Socialist Republic of Viet Nam

FY2018 Ex-Post Evaluation of Japanese ODA Loan

"Vinh Phuc Province Investment Climate Improvement Project"

External Evaluator: Kenichi Inazawa, Ernst & Young ShinNihon LLC

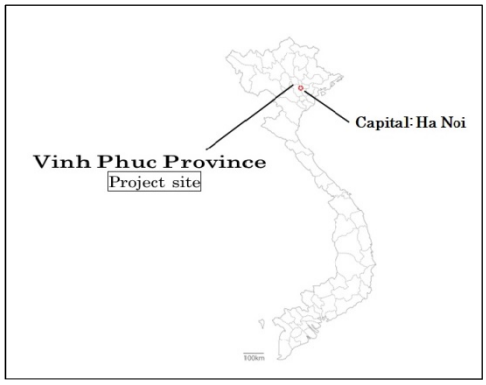
0. Summary

This project involved infrastructure development, including road, water supply and sewage services and electricity, along with reinforcing the capacity of investor support system in the industrial parks area of Vinh Phuc Province, in order to facilitate vehicle transportation, respond to demand for water supply and sewage services, and reinforce the electricity supply; thereby contributing to the promotion of investment and stimulation of socioeconomic activities. Relevance of this project is high because the Government of Vietnam has indicated the importance of infrastructure development through *the Strategy for Socioeconomic Development for the Period of 2001-2010* and *the five-year Socioeconomic Development Plan from 2016-2020*, etc., and the project maintains consistency with the development needs for Vietnam's industrial development and urban growth along with Japan's ODA policy. As for efficiency, the project's outputs were almost according to plan, but project costs slightly exceeded the initial plan due to an increase in land acquisition and compensation costs. The project period also slightly exceeded the initial plan because of the time required for land acquisition and to complete bidding and contractual procedures. Therefore, the efficiency is fair. In terms of quantitative effect indicators, the project almost achieved the facilitation of transportation and reduced travel time through the road development project, stable water supply and increase in the population served through the water supply project, increase in sewage treatment and reduction in BOD concentration[1] through the sewage project, and reduced electricity distribution loss, reduced power outage time, and increased sales volume in the electricity project. In addition, the project led to the achievement of investment promotion and socioeconomic stimulation, and as a result, the project has a high effectiveness and impact. There are no particular concerns in terms of the institutional, technical or financial aspects of the organizations in charge of the operation and maintenance of the project. There are no particular problems in terms of the operation and maintenance status of the facilities and equipment. Thus, sustainability of the effects realized through this project is high.

In light of the above, this project is evaluated to be highly satisfactory.

[1] "Biochemical Oxygen Demand" refers to the amount of oxygen required for the decomposition of organic matter in water.

1. Project Description



Project Location

Road Developed under the Project

1.1 Background

Foreign direct investment (FDI) in Vietnam has been increasing since the 1990s. In 2005, FDI accounted for around 16% of the country's Gross Domestic Product (GDP). However, investment trends in Vietnam's northern region indicate a strong tendency for investment to concentrate solely in the capital of Hanoi, which has become a factor behind environmental impacts and socioeconomic distortions. As a result, there was a need for balanced and sustainable growth across the country's entire northern region. Vinh Phuc Province, the target region for this project, is one of eight provinces forming the major economic zone in the country's northern region. The industrialization and urbanization of this province was absorbed by Hanoi's growth and momentum was seen as stagnating. Attracting investment to this province was seen as a promising way to alleviate the over-concentration of investment in the capital of Hanoi, but because this province lacked sufficient basic infrastructure of water supply and sewage services, electricity supply and roadways vital to industrial development and urban growth to cope with demand, countermeasures for future population increases and industrialization became an urgent task.

1.2 Project Outline

The objective of this project is to realize smooth vehicle transportation, respond to demand for water supply and sewage services, and reinforce the electricity supply, by improving socioeconomic infrastructure such as road, water supply and sewerage, electricity, and by reinforcing the capacity of investor support system in the industrial parks area of Vinh Phuc

Province[2]; thereby contributing to promote investment and revitalize socioeconomics[3].

