of test-slope construction is paid from the Road Safety Fund.

3. Background and purposes

● In Thailand, there are many rollover traffic accidents, such as with the double-decker chartered coaches, causing injuries and death. MOT analyzed the coach traffic accidents and found out that the cause is a lack of stability in the coaches.
● Given this, MOT spent 170 million baht to test the stability of new coaches starting 2012 so that the safety of the coaches can be ensured. Only the coaches that pass the test can be licensed for operation.

4. Contents of implementation

● The stability test for coaches was introduced in Thailand in 2012 and implemented starting 2013. The new coach is evaluated for stability on the test slope in the vehicle test center that is supervised by MOT.
● When the coach stability test was introduced, MOT consulted with coach operators and automotive manufacturers that would incur extra costs, in order to gain their agreement by explaining the necessity of ensuring coach safety. They discussed what would be the effective test methods. In addition, MOT held an auction of vehicle license plates to create the Road Safety Fund with the profit from those sales. The cost to construct the test slope was paid out of the Road Safety Fund.

5. Outcome

● All of the new coaches placed into operation in Thailand since 2013 have passed the stability test. It is expected that this will increase the safety by reducing traffic accidents from coach rollovers.

6. Key success factors

[Setting effective implementation method]
● To test coach stability, it is necessary to have equipment such as the test slope. It requires expenditures to pay for construction of the test slope. MOT uses the Road Safety Fund to pay for construction of the test slope in the vehicle inspection area.

[Promoting motivations among concerned parties]
● The new coach stability test requires coach operators and automotive manufacturers to shoulder extra costs. Opposition to the program was a realistic concern. Upon introduction of the coach stability test, MOT consulted with the coach operators and automotive manufacturers and discussed the effective test methods, while it explained the necessity of ensuring coach safety.

1. Basic information

1-1. Economy	● Thailand
1-2. Aspects of Quality Transport	● Reducing travel time ● More transportation options ● Reducing traffic accidents ● Reducing CO_2 emissions
1-3. Transportation mode	● Land transportation (rail)
1-4. Project name	● Construction of Railway
1-5. Major implementer	● SRT
1-6. Site	● Nationwide
1-7. Period	● 2012 to 2017
1-8. Total cost	● Approximately 21 billion baht

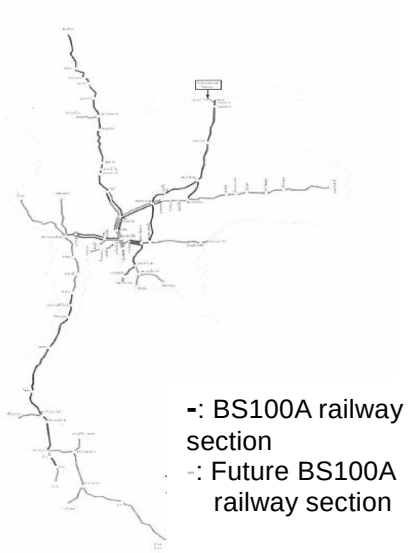
2. Summary

● With the support from MOT, SRT has been promoting the nationwide replacement of existing tracks with rail of the higher strength BS100A standard. This enables greater speed and loading capacity of the railcars.
● To revitalize international transport by rail, SRT developed the railways emphasizing the importance of the routes of SKRL and the national border with Cambodia.

3. Background and purposes

● In Thailand, railway construction is lagging. Domestic transport is more expensive by rail than by other means and is dependent on vehicle transport with a larger environmental impact such as CO_2 emissions. MOT is promoting modernization of the railway system to increase safety and efficiency and to reduce the domestic transport cost and to shorten transport time by increasing rail from its current share of 2% of all transport to 10% by 2020.
● For the modernization of the railway system, SRT receives support from MOT and is promoting track replacement with high-strength rail for the period of 2012 to 2017. With this, the loading capacity of the cars can be increased and trains can run faster.

Figure 2-74: Railway construction



Source: Created from MOT response to survey questionnaire

4. Contents of implementation

● SRT invested approximately 21 billion baht to replace existing track nationwide with high-strength BS100A-standard rail. The plan is targeted for completion in 2017 (**Figure**). In addition, SRT is constructing the railways emphasizing the importance of the border with Cambodia in the Southern Economic Corridor of the Mekong Region and SKRL.
● SRT has a shortage of railway construction employees. Out of concern that this may hinder progress, SRT is making efforts to hire new employees.

5. Outcome

- Replacing the tracks makes it possible to do rail transport of large numbers of people and a large volume of goods at high speed. It will lead to reductions in cost and time, and user convenience will be improved. It is also expected to have less environmental impact such as CO_2 emissions versus vehicle transport. In addition, train accidents will be reduced with high-strength rail, which will contribute to improvements in traffic safety.

6. Key success factors

[Setting effective implementation method]

- Industry has been increasingly concentrated in Thailand. The Mekong Region has an especially big influence on the regional economy. To revitalize international transport by rail, SRT is constructing the rail emphasizing the importance of the routes of the border with Cambodia and SKRL.

[Promoting motivations among concerned parties]

- It is very costly to implement the nationwide track replacement. SRT has secured the budget for the project supported by MOT.

1. Basic information

1-1. Economy	● Thailand
1-2. Aspects of Quality Transport	● Reducing travel time ● Reducing CO_2 emissions ● Saving fuels
1-3. Transportation mode	● Air transportation
1-4. Project name	● Gate Hold Manager (management at the time of aircraft takeoff)
1-5. Major implementer	● AEROTHAI
1-6. Site	● Suvarnabhumi International Airport
1-7. Period	● Starting 2012
1-8. Total cost	● US$ 15,000

2. Summary

- Gate Hold Manager focuses on airplanes waiting at the terminal building. It displays the time to move to the taxiway by considering the other airplanes that are taking off and the time to move from taxiway to runway so that it helps with the preliminary preparation and smooth movement.
- The introduction and utilization of Gate Hold Manager in the Suvarnabhumi International Airport, has increased the number of on-time departures and reduced CO_2 emissions by reducing fuel consumption.

3. Background and purposes

- Suvarnabhumi International Airport is a hub airport in Southeast Asia. It can handle 45 million passengers and 3 million tons of cargo a year. Recently, Suvarnabhumi International Airport became busier, so that landings and takeoffs became congested, causing schedule delays. The wait time for airplane takeoffs is especially increasing. As more fuel is consumed, CO_2 emissions are becoming greater.
- AEROTHAI provides wireless service. In 2012, Suvarnabhumi International Airport paid AEROTHAI US$15,000 to use their software product, Gate Hold Manager, to manage airplanes. This software reduced the wait time for airplanes to take off, increasing on-time departures and reducing CO_2 emissions due to less fuel being consumed.

4. Contents of implementation

- Gate Hold Manager works during periods when more than 4 airplanes are estimated to be waiting or many airplanes are taking off. It shows the time required to move from the terminal building to the taxiway where the airplane can start the engine while it considers the moving time to the runway from the taxiway and the other airplanes' takeoff conditions. The airplane waiting at the terminal for its turn can begin preparations by knowing in advance the time required to move to the taxiway. Therefore, it can move efficiently to shorten the waiting time. Gate Hold Manager can also modify the data such as the time required for an airplane to move, based on the actual status. This makes it possible to more accurately show the waiting airplane the time needed to move to the taxiway.
- AEROTHAI worked with Thailand AOT, which operates Suvarnabhumi International Airport, to explain the effectiveness and the method of using Gate Hold Manager and received the cooperation of the airlines. AEROTHAI provides the information of Gate Hold Manager to the airlines through the Internet and is making an effort to improve user convenience.

5. Outcome

- The takeoff congestion was mitigated by introduction and use of Gate Hold Manager at Suvarnabhumi International Airport. User convenience is improved as the number of on-time has departures has increased. In addition, CO_2 emissions were reduced in 2013, as fuel consumption was reduced by 20,000 tons.

6. Key success factors

[Setting effective implementation method]

- It is important for Suvarnabhumi International Airport to shorten the wait time for the airplanes taking off so that it can promote on-time departures and CO_2 emission reduction by reducing fuel consumption. Gate Hold Manager is focused on airplanes waiting at the terminal buildings. It considers other airplanes taking off and the time required to move from the taxiway to the runway. By showing the time it would take to move to the taxiway, the takeoff preparation and smooth movement are promoted.

[Utilizing technology and know-how]

- AEROTHAI provides wireless service. Gate Hold Manager uses wireless technology and shows the time to move to the taxiway for the airplane waiting to take off. It also provides the information to airlines over the Internet.

[Promoting motivations among concerned parties]

- In order to shorten the wait time for the airplanes to take off by using Gate Hold Manager, it is important for each airplane waiting at the terminal building to have an accurate estimate of the time needed to do good preparation to move to the taxiway. AEROTHAI works with Thailand AOT which operates Suvarnabhumi International Airport, to explain to airline companies the effectiveness of the system and how to utilize the wireless technology.

