

Country Name	<b>The Project for Development of Traffic Control System for Expressway in Hanoi</b>
Socialist Republic of Viet Nam	

**I. Project Outline**

Background	In Viet Nam, construction of expressway network was in progress so as to cope with rapidly increasing traffic demand at the time of ex-ante evaluation (2011). However, reporting of incidents (accidents) depended upon communication from road users, and it took time to grasp exact location and situation of incidents. Traffic regulation was able to be made only on incident site by dispatched staff, which also took time. In order to improve such situation, development of traffic control system was the most pressing issue, which enables early detection of incidents, confirmation of exact situation, quick decision of proper traffic regulation, and prompt indication of traffic regulation sign.			
Objectives of the Project	To enable prompt collection of precise road information on the expressways and proper actions against incidents and other events by introducing the technology of control system (Intelligent Transport System (ITS)) in the expressways in Hanoi metropolitan area, thereby contributing to ensuring smooth traffic in the expressways in the area.			
Contents of the Project	<ol style="list-style-type: none"> <li>1. Project Site: Hanoi City and surrounding area (Ha Nam Province)<sup>1</sup></li> <li>2. Japanese side: Provision of grant necessary for procuring ITS equipment (closed-circuit television (CCTV) cameras, variable message sign (VMS) boards, mobile VMS, control system and communication system etc.)</li> <li>3. Vietnamese side: Power supply for roadside equipment including installation of distribution boards, and preparation of space and power supply for control center equipment in the traffic control center, etc.</li> </ol>			
Project Period	E/N Date	March 29, 2012	Completion Date	July 16, 2014 (Handing over of equipment)
	G/A Date	March 29, 2012		
Project Cost	E/N Grant Limit / G/A Grant Limit: 527 million yen, Actual Grant Amount: 434 million yen			
Executing Agency	Vietnam Expressway Corporation (VEC)			
Contracted Agencies	Main Contractor: Panasonic System Solutions Japan Co., Ltd. Main Consultants: Oriental Consultants Co., Ltd. and Metropolitan Expressway Co., Ltd. (JV)			

**II. Result of the Evaluation**

&lt;Special Perspectives Considered in the Ex-Post Evaluation&gt;

- [Target Year for Evaluation] In the ex-ante evaluation sheet, it is stated that the target year for evaluation is 2016, which is three years after project completion (The project was planned to be completed in September 2013). However, this project was completed in July 2014 and three years after project completion is July 2017. Thus, in the ex-post evaluation, the target year was changed to 2017.
- [Supplemental Information for Evaluating Impact] Indicators for evaluating impact of this project (contributing to ensuring smooth traffic in the expressways in the Hanoi metropolitan area) are not stated in the ex-ante evaluation sheet. Thus, in the ex-post evaluation, whether (how and to what extent) time required for smooth traffic to be recovered has been shortened was checked qualitatively.

**1 Relevance**

&lt;Consistency with the Development Policy of Viet Nam at the Time of Ex-Ante and Ex-Post Evaluation&gt;

The project has been consistent with Viet Nam's development policies such as "development of transportation infrastructures" as set forth in "National Socio-Economic Development Plan (NSED) (2011-2015)", "The Development Strategies for Transport Sectors for the Year 2030" and "NSED (2016-2020)".

&lt;Consistency with the Development Needs of Viet Nam at the Time of Ex-Ante and Ex-Post Evaluation&gt;

The project has been consistent with Viet Nam's development needs for ITS (particularly traffic control system) at the times of both ex-ante and ex-post evaluations.

&lt;Consistency with Japan's ODA Policy at the Time of Ex-Ante Evaluation&gt;

The project was consistent with Japan's ODA policy as stated in "the Country Assistance Program for Viet Nam (2009)" (which included support for the development of public transportation and communications networks).

&lt;Evaluation Result&gt;

In light of the above, the relevance of the project is high.

**2 Effectiveness/Impact**

&lt;Effectiveness&gt;

The project has partially achieved its objectives. ITS equipment procured under the project were operated for 24 hours throughout a year except for days of maintenance and repair works after project completion until May 2017 (see below for details). Targets for both Indicators 1 and 2 were achieved after project completion. A place where a traffic incident occurred was immediately and accurately identified by the ITS equipment including CCTV cameras, and the information on the incident was broadcasted to road users the fastest through VMS boards, which would help road users to adjust their route in the most efficient way. The ITS equipment also enabled Vietnam Expressway Operation and Maintenance JSC (VEC O&M) to convey traffic information to traffic police and other agencies possessing emergency vehicles such as ambulances and wreckers much faster than previously. Moreover, a structured manual was prepared under the project, based on which staffs of VEC O&M would decide how to process traffic information. This also shortened the required time to provide traffic information to road users and dispatch an emergency vehicle. However, the procured equipment except for mobile VMS

<sup>1</sup> The target section is Ring Road No.3 (approximately 10km from the interchange National Highway-5 to Phap Van) and National Highway-1 (approximately 30km from Phap Van to Cau Gie).

have not been used since May 2017 due to breakdown of optical fiber networks and power system caused by construction works for extension of the expressway between Phap Van to Cau Gie under a Build-Operate-Transfer (BOT) project<sup>2</sup>. Thus, targets have not been achieved since then. After the breakdown, relevant agencies have been working to solve the problem.