Loan Approved Amount/ Disbursed Amount	11,718 million yen / 11,277 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	March 2007 / March 2007
Terms and Conditions	【Road, water supply, and electricity project, consulting services】 Interest Rate:1.3% Repayment Period : 30 years (Grace Period: 10 years) 【Sewage project】 Interest Rate:0.75% Repayment Period : 40 years (Grace Period: 10 years) Conditions for Procurement: General Untied
Borrower / Executing Agency	The Government of the Socialist Republic of Vietnam / Vinh Phuc Province People's Committee (hereinafter, "VPPC")
Project Completion	December 2017
Target Area	Vinh Yen City, Phuc Yen City, Vinh Phuc Province
Main Contractor (Over 1 billion yen)	・Posco Engineering & Construction Co., Ltd.(South Korea) ・Vietnam Water and Engineering Investment Cooperation (Vietnam) ・Swing Corporation (Japan) / Hanshin Engineering & Construction Co., Ltd. (South Korea) (JV)
Main Consultant (Over 100 million yen)	Nippon Koei (Japan)/Poyry Infra Ltd. (Switzerland) (JV)

[2] Vinh Phuc Province is situated about 50 km from the capital of Hanoi and about 25 km from Noi Bai International Airport, the gateway to Vietnam's northern region by air. It is located about 150 km from the Port of Haiphong, a major port, and about 165 km from the Port of Cai Lan. This close proximity gives the province advantages in the transport of goods and people. The province's population is about 1.07 million (based on data of 2016) and it covers 1,237 k m². Its major cities include Vinh Yen and Phuc Yen.

[3] The project outline at the time of the appraisal noted "This project will develop infrastructure, including road, water supply and sewage and electricity, along with reinforce the system for accepting investment in the industrial park area of Vinh Phuc Province, in order to promote investment in the province and as a result contribute to the vitalization of the regional economy and socioeconomic development in the Hanoi Capital Region." However, through this survey, it was found that this project did not contribute highly to socioeconomic development in the Hanoi Capital Region and there were extremely high expectations for contributions to this province from the initial stages of this project. After organizing the project's logic (relationship of outputs, outcomes, and impacts) taking into account the details of the project, it is more suitable to say that the effects of the impact level contributed to the socioeconomic development of the province rather than socioeconomic development in the Hanoi Capital Region. As a result, the project outline has been reorganized upon this evaluation.

Feasibility Studies, etc.	F/S (by Vietnamese side, 2006)
Related Projects	【Technical Cooperation】 "Project for Capacity Improvement of Foreign Direct Investment Management Promotion" (2007) (JICA) 【Other Donors' Cooperation】 "SME Development Program–Subprogram Loan II" (2006) (ADB)

2. Outline of the Evaluation Study

2.1 External Evaluator

Kenichi Inazawa, Ernst & Young ShinNihon LLC[4]

2.2 Duration of Evaluation Study

This ex-post evaluation study was conducted with the following schedule.

Duration of the Study: August 2018-June 2019

Duration of the Field Study: 21 October-8 November 2018 and 24 February- 2 March 2019

3. Results of the Evaluation (Overall Rating: A[5])

3.1 Relevance (Rating: ③[6])

3.1.1 Consistency with the Development Plan of Vietnam

Prior to the start of this project, the Government of Vietnam established *the Strategy for Socioeconomic Development for the period of 2001-2010* and *the Strategy for the Five-Year Socioeconomic Development Plan for 2006-2010*, which cited as policy targets the promotion of industrialization and modernization projects as well as the strengthening of economic competitiveness. In addition, the VPPC of Vinh Phuc Province established *the 5-year Socioeconomic Development Plan 2006-2010*, which identified electricity, roads, water supply and sewage, telecommunications, and waste disposal as development priorities in order to attract and promote investment.

At the time of the ex-post evaluation, the Government of Vietnam established *the Socioeconomic Development Strategy for the period of 2011-2020*, while Vinh Phuc Province established *Master planning for Vinh Phuc tourism development to 2020, vision to 2030*, which focus on socioeconomic infrastructure for establishing a climate conducive to increasing

[4] In this survey, the external evaluator who belongs to Octavia Japan Co., Ltd. participated as reinforcement.
[5] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
[6] ③: High, ②: Fair, ①: Low

economic competitiveness and attracting companies and promoting investment, etc.

Based on the above, importance is being placed on economic infrastructure development for attracting companies and investment in Vietnam and in Vinh Phuc Province, throughout the time of the project's appraisal and ex-post evaluation. Consequently, the consistency of this project with policy and measures in the national development plan and sector plan is acknowledged.