2-17. The United States

(1) List of Cases

No.	Transportation mode	Project name	Aspects of Quality Transport
1	Land transportation (road)	● Express Lanes	● User friendly devices ● Reducing traffic congestion ● Reducing air pollution
2	Land transportation (road)	● Automated Traffic Management (ATM)	● Providing information ● Reducing traffic accidents
3	Land transportation (road)	● Bicycle Lane	● Enhancing traffic manner ● Reducing traffic congestion ● Reducing traffic accidents ● Reducing CO_2 emissions
4	Land transportation (rail)	● High-Speed Rail	● Reducing travel time ● Punctuality ● Reducing CO_2 emissions ● Industrial development ● Job creation
5	Land transportation (rail)	● TriMet	● More transportation options ● Reducing CO_2 emissions ● Reducing air pollution ● Saving fuels
6	All modes	● Mitigating Environmental Impact in Construction of Transport Infrastructure	● Protecting regional environment

(2) Cases

1. Basic information

1-1. Economy	● The United States
1-2. Aspects of Quality Transport	● User friendly devices ● Reducing traffic congestion ● Reducing air pollution
1-3. Transportation mode	● Land transportation (road)
1-4. Project name	● Express Lanes
1-5. Major implementer	● State of Virginia Department of Transportation (VDOT)
1-6. Site	● State of Virginia
1-7. Period	-
1-8. Total cost	-

2. Summary

- The United States DOE has built HOV lanes, where vehicles with more than 3 people can ride, to mitigate traffic congestion and reduce the environmental load.
- VDOT has created the Express Lanes as the toll lane in addition to existing HOV lanes on Interstate Highway 495, the Washington, DC outer ring road, since the HOV lane itself has become increasingly congested.
- The number of drivers is increasing, and a number of municipalities are setting this up to increase the level of comfort for highway driving utilizing tools such as differentiated fee structures, user friendly portable devices and the familiar credit card payment method.

3. Background and purposes

- In the United States, many highways are toll-free and used for daily commuting. Chronic traffic congestion at rush hour has led to economic losses and increases in the environmental load from automotive emissions. In response, the United States DOT created HOV lanes to mitigate traffic congestion and to reduce the environmental load. Only vehicles with more than a certain number of passengers can use it, typically vehicles with 3 or more people.
- However, it is normally hard to reserve multiple lanes for HOV use. Also, there is the exception of hybrid cars being able to drive in the HOV lane even if the car has two or fewer people in it. The outcome is congestion in the HOV lane. With this background, the toll Express Lanes were created on Interstate Highway 495 on the Washington, DC outer ring road in addition to the existing HOV lane.

4. Contents of implementation

- Interstate Highway 495 is a ring road that runs around Washington, DC. It is called the Capital Beltway. To the west of Washington, DC, the State of Virginia has built Express Lanes.
- The toll fee schedule for the Interstate Highway 495 **Express Lanes** can be found in real time on the Internet (**Figure 2-75**). The toll fee schedule is very detailed, differentiated by highway section, time of day and so on (**Figure 2-76**). It is determined by the degree of congestion on the highway at a given time.

Figure 2-75: Information provide at Express Lane exits

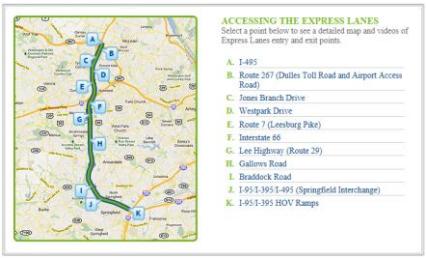
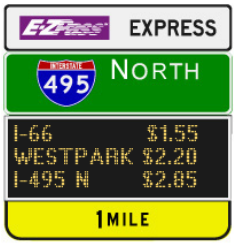


Figure 2-76: sign for Express Lanes



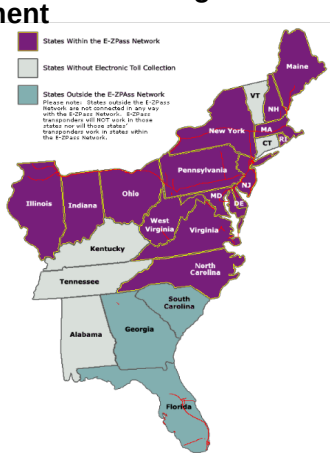
Source: Interstate Highway 495 Express Lanes

- Use of the Express Lanes requires attaching a dedicated device to the vehicle's windshield. The device can be purchased at customer centers operated by the state or automotive supply stores. However activation requires creation of an online account for that device at the transit agency web site, supplying the device ID, a driver's license number, automobile license number, and credit card information.

5. Outcome

- Tolls are collected by E-ZPass on a majority of toll roads in the eastern region of the United States including Virginia (**Figure 2-77**). The number of accounts using E-ZPass was 15,777,640 in 2013 (14,593,061 in 2012). The rate of increase was 8.1%. The number of transactions was 2,489,591,587 in 2012 and 2,599,143,439 in 2013. The rate of increase in terms of transactions was 4.4%. The average account was charged 165 times in 2013.

Figure 2-77: States in the Eastern The United States with toll roads using E-ZPass payment



Source: E-ZPass in Virginia

6. Key success factors

[Setting effective implementation method]

- The idea behind Express Lanes is different from previous road pricing schemes that used tolls to reduce traffic volume. The goal is to pay for the convenience of driving faster and more comfortably. For reducing congestion and air pollution, the number of vehicles using the Express Lanes must increase. For that, the user fee for the Express Lanes will need to be lowered.
- This is a new business model for highway use that did not previously exist. Highways that are chronically congested, such as the Capital Highway in Tokyo, may be able to construct express lanes which will be paid for by the extra fees they receive.

[Utilizing technology and knowhow]

- For Express Lanes to be widely built, it is important to have an easy payment system such as E-ZPass using IT, and it is necessary to ensure the security of transactions. The system was built on top of the lifestyle of the United States where credit card transactions through the Internet using IT rather than cash transactions are routine.

[Promoting motivations among concerned parties]

- On Interstate Highway 495, the State of Maryland east of Washington, DC is following Virginia's lead in setting up Express Lanes. Currently, 15 states and 25 agencies use E-Zpass, so that this type of lane may spread more widely in the future.
- The number of E-ZPass users is also increasing. This indicates that the concept of "freeways," another name for highways in the United States, is also changing, as the idea of paying a toll for traveling quickly and comfortably on the highway is starting to be thought of as normal.

1. Basic information

1-1. Economy	● The United States
1-2. Aspects of Quality Transport	● Providing information ● Reducing traffic accidents
1-3. Transportation mode	● Land transportation (road)
1-4. Project name	● Automated Traffic Management (ATM)
1-5. Major implementer	● Oregon Department of Transportation (ODOT)
1-6. Site	● State of Oregon
1-7. Period	-
1-8. Total cost	-

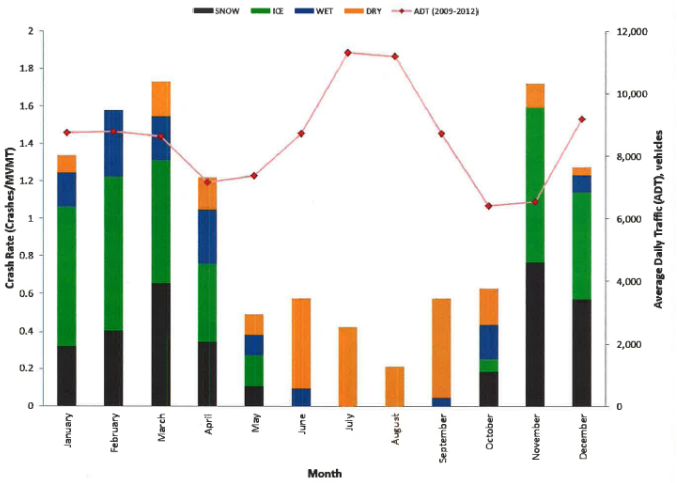
2. Summary

- ODOT aims to reduce the number of accidents, especially during the snow season. Using the highway advisory system, vehicle speed was reduced. Traffic volume increased by 3-22%, but there was a decrease in primary accidents of 3-30% and secondary accidents of 40-50%.
- This is the system to get vehicles to move at a slower speed to reduce the number of accidents. No user complaints or dissatisfaction was experienced. It is working as the system that provides benefits for both users and administrators.