<Impact>  
The expected impact was observed to a certain extent until May 2017. According to VEC, as information on a traffic incident was timely provided from the ITS equipment to road users and agencies possessing emergency vehicles and staffs in charge of incident management within VEC O&M were well coordinated, smooth traffic became able to be recovered in a shorter time in the Hanoi metropolitan area in the event of traffic incident compared with the time required before project implementation. However, quantitative data and information on such impacts were not available.

Regarding other impact, no negative impact on natural environment has been observed and no land acquisition and resettlement has been occurred under the project. In addition, equipment procured under the project were also frequently utilized for trainings and demonstrations on incident management for staffs of VEC O&M every month and for traffic police every quarter until May 2017, by which traffic control and incident management on the expressways in the Hanoi metropolitan area were strengthened.

<Evaluation Result>

Therefore, the effectiveness/impact of the project is fair.

#### Quantitative Effects

Indicators	Baseline 2011 Baseline Year	Target 2017 3 Years after Completion	Actual 2015 1 Year after Completion	Actual 2016 2 Years after Completion	Actual 2017 (until May) 3 Years after Completion
Indicator 1: Required time to provide traffic information to road users in the expressways in Hanoi metropolitan area (minute)	Approximately 30-40 (Interval of updating of information in radio broadcasting)	Approximately 5	Approximately 3	Approximately 3	Approximately 3
Indicator 2: Required time to dispatch emergency vehicle after event occurred in the expressways in Hanoi metropolitan area (minute)	Approximately 30	Approximately 5	Approximately 3-5	Approximately 3-5	Approximately 3-5

Note: Indicator 2 means 'time required until dispatching emergency vehicle after event occurred (not include actual traveling time to an incident site)', as an emergency vehicle was not included in project outputs.

Source: Ex-Ante Evaluation Sheet, Preparatory Survey Report, Questionnaire Survey and interview with VEC

#### 3 Efficiency

The outputs of the project were produced mostly as planned<sup>3</sup>. While the project cost was within the plan, the project period exceeded the plan, because (i) the plan did not include the procurement period for the consultancy services, (ii) there were delays in preparation of legal documents for establishing the management board of the contractor and in obtaining construction license and (iii) capacity of sub-contractor was limited etc. (ratio against plan: 82%, 153%, respectively). Therefore, the efficiency of the project is fair.

#### 4 Sustainability

<Institutional Aspect>

VEC is responsible for O&M of the ITS equipment procured under the project, and VEC O&M, one of the member units of VEC, is engaged with actual O&M works of the equipment at the time of ex-post evaluation. There are three staffs engaged in O&M of the equipment: one staff from the Operation Management Department in VEC is responsible for approving cost estimation and operation, maintenance and repair plans of the ITS equipment; one staff from Vietnam Expressway Monitoring and Operation Center in VEC is responsible for monitoring and evaluation of operation of the ITS equipment; and one staff from Cau Gie - Ninh Binh Management Center in VEC O&M is responsible for ITS management and actual O&M of the equipment. The personnel plan for O&M of system is approved by the Directorate for Roads of Vietnam (DRVN), in which the number of staff required for ITS management and actual O&M of the equipment is stated as three staffs. VEC O&M had assigned three staffs according to the approved personnel plan until May 2017. However, only one staff has been assigned since May 2017, as the ITS equipment except for mobile VMS have not been used since then as explained above and one staff is sufficient for patrol preventing theft of ITS equipment and O&M of mobile VMS. As for O&M after the recovery of ITS equipment, it was determined at the meeting held in April 2019 among the Ministry of Transport (MOT), the higher authority of VEC, VEC, DRVN, and related agencies that VEC would handover O&M for the equipment to DRVN. DRVN has carries out operation and maintenance of ITS on expressways other than this project section, so that there is no problem in terms of institutional aspect after ITS recovery.

<Technical Aspect>

Technical staff who were trained under the project are still in charge of O&M of the equipment procured under the project, and necessary O&M works including daily inspection (checking of operation and cable connections and cleaning), periodical inspection and trouble shooting are carried out without problems. In accordance with the design of the project, repairing of equipment is outsourced to

<sup>2</sup> During construction works, the BOT investor of the expressway piled guardrails which had the depth structure nearly two meters underground. This together with relocation of power box and electric transformation station caused the breakdown of optical fiber and power system.