3.1.2 Consistency with the Development Needs of Vietnam

Prior to the start of the project, Vinh Phuc Province lacked sufficient basic infrastructure of water supply and sewage services, power supply and roadways vital to industrial development and urban growth, and as such, development aimed at future population increases and industrialization was an urgent task. Specifically, in terms of roadways, there were strong needs to connect the province's capital of Phuc Yen with downtown Hanoi to shorten travel time. In terms of water, demand for household water connections in the province was forecast to exceed the supply capacity of the water treatment plant in the future. In terms of sewage, there was almost no infrastructure for sewage or wastewater treatment in Phuc Yen and Vinh Yen. In addition, there was an immediate requirement to establish wastewater treatment facilities because there were none even in the province's major industrial parks. As for power distribution, there were frequent blackouts due to the lack of a backup system mutually connecting the power distribution grid owing to the lack of standard voltage. Power distribution lines were also aging, requiring the construction of additional substations, standardization of voltage, and repairs to distribution lines.

At the time of the ex-post evaluation, the VPPC continues to work on the establishment of socioeconomic infrastructure. The VPPC is implementing an expansion plan of water supply and sewage service facilities based on expected future increases in demand for water supply and sewage services found in *the five-year Socioeconomic Development Plan from 2016-2020* mentioned above. In 2018, the province completed development of Thang Long Industrial Park III (total area of 213ha) and in the future it expects factories, offices and stores to open there. In addition, the province has a total of 11 industrial parks (total area of 2,255.7ha). In the near future, the VPPC plans to increase this number to 18 covering a total area of 5,228ha[7]. In terms of power distribution, according to the VPPC, "Demand for electricity in the province is increasing annually. This demand will rise about 18% per year in the industrial sector between 2016 and 2020. At the same time, demand is expected to increase about 15% per year in the same sector between 2020

[7] In addition, the VPPC plans to expand roads connecting various cities in the province (Binh Xuyen, Yen Lac, and Vin Tuong) with Vinh Yen and Phuc Yen and promote industrial and urban development.

and 2025. As a result, the province requires further stable supplies of electricity."

Based on the above, throughout the time of the appraisal and ex-post evaluation, the project is judged to have a high consistency with the development needs in Vinh Phuc Province with regard to socioeconomic infrastructure development.

3.1.3 Consistency with Japan's ODA Policy

The Country Assistance Program for Vietnam formulated in April 2004 by the Government of Japan states, "Japan provides assistance for promotion of economic growth and enhancement of competitiveness through the promotion of market economy, improvement of the investment environment and development of economic infrastructure." In addition, in April 2005 JICA formulated *the Medium-Term Strategy for Overseas Economic Cooperation Operations* that cites "infrastructure development aimed at sustainable growth" as a priority area of assistance. Within this policy, it clearly states that the development of socioeconomic infrastructure as a base for private-sector activities (facilities for transport/logistics, energy, information/communications, irrigation, and water supply and sewage services) will play an important role. Furthermore, JICA formulated *the Country Assistance Strategy* in 2006 that cited as major sectors the transition to a market-based economy along with transport, electricity, and environmental sectors. In particular, assistance policy for the environmental sector stated, "assistance will be considered for improving the living environment through water supply and sewage/wastewater treatment projects and waste disposal targeting major cities and industrial areas in order to prevent and improve environmental degradation caused by urbanization."

Based on the above, this project can be said to align with Japan's ODA policy because it aimed to develop infrastructure and reinforce capacity of investor support system.

This project has been highly relevant to Vietnam's development plan and development needs, as well as Japan's ODA policy. Therefore, its relevance is high.

3.2 Efficiency (Rating:②)

3.2.1 Project Outputs

This project involved infrastructure development for the road, water supply and sewage services and electricity projects, in the industrial areas of Vinh Phuc Province, along with consulting services reinforcing the province's system for accepting investment. Table 1 contains

the output plan and results for this project, indicating that the project was carried out almost as initially planned.