3. Background and purposes

- Portland is the largest city in Oregon. The area including Portland is well known as the place with active bicycle racing. Many tourists come to participate in cycling tours. In winter, many skiers visit from California, Washington State, and Vancouver, Canada.
- There are many commuter vehicles going to the center of the city. With tourists and commuters using highways at the same time, the north-south Interstate 5, the Interstate 205 bypass and the east-west Interstate 84 have been chronically congested. In addition, many collisions occur in the winter snow season.
- In terms of safety information, ODOT provides alerts as highway displays of the advisory speed for vehicle drivers, with the aim of reducing the number of collisions. For the convenience of the road users, ODOT promotes ATM which provides the information about the best route and travel time.
- On the highways near Portland, there are many vehicle collisions in the winter **(Figure 2-78)**. In winter, many people such as skiing tourists who are from outside the immediate area use the highways. It is necessary to find a way to improve this situation.

Figure 2-78: Highway collisions near Portland



Source: ODOT

4. Contents of implementation

[Use of ATM for complex response to secure safety, mitigate traffic congestion and reduce the number of vehicle collisions]

- ODOT has the aim of reducing the number of vehicle collisions by positioning the merging lanes in the most optimal locations on the highway and by providing ATM that uses a variety of integrated measures.

◆ **Measure 1: Real time monitoring of weather, road and traveling conditions**

● ODOT uses cameras to monitor the highways near Portland. The direction and zoom of each of the cameras can be individually controlled. Weather, road and traveling conditions are monitored in real time.

◆ **Measure 2: Provide road information such as curve warning signs**

● ODOT provides signs that alert drivers to upcoming road issues, such as advance warning of curves, so that drivers can avoid entering the curve at too high of a rate of speed.

◆ **Measure 3: Display the advisory speed**

● This measure may be done in many other states as well, but ODOT uses the combined information from measure 1 and measure 2 to come up with the advisory speed and notifies the driver with easy-to-understand signage. This is not like the uniform, precisely set requirement in Japan of a maximum speed of 50kph in inclement weather. The advisory speed varies depending on the location. It is advisory only and is not legally binding. However if ODOT determines that current weather conditions require drivers comply with the displayed speed, then excessive speeds may become a target for enforcement.

◆ **Measure 4: Providing travel time and route information**

● ODOT displays the travel times between junctions for different routes for the same direction, for instance where the two major highways, Interstate 5 and Interstate 205, run parallel to each other. This aims to even out the traffic volume on both routes to mitigate the traffic congestion, which reduces collisions caused by sudden braking.

5. Outcome

● At Staley's Junction, driving speeds fell by 1 ~ 7 miles per hour after ATM was implemented. The percentage of vehicles going faster than the legal speed limit fell to 10%, which is minimal **(Figure 2-79)** and the driving environment became safer. Also, reductions in primary accidents occurred of 3~30% and secondary accidents 40~50% even as traffic volumes increased 3~22%.

Figure 2-79: Driving speed at Staley's Junction

TABLE 7
STALEY'S JCT. VSL ANALYSIS BY POSTED SPEED SUMMARY
June 12 & July 24, 2011

	Vehicles	Posted Speed	Average Speed	85% Speed	Percent Exceeding	Pace Limits	Percent in Pace	Maximum Speed
AVERAGES	231	50 MPH	47	52	>50=23%	43-53	82%	58
AVERAGES	217	45 MPH	44	48	>45=45%	39-49	81%	56
AVERAGES	282	40 MPH	35	41	>40=27%	32-42	75%	50
AVERAGES	278	35 MPH	31	37	>35=31%	26-36	68%	46
AVERAGES	316	30 MPH	23	29	>30=10%	20-30	66%	38

Source: ODOT

6. Key success factors

[Setting effective implementation method]

● ODOT's use of ATM led to drivers slowing down voluntarily and to reduced accident risks. ODOT works on the physical design of road curve shapes, installing the appropriate signs, real-time monitoring of weather, road and traveling conditions, and displays of advisory speeds calculated from collected data. This approach to safety by both the physical implementation and providing data-driven displays, as well as real time monitoring, may be effective.

[Utilizing technology and knowhow]

● Travel time information provided by ODOT is not based on the system like the N-system of Japan where the recognized number plate is followed. It is instead done by utilizing big data, i.e. computing the position data received from mobile phone users. ODOT regards this as a very cost-effective method for providing travel time displays.

[Promoting motivations among concerned parties]

● ODOT established for itself the big mission of reducing traffic accidents. For that it implemented ATM for the winter highway management in Portland and its surrounding areas, where snow piles up in the winter. This has seen drivers voluntarily reducing their driving speeds and a safer driving environment. The lower driving speed did not result in drivers registering any complaints or dissatisfaction, leading to the assumption that they are satisfied. ATM is therefore providing benefits to both administrators and travelers.

1. Basic information

1-1. Economy	● The United States
1-2. Aspects of Quality Transport	● Enhancing traffic manner ● Reducing traffic congestion ● Reducing traffic accidents ● Reducing CO_2 emissions
1-3. Transportation mode	● Land transportation (road)
1-4. Project name	● Bicycle Lane
1-5. Major implementer	● Chicago
1-6. Site	● Chicago
1-7. Period	● Since 2005
1-8. Total cost	-

2. Summary

● Chicago aims to mitigate traffic congestion, reduce collisions between bicycles and vehicles and reduce CO_2 emissions. It installed bicycle lanes in 2005 to promote the modal shift away from vehicle use. Bicycle travel safety is the priority. Chicago built the dedicated traffic signals for bicycles.
● For bicycle lanes to be fully utilized, bicycle sharing is available at 300 stations with 4,500 bicycles.
● This program is effective since the total system was designed incorporating physical infrastructure and user education.

3. Background and purposes

[Promote modal shift from vehicles to bicycles, with the aim of mitigating traffic congestion and reducing CO_2 emissions]

● Chicago's population is 2.7 million. The surrounding area's population is over 9 million. It is the 3rd largest city and the 3rd largest metropolitan area in the United States. Currently, the city is known as the financial hub. However, it is historically the strategically important point for inland transportation. The city's development came with the industrial development of the United States.
● In the business section of urban Chicago, many businesspeople use the well-developed and constructed subways, but traffic congestion and vehicle accidents occur because of the movement of vehicles. This also goes against the trend of reducing CO_2 emissions. For these reasons, Chicago built bicycle lanes on the major roads in the city center. They increase the level of convenience by shortening the time to travel in the urban area while also being good for the environment.

4. Contents of implementation

● Chicago is steadily extending its network of bicycle lanes under the "Bike 2015 Plan" and "Chicago Streets for Cycling Plan 2020". Most of the streets in central Chicago are two-way and two lanes in each direction, in addition to the parking lane on both sides. Often, the bicycle lane is created by shaving some lanes to be narrower or by replacing a motor vehicle lane.
● From the vehicle user's viewpoint, the car lanes becoming narrower or elimination of a lane is a barrier to convenience. However, Chicago takes the position that it is not such a big problem since the morning and evening rush hour traffic inflow and outflow will be reduced by the modal shift to bicycle.

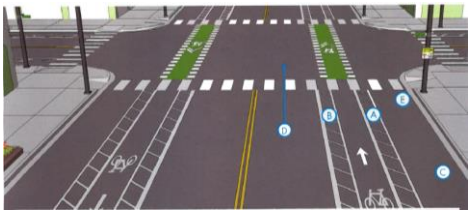
[Building bicycle lanes and dedicated traffic signals in the city center]

◆Basic pattern for creating a bicycle lane

● The pattern for creating a bicycle lane on an existing two-lane road is to replace a driving lane with a bicycle lane. In **Figure 2-80**, the previous passing lane is now a driving lane. The places marked C and E remain as parking zones. However, the places marked A and B are set aside as

buffer zones for the bicycles between the cars in the driving lane and cars moving in and out of the parking zone, and the same is done for the opposite direction..

Figure 2-80: Basic pattern for creating a bicycle lane



Source: Chicago Streets for Cycling Plan 2020

◆ **Alternative patterns for bicycle lanes**

- Alternative patterns include placing the bicycle lane only on one side, placing it closer to the sidewalk than the street parking with poles to prevent vehicles from parking, and placing the bicycle lane parallel to and adjacent the bus lane.
- Many cities have undertaken similar measures. However Chicago goes beyond just installing bicycle lanes. It has installed traffic signals in many locations dedicated to bicycle riders to avoid collisions with vehicles turning right (or turning left from a one-way street to a one-way street) when the bicycle is traveling straight. Because of these traffic signals, bicycle users can cross intersections safely.