<sup>3</sup> One Mobile VMS was added due to requirement from VEC.

suppliers (original manufacturers). As stated above, equipment procured under the project were frequently utilized for trainings and demonstrations on incident management for staffs of VEC O&M every month and for traffic police every quarter until May 2017. However, at the time of ex-post evaluation, there is no training conducted. Nonetheless, while no training is conducted, no technical problem was observed regarding O&M of the ITS equipment, as technical staff who were trained under the project are still in charge of O&M and no new staff has been assigned. Besides that, according to the instructions of MOT at the meeting in April 2019, after handing over the system, VEC will continue to assign necessary officials to support DRVN during the initial operation of system, to ensure the continuous exploitation of the system.

<Financial Aspect>

O&M budget for the equipment procured under the project including cost for repair works has not been allocated by MOT, , and VEC has allocated its own budget for inspection and minor repair works in some cases<sup>4</sup>. However, VEC does not have specific budget for O&M of the procured equipment, and thus it has not been able to disburse O&M budget for the procured equipment sufficiently. VEC plans to put into operation some expressway projects soon and submit to the government the financial plan for five expressway projects for which VEC is an investor, and this plan will merge VEC's income sources and enable VEC to cover some projects' O&M costs. Moreover, MOT has assigned DRVN to work with VEC and relevant entities to study and propose a plan to secure sufficient O&M budget for the procured equipment. As for the non-functioning ITS system since May 2017 explained above, in October 2018 the Vice Minister of MOT has instructed VEC and the BOT investor of the expressway between Phap Van to Cau Gie called BOT PV-CG to allocate resources themselves to repair and put the system back into operation as soon as possible. In addition, it was confirmed at the above-mentioned meeting in April 2019 that cost for repair works and O&M after the recovery of ITS equipment would be allocated by MOT.

<Current Status of Operation and Maintenance>

VEC O&M has conducted O&M works of the equipment procured under the project such as daily inspection (checking of operation and cable connections and cleaning), periodical inspection and trouble shooting as expected in the ex-ante evaluation. However, works requiring quite a large amount of budget such as replacement of consumables and repairing works by suppliers (about 13 traffic monitoring cameras have broken Power over Ethernet (PoE) and one VMS board has broken LED module, which needs to be repaired by suppliers) have been pending due to lack of budget. As for the non-functioning ITS system due to breakdown of optical fiber networks and power system since May 2017, repair works of the damages have been conducted by VEC and BOT PV-CG and from March 2019, the ITS system has been partially restored and used but there are still pending issues such as reconnection of cabinets of a power system and some troubles with a signal line system. VEC and BOT PV-CG still work on these issues to fix the networks as soon as possible.

<Evaluation Result>

Therefore, the sustainability of the project effect is fair.

5 Summary of the Evaluation

The project partially achieved its objective of enabling prompt collection of precise road information on the expressways and proper actions against incidents and other events, as the ITS equipment procured under the project functioned well until May 2017. The expected impact of contributing to ensuring smooth traffic in the expressways has been observed to a certain extent, as smooth traffic became able to be recovered in a shorter time in the Hanoi metropolitan area upon traffic incidents compared with the time required before project implementation. For the sustainability, some problems were found such as lack of budget and the non-functioning ITS system since May 2017. At the time of ex-post evaluation, VEC and BOT PV-CG were conducting repair works of the damages so that the optical fiber networks and power system can be resumed as soon as possible. As for efficiency, the project period exceeded the plan.

Considering all of the above points, this project is evaluated to be partially satisfactory.

### III. Recommendations & Lessons Learned

Recommendations to Executing Agency:

- As stated above, VEC does not have specific budget for O&M of the procured equipment, and thus it has not been able to disburse O&M budget for the procured equipment sufficiently. Vietnamese side such as MOT, DRVN, VEC and relevant entities should take an immediate action to establish a mechanism to allocate necessary budget for O&M of the procured equipment so that VEC can undertake the necessary works.

Lessons Learned for JICA:

- Regarding O&M budget for the procured equipment, it is necessary to check the feasibility of O&M budget allocation and remind a counterpart agency in a recipient country to make a plan of budget allocation including sources of budget, estimated amount and responsible organization well before the time of project completion.
- As stated above, the BOT investor caused damages to the optical fiber networks and power system, however, he BOT investor did not take a prompt action to recover the damages. Thus, it is necessary for JICA to make agreements with a counterpart agency in advance that in case a private company is contracted with certain works on road sections where equipment procured under the project are installed, the counterpart agency should state within the contract with the contractor (private company) related parties' responsibilities in case damages are caused during construction works to secure enforceability and should take legal actions based on the contract promptly.

<sup>4</sup> Detailed financial data on O&M of equipment was not available.



Camera procured under the project



Operation room