Table 1: Planned and Actual Outputs of this Project

Plan at time of appraisal (2007)	Results at the time of the ex-post evaluation (2018)
1) Civil works and procurement of equipment, etc.	
a) Road: 4-lane road connecting Me Linh and Hanoi (15 km) b) Water supply: Lo River water intake facility (50,000 m^3/day), water treatment plant (30,000 m^3/day), Hop Thinh reservoir (6,300 m^3/day), water transmission pipes (3 km) and water supply pipes (9 km; eastern region including Vinh Yen) c) Sewerage: Vinh Yen sewage treatment plant (5,000 m^3/day), sewage relay pump (6), and sewage and wastewater pipes (16 km) d) Electricity: Standardization of distribution voltage in Vinh Yen and Phuc Yen and expansion of transformers for distribution (22/0.4 kV, 430 locations), and repairs to distribution lines (about 350 km)	a) Road: As planned b) Water supply: Almost as planned (however, the specification of Hop Thinh reservoir was changed to 7,000 m^3/day) c) Sewerage: Almost as planned (sewage relay pumps reduced to 5 and wastewater pipes reduced to 7.9 km) d) Electricity: Scope reduced. Standardization of distribution voltage in Vinh Yen and Phuc Yen and expansion of transformers for distribution (22/0.4 kV, reduced to 325 locations), and repairs to distribution lines (reduced to 188 km)
2) Consulting services	
Detailed design, bid assistance, construction management, reinforcement of investor support system of provincial government, reinforcement of PMU's organization, reinforcement of organizational system of operation and maintenance agency	As planned

Source: Document provided by JICA, answers to the questionnaires, and interview results to VPPC (actual at the time of ex-post evaluation).

1) Civil Works and Equipment of Procurement, etc

a) Road project: Implemented as planned. In regard to the four-lane road connecting Me Linh and Hanoi, in 2008 after the start of this project Me Linh, part of the target area of the project, was transferred to the Hanoi People's Committee[8]. As a result, 12.8 km of the 15 km target section was placed under the control of the Hanoi People's Committee. The VPPC controls the other 2.2

[8] Prior to the start of this project, Me Linh was part of Phuc Yen in Vinh Phuc Province. Me Linh was considered a satellite city of the capital of Hanoi and development plans were underway, but after the start of this project, Me Linh was transferred to Hanoi based on a political judgement coupled with the gradual expansion of its urban area.

km section.

b) Water supply project: Implemented almost as planned. The demand forecast at the time of the detailed design was reviewed, resulting in changes in the specification of Hop Thinh reservoir's capacity from 6,300 m^3/day to 7,000 m^3/day.

c) Sewerage project: The quantity of sewage relay pumps and wastewater pipes were reduced compared to the plan. According to VPPC, the quantity of facilities was reviewed based on a detailed examination of the actual situation in the field conducted at the time of the detailed design. As such, the scope of the plan was changed to 5 sewage relay pumps and 8.6 km of wastewater pipes. Later, the length was further reviewed based on the situation in the field during the construction phase, with the actual length becoming 7.9 km[9].

d) Electricity project: The number of transformers for distribution as well as the length of distribution lines for repair were reduced compared to the plan. According to the VPPC and Vinh Phuc Electricity Company[10] (VPEC), the reason is because (1) as noted above, Me Linh was transferred to the Hanoi People's Committee, which excluded it from the scope of the project[11] and (2) reviews at the time of the detailed design and other factors[12].

2) Consulting Services

Implemented as planned. Of the consulting services, "reinforcement of investor support system of provincial government" mainly involved supporting investment promotion activities, informing/supporting international investors about industrial parks in Vinh Phuc Province, and supporting public relations related to investment promotion activities (website development, preparation of public relations materials, preparation of email magazine/pamphlets), etc.

[9] The scope was finalized based on a careful examination of the actual situation in the field. This change was not due to a lack of project funding. At the time of the ex-post evaluation, the government of Vinh Phuc Province planned to extend wastewater pipes and increase the number of connected households using a project funded by itself as well as *the Second Cities Development Project (Green cities)* run by the Asian Development Bank (ADB).

[10] Organization in charge of the operation and maintenance of the project's electricity component. A public electricity company under the umbrella of Power Company No. 1 (PC1), an affiliated company of Vietnam Electricity (EVN).

[11] On the other hand, the Hanoi People's Committee is increasing the number of transformers for distribution and carrying out repair work using its own funds.

[12] This survey selected five locations in Vinh Yen and five locations in Phuc Yen (total of 10 locations: downtown area including university and vicinity of commercial facilities, etc.) in order to confirm the situation of transformers for distribution installed by this project along with repaired distribution lines. The survey confirmed the situation pertaining to operation and maintenance of these facilities. The survey found that the operating status of all of the facilities and equipment is good and there are no failures or deficiencies.