[Bicycle sharing is up and running for the city-center streets]

- Chicago has bicycle sharing for traveling on the city-center streets. There are more than 15 bicycle stations in the area of about 10 blocks by 10 blocks. The important points for their active use are for users to know the locations of the stations well and for there to be enough bicycles available.
- Bicycle stations have a pay station for the rental fees. Tourists can use bicycle sharing as well. Payment is done by credit card. Instructions are displayed in 8 major languages. With all of these features, bicycle sharing needs can be easily satisfied. The bicycle sharing is operated at 300 bicycle stations with 4,500 bicycles and 7,500 bicycle parking. There are 15,000 registered members.

5. Outcome

- According to Chicago, 75,000 commuters to the city center have changed their commuting mode from vehicle to bicycle since bicycle lanes were created. The share of bicycling in the commute became 20%. Bicycle lanes were created first on the roads where there were many collisions involving vehicles and bicycles. Because of this, the traffic accidents involving bicycles have been decreasing.

6. Key success factors

[Setting effective implementation method]

- Chicago has a uniquely advanced system integrating vehicles, bicycles and pedestrians. It installed the physical infrastructure of bicycle lanes and introduced the dedicated traffic signals to ensure the safety of bicycle lane users. Chicago did not simply consider the physical system of bicycle lanes, but also implemented such innovations as intersection control to ensure safe crossing for bicycles and bicycle lanes that are not blocked by parked cars. It is important to design and construct bicycle lanes with the infrastructure and safety systems integrated.
- Bicycle sharing is another way to use new bicycle lanes more effectively. These serve not only the needs of commuters but also those of tourists visiting the city center. To promote bicycle sharing, various infrastructure and systems features are combined such as:
    1) Bicycle stations in locations that are easy to find
    2) Enough bicycles for use in bicycle sharing
    3) Easy payment system for ease of use, and
    4) Encouraging use of the web service for convenience of annual member registration.

[Promoting motivations among concerned parties]

- Chicago established the Bicycling Ambassador system to educate the citizens on bicycle use. In Chicago, education of residents is regarded as the most important, therefore, the city actively pursues bicycling education.

1. Basic information

1-1. Economy	● The United States
1-2. Aspects of Quality Transport	● Reducing travel time ● Punctuality ● Reducing CO_2 emissions ● Industrial development ● Job creation
1-3. Transportation mode	● Land transportation (rail)
1-4. Project name	● High-Speed Rail
1-5. Major implementer	● The United States Department of Transportation (DOT)
1-6. Site	● Boston-New York-Washington, DC
1-7. Period	-
1-8. Total cost	-

2. Summary

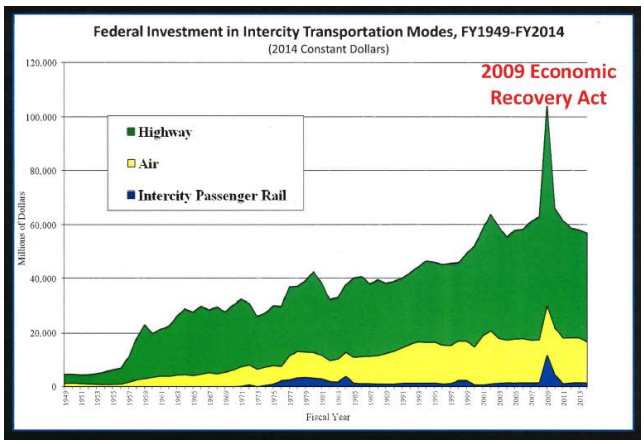
● Under President Obama's policies, the United States federal government considers high-speed rail as one means of transport between large cities. The amount of federal funding for rail is rising, although the level of funding is much less than for roads and air transport.
● The most concretely discussed segment is Boston-New York-Washington, DC in the Northeast Corridor. The distance between Boston and Washington, DC is about the same as between Tokyo and Okayama. The possibility is for it to become a competitive alternative to air travel.
● In terms of the environment, it is superior to vehicle and air travel. The future outcome of the discussion high-speed rail should be followed.

3. Background and purposes

● Since 1949, the federal investment for intercity transport in the United States has been increasing. Most of the funding is for highways. However, recently the share of rail investment is increasing. The Economic Recovery Act was enacted in 2009 after the 2008 Lehman shock. Under President Obama's high-speed rail construction promotion policy, investment in the rail sector increased. DOT established the GROW AMERICA Five Priorities for Rail, which aims to achieve economic growth as well as improve transport system **(Figure 2-81)**.

- ○ Enhancing World-Class Safety
- ○ Modernizing Rail Infrastructure
- ○ Meeting the Growing Market Demand
- ○ Promoting Innovation
- ○ Ensuring Transparency and Accountability

Figure 2-81: Change over time in federal investment in the transport sector

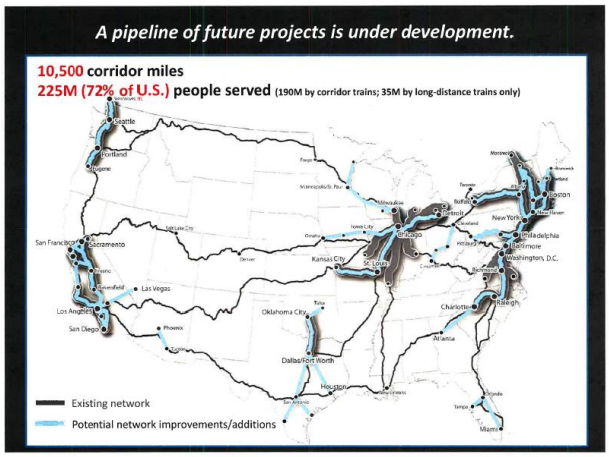


Source: DOT

4. Contents of implementation

- In the United States, most of the railway infrastructure is owned by private corporations. However, 34% of the funding for passenger rail is federal government support. About 60% comes from fares and food and beverage concession revenue. State governments fund about 6%.
- In the United States, railway projects are ongoing in the locations such as the East Coast (Boston - New York - Washington, DC corridor and Charlotte - Raleigh), the Midwest (Chicago - St. Louis, Chicago - Detroit) the Pacific Northwest (Seattle - Portland, Vancouver - Eugene) and the central to south part of the Pacific Coast (San Francisco - Los Angeles, Sacramento - San Diego). These are called pipeline projects. The areas where there are no passenger railways at present are also included, such as Texas and Florida (**Figure 2-82**).

Figure 2-82: High-speed rail segments currently under consideration



Source: DOT

5. Outcome

- The volume of vehicle traffic can be reduced if passenger transport by vehicles between large cities can be shifted to railway use. There is also a possibility to compete with the airline industry. From the environmental perspective, there is a possibility to reduce greenhouse gases. Amtrak, which operates passenger rail service throughout the United States, is planning to invest about US$8 billion for the long-haul sections of Northeast Corridor and the Southern Corridor. The distance between Boston and Washington, DC is approximately the same distance as Tokyo to Okayama, about 455 miles (730km). They are 3 hours apart by high-speed rail. For those close to the stations this may be a good alternative to air travel and could increase the travel options.

6. Key success factors

[Utilizing technology and knowhow]

- The United States lacks the knowhow about the infrastructure for high-speed rail, including civil engineering, railcars, electrical engineering and telecommunication technology, as well as the systems knowhow such as management of operations. It is important to utilize the technological knowhow s of Japan and Europe, with their rich experience in high-speed rail such as with the Bullet Trains.

[Promoting motivations among concerned parties]

- The federal government is planning to invest US$19 billion in the railway sector. DOT is prioritizing high-speed rail construction.

1. Basic information

1-1. Economy	● The United States
1-2. Aspects of Quality Transport	● Multiple transportation means ● Reducing CO_2 emissions ● Reducing air pollution ● Saving fuels
1-3. Transportation mode	● Land transportation (rail)
1-4. Project name	● TriMet
1-5. Major implementer	● City of Portland
1-6. Site	● City of Portland
1-7. Period	-
1-8. Total cost	-

2. Summary

- Portland, Oregon, in the United States, has started TriMet, which is the municipal transport system of integrated bus, railway, and trolley services. This was triggered by the citizen activism to oppose highway construction. There is no charge for transferring between different transport modes. Residents' usage of the system is high. Tourists see TriMet as symbol of the environmental movement in Portland.
- The economic effect of establishing TriMet is about US$98 million annually, due to savings in time and fuel cost. The urban transport is revitalized in the entire area. The environmental advantage is maximized.

3. Background and purposes

- The citizens of Portland, Oregon rejected the plan to construct an 8-lane highway because it would destroy the neighboring communities. TriMet was funded instead of the highway to become the integrated city transport system of buses, trains and trolleys.

4. Contents of implementation

- TriMet is the integrated system of buses, trains and trolleys that allows people to move within the city entirely on public transport. It has an innovative coexistence with bicycles as well **(Figure 2-83)**. In Portland, the number of motor vehicles in the city was reduced, and traffic congestion was mitigated. TriMet contributed to environmental protection. It is also thought to be effective in reducing the loss in terms of economic activities.

Figure 2-83: TriMet public transport

[Bus] **[Commuter train]** **[Trolley]**

Source: TriMet

5. Outcome

- Because of TriMet, 207,300 vehicle trips per day were eliminated. This is equivalent to 65 million trips annually. The reduction in smog-producing emissions was 4.2 tons per day. The yearly avoided cost due to fuel and time savings is US$98 million.
- TriMet has capped vehicle travel and has improved air quality, thus creating a better quality of life for Portland residents.

6. Key success factors

[Utilizing technology and knowhow]

- TriMet is making an effort to improve the convenience for passengers in different ways. One example is its easy-to-understand and clearly explained time-variant fare during commute hours. Other examples are its superior accessibility, and multi-modal, bicycle -friendly transport.

[Promoting motivations among concerned parties]

- TriMet was strongly pushed by the strong will of the residents. Its active use by residents smoothed the path for development. It is helping to give Portland a good reputation, in addition to its economic advantages.

1. Basic information

1-1. Economy	● The United States
1-2. Aspects of Quality Transport	● Protecting regional environment
1-3. Transportation mode	● All modes
1-4. Project name	● Mitigating Environmental Impact in Construction of Transport Infrastructure
1-5. Major implementer	● Washington State
1-6. Site	● Washington State
1-7. Period	-
1-8. Total cost	-

2. Summary

- The State of Washington is working on mitigation of environmental impact facing the transport infrastructure construction, such as for the highway interchanges or HOV lanes. In the United States, this is perceived as especially important for wetlands, which are critical for biodiversity. Therefore, there are many demands for mitigation of wetlands.
- The new environmental business was created called the mitigation bank. This is used to ensure that mitigation will be implemented when the transport infrastructure is to be built.

3. Background and purposes

- In the United States, at the time of undertaking large-scale development of transport infrastructure, it is necessary to carry out the mitigation activities to reduce their environmental impact. This is similar to the required environment assessment in Japan. To reduce the environmental impact of development, a method has been devised to practice the principle of no net loss of quantity and quality of the natural environment. The following 5 working levels have been established. According to CEQ, the rule is that step 5 may only be carried out when all the other onsite measures from 1 to 4 are practiced but there is still some remaining impact.
    1) Avoidance
    2) Minimization
    3) Rectifying
    4) Reduction/Elimination
    5) Compensation
- Because environmental mitigation is one of the conditions for issuance of development permits, rapid and effective mitigation was a part of the requirements for the transport infrastructure construction business. However, it is changing to the system where the central focus is on considering offsite alternatives. This is partly because of the emergence of mitigation banks, which will be described later.
- Transport infrastructure development is often on a large scale and therefore has a comparatively large environmental impact. Due to environmental considerations, state departments of transportation often get involved with mitigation. The United States does not overall receive a great deal of rain and much of the land is dry. Because of this, wetlands are regarded as important bird sanctuaries.

4. Contents of implementation

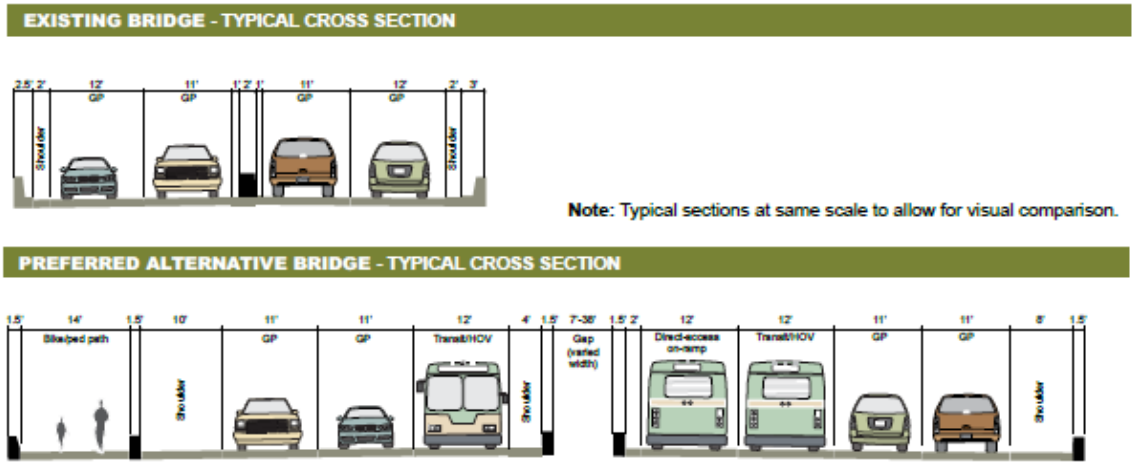
[Mitigation example: Interchange for Seattle Tacoma International Airport]

- Mitigation was carried out at the interchange of the access road to Seattle-Tacoma International Airport (State Route 518) and federal highways Interstate 5 and Interstate 405. Construction was performed to deal with stormwater, reconstruction of wetlands, conservation of water flow and noise reduction. The cost was US$14 million. This was more than one-third of the entire cost of this project.

[Mitigation example: Washington Park Arboretum, Washington State]

- The plan to replace the existing bridge going through Washington Park Arboretum with the floating bridge with an increased number of lanes including the HOV lane will impact the surrounding environment. Therefore, mitigation is being done. The green areas on the map are wetlands. The red and purple portions are the areas that will be impacted. Mitigation efforts are being directed at restoration and enhancement of the wetlands **(Figure 2-84)**.

Figure 2-84: Changes in the bridge in Washington Park Arboretum



Source: Washington Park Arboretum Mitigation Plan, Washington State

5. Outcome

- In the example of the Washington Park mitigation effort, the traditional mindset would be to build a road straight through the wetland to keep highway construction costs down, and to ignore mitigation due to the significant cost.
- This case study shows the effect of mitigation needs, which in this case have led the economic discussion in the direction of whether the highway should go through the protected wetlands. In the end, it may cost less to bypass the wetlands, even with the added construction cost. At this point, the mitigation needs are playing a large role in environmental protection.

6. Key success factors

[Setting effective implementation method]

- Mitigation is effective as the way to maintain the environment qualitatively and quantitatively. However, to ensure its effectiveness, a portion of the mitigation must start prior to approval of the development plan. From the implementer's view, this is a risk with uncertain cost and length of the process, therefore it is a large burden.

[Utilizing technology and knowhow]

- The new environmental business has been created to do advance mitigation work for transport infrastructure construction. For instance, when wetland mitigation might be required, the project implementer can purchase the credit matching the quality and quantity of biodiversity in the project's natural environment. The project implementer can start the usual process without starting the mitigation work as soon as this credit is purchased. There will be no more risk of failing the mitigation process. With the credit, the environment to be preserved at a substitute site can be prepared immediately.
- However, if environmental conservation is done offsite rather than in at the construction site, this leads to some saying that it is counter to the original idea of mitigation.

[Promoting motivations among concerned parties]

- Environmental protection related to roads, railways, ports and airports is an important issue for city and state transport authorities, as this consumes must of their time and expense.
- For a new system of known efficacy such as the mitigation bank to become established, the city and state transport authorities must cooperate with the Environmental Protection Agency to create and show successful case studies so that their efficacy will become widely known.

2-18. Viet Nam

(1) List of Cases

No.	Transportation mode	Project name	Aspects of Quality Transport
1	Land transportation (road)	● Introduction of Motorbike Exhaust Regulation	● Reducing air pollution
2	Land transportation (road)	● Vehicle Inspection System	● Reducing air pollution
3	Land transportation (road)	● Ethanol Production for Fuel	● Reducing air pollution
4	Land transportation (road)	● Nhat Tan Bridge	● Reducing travel time ● Life-cycle cost saving ● Disaster risk reduction ● Debt sustainability ● Human resources development and institutional development ● Alignment with development plan
5	Maritime transportation	● Initiative to Reduce Detention Rate of International Ships	● Reducing traffic accidents ● Strengthening security

(2) Cases

1. Basic information

1-1. Economy	● Viet Nam
1-2. Aspects of Quality Transport	● Reducing air pollution
1-3. Transportation mode	● Land transportation (road)
1-4. Project name	● Introduction of Motorbike Exhaust Regulation
1-5. Major implementer	● MOT, VR
1-6. Site	● Nationwide
1-7. Period	● Since 2010
1-8. Total cost	-

2. Summary

● MOT decided the action plan for regulation of exhaust of in-use motorbikes in 2010. VR is preparing to execute the exhaust testing.
● Currently motorbikes are not required to have exhaust testing, but the pilot test at the existing vehicle inspection facilities is performed free of charge to disseminate the information to citizens and to move toward introduction of the test.
● It is important to execute the plan in phases due to budget constraints and train the personnel to do the test.