3.2.2 Project Inputs

3.2.2.1 Project Cost

The total project cost at the time of the project's appraisal was planned to be 14,049 million yen (of this, 11,718 million yen was covered by yen loan). The actual total project cost was 19,499 million yen (of this, 11,277 million yen was covered by yen loan), which exceeded the plan (approx. 139% of the plan). The main reason for this overrun was an increase in the cost of land acquisition and compensation. Specifically, because of the revision of country's Land Act by the central government and VPPC during the project implementation[13],the scope of land acquisition increased and land prices in Vinh Phuc Province rose (actual price of commercial land, farmland, and residential land), resulting in significant increase in the amount of land acquisition costs borne by the VPPC to eligible persons[14]. As explained below in "3.3.2.2 Other Positive and Negative Impacts (Land Acquisition and Resettlement)," land prices rose sharply during the project implementation. In countries with robust economic growth, such as Vietnam, land prices rise alongside their growth. While the difficulty of forecasting increases in land acquisition costs at the time of the project's appraisal can be presumed, it is determined that the necessary social considerations were steadily given based on paying the appropriate compensation to land owners.

3.2.2.2 Project Period

Table 2 shows the project's planned and actual periods. At the time of the project's appraisal, the project period was planned for the 7 years 5 months from March 2007 to July 2014 (89 months). However, the actual project period was the 10-year 10-month period from March 2007 to December 2017 (130 months), exceeding the plan (approx. 146% of the plan)[15]. The main reason for this is due to greater-than-expected difficulties in 2) land acquisition procedures. Procedures fell behind schedule due to the requirement of more time than expected for the confirmation of land inheritors, etc., and delays in legal procedures including compensation. As a result, the start of construction was delayed, extending the period of consulting services. Elsewhere, in terms of 3) Contractor's bidding and contracts, mainly related to the water project, the winning bid of the construction company exceeded the initial planned cost of the Vietnamese

[13] Mainly the target was road projects.

[14] As one example, in the road project, according to the VPPC, the average price of farmland swelled by around four times the initial estimate. As another reason, the road section subject to development was expected to see an increase in traffic volume and the need for a wider road in the future (a maximum width of around 100 meters was expected compared to the actual width of between 41 and 68 meters). As a result, the VPPC acquired a large area of land in advance to accommodate such expectations.

[15] At the time of the project's appraisal, the end of the warranty period was set as the completion period. In other words, considering the results in Table 2, the completion period of this project was December 2017.

side, which required Vinh Phuc Province to spend some time to obtain approval from the central government and prime minister's office[16].

Table 2: Planned and Actual Periods

		Planned	Actual
(Whole project)		March 2007 - July 2014 (89 months)	March 2007 - December 2017 (130 months)
1) Consulting services		October 2007 - July 2012	May 2008 - October 2016
2) Procedures of land acquisition		April 2007 – March 2009	April 2007 – March 2016
3) Procedures of bidding and contract		May 2008 - May 2010	August 2010 - March 2014
4) Construction work and warranty period		May 2009 - July 2012 (Warranty period is until July 2014.)	September 2011 - December 2017
【Details about construction work and warranty period of each project (Actual)】			
	Road project		September 2011 – May 2016 (Warranty period: October 2016 – October 2017)
	Water Supply Project		May 2014 – October 2016 (Warranty period: October 2016 – October 2017)
	Sewerage project		December 2011 – May 2015 (Warranty period: August 2015 – August 2016)
	Electricity project		December 2011 – December 2016[17] (Warranty period: June 2015 – December 2017[18])

Source: Document provided by JICA, answers to the questionnaires

3.2.3 Results of Calculations for Internal Rates of Return (Reference only)

Financial Internal Rate of Return (FIRR)

At the time of the project's appraisal, FIRR was calculated using the water tariff revenue (water service) and electricity sales revenue (electricity) as the benefits and the construction cost and operation and maintenance expenses as the costs, assuming a project life of 40 years. The result was 9.2% for water services and 17.5%[19] for electricity. The results of the recalculation of FIRR using the same conditions yielded 11.8% for water services and 16.4% for electricity. The reason why FIRR of the water service exceeded the assumption at the time of the project's appraisal is because the benefits exceeded expectations due to revisions to water tariffs in line with Vietnam's

[16] 3) The actual start of bidding and contracts was August 2010, which was delayed compared to the plan. The reason is because after the selection period for the consultant (April 2007 to May 2008), time was required for procurement support by the selected consultant (site survey, preparation of project specification document) and the process for procedures and approval within the VPPC, between May 2008 and October 2010. According to the VPPC, this period (around two years) is the typical period required, and it does not acknowledge this as a particularly major delay. After that, the procurement process (bidding and contract) for the contractor was initiated (after August 2010).