3. Background and purposes

● Today about 30 million motorbikes are in use in Viet Nam and there is serious air pollution in the urban areas in Ha Noi and Ho Chi Min city. To maintain the motorbikes and regulate air pollution, it is necessary to have test motorbike exhaust. The action plan for in-use motorbike exhaust testing was based on Prime Minister's Order 909 of June 2010. MOT prepared to do exhaust testing at the Viet Nam Register (VR) of MOT.
● Currently in Viet Nam, Euro2 has been introduced as the exhaust regulation for vehicles and motorbikes. But by 2017 it is planned to introduce Euro4 for vehicles and Euro4 by 2022. For motorbikes, Euro3 will be introduced by 2017.

4. Contents of implementation and outcome

● MOT is in charge of the total system design for in-use motorbike exhaust regulations, including system development and the planning for the nationwide network of testing facilities. It is planning to implement the plan in collaboration with the Ministry of Public Safety (MOPS) and the Ministerial and Municipal People's Committees (**Figure 2-85**).

Figure 2-85: Major projects in the action plan for MOT motorbike exhaust tests

Major project	Institution	Cooperating institutions
1. Organization, budget, regulations, technical standards, set for motorbike exhaust test	MOT	MONRE, MOPS, MOF,MOHA, MOJ
2. Preparation and announcements of the guidelines for motorbike exhaust testing	MOT	MOIC, mass media
3. Equipment purchase and staff training for motorbike exhaust testing	MOT	Ministry and City People's Committees, concerned organizations and individuals
4. Road test for motorbike exhaust testing	MOPS	MOT, Ministry and City People's Committees
5. Nationwide network plan set and national facilities set up for motorbike exhaust testing	MOT	Ministry and City People's Committees, concerned organizations and individuals
6. Information network and database creation for motorbike exhaust testing	MOT	Ministry and City People's Committees, concerned organizations and individuals

Note: The period for the above projects is 2010 – 2015.
Source: MOT "Exhaust Emission Control Plan for In-Use Motorcycles and Mopeds in the Provinces and City"

- To execute exhaust regulation for all 30 million motorbikes in Viet Nam will take a long time and a large amount of funding to set up the testing equipment and test facilities. The current plan calls for 100 locations in Ha Noi and 150 locations in Ho Chi Minh city by 2015 for doing motorbike exhaust testing.
- Motor vehicle inspection stations being planned for in-use motorbike exhaust testing are the safety testing stations for brakes and lights and exhaust testing of trucks and other commercial vehicles as well as private vehicles in use. There are 99 such vehicle inspection facilities in Viet Nam. In Ha Noi, six vehicle inspection facilities are run by VR and 3 are run by the Ha Noi municipal people's committee. There is one other private facility, for a total of 10.
- A vehicle inspection facility under VR in Ha Noi with 19 employees tests 60-80 vehicles per day, for a total of 17,000 - 20,000 vehicles per year. Currently, motorbikes are not obligated for the vehicle inspections such as exhaust tests; but because of the impending regulation, this facility offers free trial testing as a pilot project to promote understanding by the general public.

Figure 2-86: Truck inspection

Figure 2-87: Motorbike test (trial)

Source: Ha Noi research field inspection visit

5. Key success factors

[Setting effective process]

- It is important to have satisfactory testing facilities to deal with the number of vehicles in order to implement the test after the motor vehicle exhaust regulation is introduced. In Viet Nam, the test facilities are to be set up based on the action plan for the regulation of motorbike exhaust; however due to budget constraints, this will be phased in.

[Utilizing technology and know-how]

- It is important to train personnel to do the testing work in addition to purchasing the testing equipment, to implement the motorbike exhaust regulation. In Viet Nam, new models of vehicles and motorbikes are tested fat the National Motor Vehicle Emission Test Center (NETC) where the Austrian government paid for the cost of the building and test equipment. NETC employees are receiving training for the test equipment and testing methods.

[Promoting motivations among concerned parties]

- To have mandatory motorbike exhaust testing and to collect a fee, it is not only important to plan and implement the project but also to raise public awareness. In Viet Nam the vehicle inspection system has been in place for over 10 years, so it is widely understood; however, the necessity of testing motorbikes is not yet appreciated. Currently the pilot project is being implemented in Ha Noi and Ho Chi Minh City to educate and raise awareness of the general public.

1. Basic information

1-1. Economy	● Viet Nam
1-2. Aspects of Quality Transport	● Reducing air pollution
1-3. Transportation mode	● Land transportation (road)
1-4. Project name	● Vehicle Inspection System
1-5. Major implementer	● MOT, VR
1-6. Site	● Nationwide
1-7. Period	● Ongoing
1-8. Total cost	

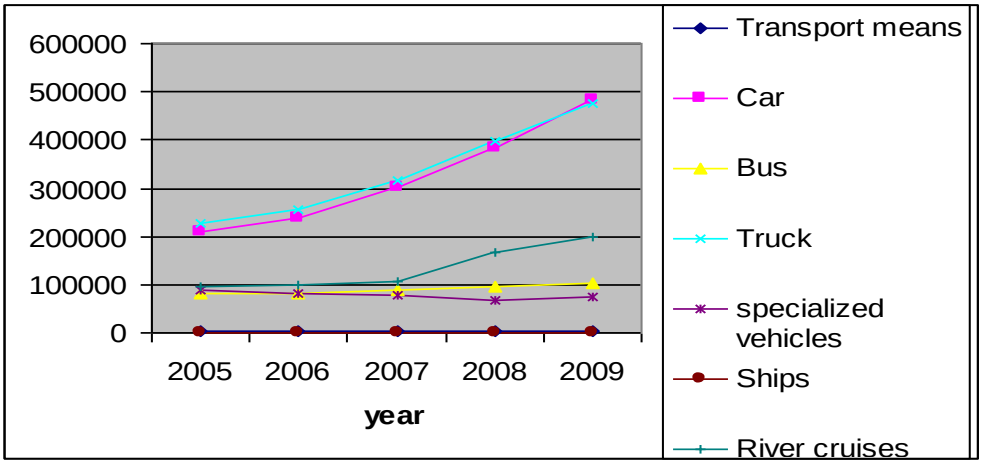
2. Summary

● 107 Automobile inspection centers nationwide with 189 inspection lines.
● Inspection items: Identification, general check; Engine & related system; Steering; Wheels; Suspension system; Driving system; Braking; Lighting and signals; Emissions and noise.

3. Background and purposes

● In recent years, the number of vehicles mainly increased in the big cities. From 1995 to the end of 12/2009, annual average number of road motor vehicles has increased of 16.25%, (17.45% motorbikes, 11.75% automobiles) (**Figure 2-88**). In 2011, the total number of road motor vehicles is 35,808,811 units, including 1,882,972 automobiles and 33,925,839 motorcycles.

Figure 2-88: Growth of Vehicle numbers



Source: VR

● While vehicle use is prevalent, leading to great amounts of air pollution and CO_2 emissions and great societal loss from large numbers of traffic accidents and deaths. To mitigate the social loss from automobile use, the vehicle inspection system tests commercial vehicles for safety features and environmental performance periodically while they are in use.

4. Contents of implementation and outcome

● Viet Nam Register is a state body, responsible for vehicle inspection. Annually, each center must have the Operational Certificate from Viet Nam Register.
● Inspection items:
  - Identification, general check;
  - Engine & related system;
  - Steering;

- Wheels;
- Suspension system;
- Driving system;
- Braking;
- Lighting and signals;
- Emissions and noise.

● Inspection equipments:
- Side slip tester;
- Brake tester and Weighing;;
- Head-light tester;
- Gas Analyzer and Smoke meter.
- Noise level meter;
- Axle play detector;
- Speedometer;
- Lifting device (hoist, pits) for underbody check;
- Other tools and supervision camera.

● Equipment and visual inspection are linked to the computer and processed by a software.

Figure 2-89: Equipment of vehicle inspection

Source: MOT

5. Key success factors

[Utilizing technology and know-how]

● Have the satisfactory testing facilities in big cities to deal with the number of vehicles.

● Modernization of inspection system and setting up a computer network link the inspection centers with the central management office.

[Promoting motivations among concerned parties]

● Government encourages the private businesses to invest into vehicle inspection center; Socialization of vehicle inspections.

1. Basic information

1-1. Economy	● Viet Nam
1-2. Aspects of Quality Transport	● Reducing air pollution
1-3. Transportation mode	● Land transportation (road)
1-4. Project name	● Ethanol Production for Fuel
1-5. Major implementer	● MOT, Petrol Viet Nam
1-6. Site	● Quang Nam
1-7. Period	● Since 2007
1-8. Total cost	

2. Summary

● In Aug 2010, Dai Tan bio-ethanol Factory in Quang Nam, invested by DongXanh joint stock Company, produced bio-ethanol (E5). This is the first bio-ethanol product manufactured in Viet Nam. The Factory was started to be built in 2007 with total invested capital of approximately VND 600 million (US$ 300 thousand).
  - Capacity: 100,000 tons bio-ethanol per year.
  - Material: 300,000 tons dry cassava.
● Petro Viet Nam has been building 3 bio-ethanol production factories, located in 3 regions of Viet Nam: North, Central and South with capacity of each one of 100,000 m^3 bio-ethanol per year

3. Background and purposes

● According to the statistics of the Transport Development and Strategy Institute, transport activities in Viet Nam consume around 60% of total fuel consumption. Fuel consumption for transport increased 10% per year over the past decade; fuel consumption for road transport accounting around 68% of the total transportation fuel consumption; 90% of fuel for transport are gasoline and diesel, which is only 0.3% use clean fuel.
● In 2011, the total amount 10.7 million tons of petroleum was imported mainly from: Singapore, Chinese Taipei, China, Korea, Kuwait ... (Source: statistics from the General Administration of Customs).
● The product is denatured ethanol mixed with petrol that distributes nationally. The mixture will run the engine longer and reduce to minimum the pollution to save the environment and ensure the safe of national resource. Other by-products will be re-used and sell to companies or partners for other purposes. Especially, factory co-operated with Petroleum Fertilizer and Chemist Company (PVFC Co) produce micro-organic fertilizer from factory's waste to supply agriculture through Province.

4. Contents of implementation and outcome

● Petro Viet Nam has been building 3 bio-ethanol production factories, located in 3 regions of Viet Nam: North, Central and South with capacity of each one of 100,000 m^3 bio-ethanol per year.
● Phu Tho bio-ethanol factory: Construction of northern Viet Nam's first bio-ethanol factory began Sunday in Phu Tho Province (**Figure 2-90**). The US$ 80 million project, located in Tam Nong District, is scheduled to become operational in December 2012, producing 100,000 cubic meters of ethanol a year as fuel from locally sourced cassava and sugarcane. The project investor claims its products will not only be environment friendly by reducing CO_2 emissions but also contribute to reducing poverty among cassava and sugarcane farmers in the region.

Figure 2-90: Phu Tho Bio-ethanol factory

Source: MOT

● Dung Quat bio-ethanol factory - The biggest factory in Central currently equipped with modern technology and capacity if 100,000 m^3 ethanol/year - completed construction and put in to operation since February, 2012 (**Figure 2-91**).

Figure 2-91: Dung Quat bio-ethanol factory

Source: MOT

● Binh Phuoc bio-ethanol factory: The project is expected to create more jobs for local farmers who can grow cassava and sugarcanes as input materials for the plant (**Figure 2-92**). Binh Phuoc Bio Ethanol Plant Project belongs to "Development Project for Biological Ability to 2015, vision for 2025", signed & approved by Prime Minister on 20th October 2007. The plant is built on the area of 44ha, providing 300,000 litters/day.

Figure 2-92: Binh Phuoc bio-ethanol factory

Source: MOT

6. Key success factors

[Setting effective process]

● Decision no 177/2007/QD-TTg of Prime Minister approved the Scheme on Biofuel Development to 2015, vision for 2025.

● General objectives:

- To develop biofuel, a new and renewable energy, for use as an alternative to partially replace conventional fossil fuels, contributing to assuring energy security and environmental protection.

● Main tasks:

- Conducting scientific research and technological development (R-D), deploying trial 1 production of products to serve biofuel development.
- Founding and developing the biofuel production industry.
- Building biofuel development potential.
- International cooperation.

1. Basic information

1-1. Economy	● Viet Nam
1-2. Aspects of Quality Transport	● Reducing Travel Time ● Life-cycle Cost Saving ● Disaster Risk Reduction ● Debt Sustainability ● Human Resources development and institutional development ● Alignment with development plan
1-3. Transportation mode	● Land transportation (Road)
1-4. Project name	● Nhat Tan Bridge
1-5. Major implementer	● MOT
1-6. Site	● Ha Noi
1-7. Period	● From 2009 - 2014
1-8. Total cost	● 75,449 million Yen (US$ 629 million)

2. Summary

- The objective of Nhat Tan Bridge is to improve traffic between central Ha Noi and Noi Bai International Airport. It connects between Ha Noi and the airport in 35 minutes.
- This bridge was constructed upon a soft ground by introducing advanced civil engineering technology. This technology achieves high life-cycle cost saving. Although this technology was newly introduced into Viet Nam, it was adopted as its bridge design standard. This technology and skill was also transferred into engineers in Viet Nam.
- This bridge is a project aligned with Northern Ha Noi urban development project. In this project, public facilities, housing facilities and commercial facilities are expected to be developed. Long term with low interest was provided by JICA.

3. Background and purposes

- The number of passengers of Noi Bai International Airport in Ha Noi has been increasing due to rapid economic growth. Before completion of the construction, it took around 1 hour between central Ha Noi and Noi Bai International Airport because heavy traffic congestion was caused by large traffic demand.
- MOT has been implementing to build Nhat Tan Bridge over the Red River as a new route to connect central Ha Noi and Noi Bai International Airport with support of JICA. Nhat Tan Bridge, made road traffic smoothed between central Ha Noi and Noi Bai International Airport.
- The new route created by the bridge is expected to stimulate housing and commercial development alone it under the urban development plan.

4. Contents of implementation

- The length of Nhat Tan Bridge is 1,500m and its width is 35.6m.
- JICA has provided 75,449 million Yen (US$ 629 million) as Yen Loan for MOT to build Nhat Tan Bridge from 2009 - 2014. Building Nhat Tan Bridge is divided in to the following 3 packages:
  - Package 1: Building cable-stayed bridge (1,500m) and northern approach bridge (1,580m)
  - Package 2: Building southern approach bridge (1,251m)
  - Package 3: Northern approach bridge (4,603m)
- The ground condition is so soft around Nhat Tan Bridge that advanced technology should be introduced for construction of the bridge beyond the Red River. The steel pipe-sheet pile-well foundation method has been

Figure 2-93: Location of Nhat Tan Bridge

Source: MLIT, JAPAN

adopted, which was used in the foundation part of the six-span continuous cable-stayed bridge.

- Viet Nam engineers have been working with Japanese engineers for construction period of Nhat Tan Bridge and know-how of the steel pipe- sheet pile-well foundation method has been transferred to Vietnamese engineers.

[Features of building Nhat Tan Bridge]

- Longest continuous cable-stayed bridge in the southeast region (six-span continuous cable-stayed bridge with five main towers)
- Two ship passages 80m wide and 25m high were created by adopting the continuous cable-stayed bridge design

5. Outcome

- Effects of building Nhat Tan Bridge was estimated by JICA. In 2016, the traffic volume of Nhat Tan Bridge is prospected to be 65,821 Passenger Car Unit / day, and saving money of reducing travel time and mileage will be 1,209 VND (US$ 54 million). Building Nhat Tan Bridge made road traffic flow smooth between central Ha Noi and Noi Bai International Airport.
- Introduction of the steel pipe-sheet pile-well foundation method in building Nhat Tan Bridge contributes to disaster risk reduction and life-cycle cost saving. Furthermore the steel pipe-sheet pile-well foundation method is transferred to Vietnamese engineers and adopted as standard of design of bridges in Viet Nam.

6. Key success factors

[Utilizing know-how and technique]

- The ground condition is soft of Nhat Tan Bridge. The steel pipe sheet pile well foundation method, a Japanese technique, has been introduced and improved durability and life cycle cost of Nhat Tan Bridge.

[Promoting motivations among concerned parties]

- MOT have been implementing to build Nhat Tan Bridge with support of JICA. Economic effect of building Nhat Tan Bridge was estimated and helpful for understanding its effectiveness among related people. Construction term also worked together for transferring technology and enhanced motivations.

1. Basic information

1-1. Economy	● Viet Nam
1-2. Aspects of Quality Transport	● Reducing traffic accidents ● Strengthening security
1-3. Transportation mode	● Maritime transportation
1-4. Project name	● Initiative to Reduce Detention Rate of International Ships
1-5. Major implementer	● MOT, Vinamarine
1-6. Site	● Nationwide
1-7. Period	● Starting 2011
1-8. Total cost	-

2. Summary

● Historically, international ships from Viet Nam have had a high detention rate. Viet Nam was consistently on the Tokyo-MOU Black List. However, in 2011, Vinamarine undertook a strenuous initiative to reduce the detention rate. The detention rate improved greatly, and maritime accidents involving Viet Namese ships are steadily declining.

3. Background and purposes

● In Viet Nam, initiatives have been undertaken to reduce traffic accidents in each sector. For the period of 2008 to 2010, the number of traffic accidents was reduced. On the other hand, deaths and injuries due to traffic accidents remained high. The different agencies were encouraged to work continuously to reduce traffic accidents. MOT and Vinamarine are working to strengthen ship inspections, to cite violators, and to work on capacity building of crews.

● The past detention rate of Viet Nam-flagged international ships in the Tokyo MOU region was higher than average. Starting in 2011, Vinamarine undertook a strenuous initiative to reduce the detention rate of international ships. Vinamarine made continuous efforts toward improvement, with the aim of being removed from the Tokyo-MOU Black List by the end of 2014.

4. Contents of implementation

● Vinamarine created the partnership agreement (PA) together with Viet Nam Register (VR) and started to use the following system for the implementation of inspections:
  - The PA Director takes responsibility for ship accidents caused by PA employee errors and for ships detained by foreign governments.
  - Inspection of international ships is carried out jointly by VR and Vinamarine in a coordinated scheme. The purpose is to avoid redundant ship inspections by the two agencies.

● Vinamarine regards the advantages of this system to be an increase in the level of responsibility of the Port State Control Officer (PSCO), who is the inspection implementer, and that VR will ensure that ship inspection is done properly to secure ship safety.

5. Outcome

● The Viet Nam-flagged international ship detention rate has steadily decreased since the start of the project in 2011. The figure below shows the past 3 years of changes (2011 to 2013) in the detention rate (**Figure 2-94**).

Figure 2-94: Changes in rate of detention and target rate

	2011	2012	2013	2014
Detention rate (%)	12.33%	6.88%	6.00%	5.5% (target)

Source：Vinamarine

● Two months ahead of the intensive inspection campaign by Tokyo MOU, Vinamarine engaged in an intensive inspections of Viet Nam-flagged ships. They gave guidance to ship owners about

the types of inspections for ships to do to reduce maritime accidents and detentions by foreign economies (**Figure 2-95**). This initiative, begun in 2012, was highly rated by ship owners.

Figure 2-95: International ship being inspected before leaving port

Figure 2-96: Inspectors confirming pier safety

Source: Article: "Tăng cường các giải pháp nhằm giảm thiểu tai nạn hàng hải và tàu biển Việt Nam bị lưu giữ", Vinamarine, January 15, 2014

- In addition, Vinamarine regularly provides education and disseminates information about ship-safety regulations and undertakes awareness-raising campaigns with ship owners and crews about the importance of ship maintenance. From 2013, Vinamarine's responsibilities were clarified and its ship inspections became even stricter. Further reductions in the detention rate are expected.

6. Key success factors

[Setting effective implementation method]

- To reduce the number of maritime accidents for international ships, it is important to work on traffic safety on a daily basis by creating the complete, systematic inspection system, and to raise the safety awareness for operating companies such as the owners of international ships. Vinamarine has clarified its role and is undertaking the inspections, disseminating information about regulations, and making efforts to raise awareness of the importance of ship maintenance.

3. Appendix

3-1. Abbreviations and terms

[Common]

Type	Abbreviation/Term	Name
Organization	ADB	Asian Development Bank
	DOE	Department of Energy
	DOT	Department of Transportation
	MOT	Ministry of Transportation
Transportation-related System	ETC	Electronic Toll Collection System
	ITS	Intelligent Transport Systems

[By Economy]

Economies	Type	Abbreviation/Term	Name
Australia	Organization	CBD	Central Business District, Sydney
		DIRD	Department of Infrastructure and Regional Development, Australia
	General term	CAT	Central Area Transit
		FTZ	Free Transit Zone
		PPMA	Perth Parking Management Area
Canada	Organization	TC	Transport Canada
	General term	EV	Electric Vehicles
		SPARC	Scholarly Publishing and Academic Resources Coalition
Chile	Organization	MTT	Ministry of Transport and Telecommunications, Chile
	General term	TEU	Twenty-foot Equivalent Unit
Hong Kong, China	Organization	ETWB	Environment, Transport and Works Bureau, Hong Kong
		HKMA	Hong Kong Monetary Authority
		HYF	The Hongkong and Yaumati Ferry Company Limited
		KCRC	Kowloon-Canton Railway Corporation
Indonesia	Organization	MPW	Ministry of Public Works, Indonesia
Japan	Organization	JR	Japan railway
		MLIT	Ministry of Land, Infrastructure, Transport and Tourism, Japan
		UR	Urban Renaissance Agency
	General term	NGO	Non-governmental Organization
		PASMO	IC card that can be used in place of a train ticket or cash
		VICS	Vehicle Information and Communication System
Korea	Organization	KOTI	Korea Transport Institute
		MOLIT	Ministry of Land Infrastructure and Transport, Korea
	General term	BRT	Bus Rapid Transit
Malaysia	Organization	KTMB	Keretapi Tanah Melayu Berhad
		MIROS	Malaysian Institute of Road Safety

Economies	Type	Abbreviation/Term	Name
			Research
		MOT	Ministry of Transportation,Malaysia
		MOW	Ministry of works Malaysia
	General term	EDTP	Electrified Double Track Project
		KVMRT	The Klang Valley Mass Rapid Transit
		MRT	Mass Rapid Transit
		NCAP	New Car Assessment Program
		NKRA	National Key Results Areas
Mexico	Organization	BRT	Bus Rapid Transit
		IBRD	International Bank for Reconstruction and Development
	General term	CNG	Compressed Natural Gas
		CTF	Clean Truck Fee
		GEF	Global Environment Facility
		UTTP	Urban Transport Transformation Project
New Zealand	Organization	MOT	Ministry of Transport, New Zealand
		NRSC	National Road Safety Committee
		NZTA	New Zealand Transport Agency
Papua New Guinea	Organization	DOT	Department of Transportation, Papua New Guinea
		NRSC	National Road Safety Council, Papua New Guinea
		RTA	Road Traffic Authority
Peru	General term	DWT	Dead weight tonnage
		m.s.l	mean sea level
The Philippines	Organization	DOF	Department of Finance, Philippines
		DOH	Department of Health, Philippines
		DOST	Department of Science and Technology, Philippines
		DOTC	Department of Transportation and Communications, Philippines
		DPWH	Department of Public Works and Highways, Philippines
		PBE	Philippine Business for the Environment
		PPA	Philippines Port Authority
		PNP	Philippine National Police
	General term	BAQ	Better Air Quality
		CAI	Clean Air Initiative
		CDM	Clean Development Mechanism
		GHG	Greenhouse Gas
		UNEP	United Nations Environment Program
Singapore	Organization	LTA	Land Transport Authority, Singapore
		MPA	Maritime and Port Authority, Singapore
		CAAS	Civil Aviation Authority of Singapore
		ITSS	Intelligent Transportation Society Singapore
	General term	IOT	Internet of Things

Economies	Type	Abbreviation/Term	Name
Chinese Taipei	Organization	MOEA	Ministry of Economic Affairs, Chinese Taipei
		MOTC	Ministry of. Transportation and Communications, Chinese Taipei
Thailand	Organization	AEROTHAI	Aeronautical Radio of Thailand Limited
		AOT	Airports of Thailand
		SRT	State Railway of Thailand
	General term	Q-Mark	Quality Mark
		SKRL	Singapore-Kunming Rail Link
		SRT	State Railway of Thailand
The United States	Organization	CEQ	Council on Environmental Quality
		ODOT	Oregon Department of Transportation
		VDOT	Virginia Department of Transportation
	General term	ATM	Automated Traffic Management
		HOV	High Occupancy Vehicle
Viet Nam	Organization	MOPS	Ministry of Public Security, Viet Nam
		MOT	Ministry of Transport of Vietnam
	General term	MOU	Memorandum of Understanding on Port State Control in the Asia-Pacific Region
		PA	Partnership Agreement
		PSCO	Port State Control Officer
		VR	Viet Nam Register

3-2. Research Materials

Economies	Title (Publication, Year)
Indonesia	FY2010 private sector infrastructure building for general projects (Indonesia, Tanjung Priok Port Access Road PPP project survey report)(Ministry of Economy, Trade and Industry, Japan)
Korea	Green Transport Strategy of Korea(MOLIT,2014)
	Seamless Transport (transit center in Korea)(Korea Transport Institute, 2014)
	Travel all over the nation with one transportation card(MOLIT,2015)
New Zealand	Total Mobility Scheme - a guide for local authorities(MOT)
	Total Mobility Scheme Review(MOT)
Singapore	Smart Mobility 2030(LTA)
Unites States	Chicago Streets for Cycling Plan 2020(Chicago City)
	Washington Park Arboretum Mitigation Plan(Washington State)
Viet Nam	Exhaust Emission Control Plan for In-Use Motorcycles and Mopeds in the Provinces and City(MOT)

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