[17] Breakdown: Vinh Yen is from December 2011-June 2015, and Phuc Yen is from December 2011-December 2016.

[18] Breakdown: Vinh Yen is from June 2015-June 2016, and Phuc Yen is from December 2016-December 2017.

[19] This FIRR was calculated as 11.2% at the time of the project's appraisal, but after scrutinizing the basis of the calculation, this survey determined it to be 17.5% when recalculating by eliminating redundancies found in the accounting of costs during the calculation process. As a result, this survey compared the IRR by comparing this value with the value at the time of the ex-post evaluation.

economic situation, while the operation and maintenance cost was below expectations at the time of the project's appraisal. The reason why FIRR of electricity was slightly below assumption at the time of the project's appraisal is because of the impacts whereby the benefits declined due to the reduction in the scope of distribution facilities and distribution lines, despite the construction cost as well as operation and maintenance cost falling below the assumption at the time of the project's appraisal.

Economic Internal Rate of Return (EIRR)

At the time of the project's appraisal, EIRR was calculated using shortened travel time and reduction of vehicle operation costs (road), effect of reduced operation and maintenance costs (compared to when using the Red River as an intake source) (water service), effect of reduced operation and maintenance costs (compared to when using onsite treatment facilities) (sewage), and effect of reduced electricity generation costs (compared to when using onsite power generators) (electricity) as the benefits and the construction cost and operation and maintenance expenses as the costs, assuming a project life of 40 years. The result was 9.8% for road, 23.4% for water services, 17.3% for sewage and 10.8% for electricity. The results of the recalculation of EIRR using the same conditions yielded 17.5% for road, which exceeded the figure from the time of the project's appraisal (9.8%). This is because the operation and maintenance costs are below the assumptions at the time of the project's appraisal along with positive developments in the economic situation, including significant gains in average wage of workers, used as a calculation basis for the benefit of shortened travel time. As for EIRR of water supply, sewerage, and electricity, recalculation was attempted using numerical values of benefits at the time of project appraisal. It was 11.9% for water supply, 20.2% for sewerage, and 13.3% for electricity. The reason for the fact that the value of water supply was lower than at the time of the appraisal is that the benefit in the project life (starting from the point of the loan agreement) decreased due to the delay in the completion of the construction. The reason why the values of sewerage and electricity are slightly higher than at the time of the appraisal is that the construction and maintenance costs were lower than at the time of the appraisal.

The project's outputs were almost according to plan, but project costs slightly exceeded the initial plan due to an increase in land acquisition and compensation costs. The project period exceeded the initial plan because of delays from the time required for land acquisition and to complete bidding and contractual procedures. Based on the above, both the project cost and project period exceeded the plan. Therefore, efficiency of the project is fair.

3.3 Effectiveness and Impact[20] (Rating:③)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

Table 3 shows quantitative effect indicators (baseline, target and actual) of this project.

Table 3: Operation and Effect Indicators (Baseline, Target and Actual) of This Project

Indicators	Baseline (2006)	Target (2015: one year after completion)	Actual (2017: completion year[21])
【Road project】			
Annual Average Daily Traffic Volume (Unit: number of vehicle)	N/A	29,000 (2014's data.)	36,000
Travel Time (Thang Long Bridge to Phuc Yen) (Unit: minutes)	25	15	15-18
【Water supply project】			
Served Population in Target Area (Unit: people)	57,000	151,000	Approx.151,000
Amount of Water Supply (Unit: m^3/day)	16,000	46,000	46,000 (*Maximum capacity of water supply is 77,600.)
【Sewerage project】			
Amount of Waste Water Treated (Unit: m^3/day)	0	4,000	5,000-5,750
BOD Concentration (discharge) (Unit: mg/l)	N/A	Below 50	Approx.13-20
【Electricity project】			
Electricity Distribution Loss Rate (Unit: %)	5.62	Below 4.60	Vinh Yen: 3.09 Phuc Yen: 3.03
Power Outage Time per Annum (Unit: hours/year)	Vinh Yen: 256 Phuc Yen: 399	Vinh Yen: 51 Phuc Yen: 80	Vinh Yen: 10.05 Phuc Yen: 8.6
Electricity Sales Volume (Unit: 1,000MWh)	Vinh Yen: 102 Phuc Yen: 134	Vinh Yen: 412 Phuc Yen: 543	Vinh Yen: 589 Phuc Yen: 301

Source: Document provided by JICA (Baseline and Target), answers to the questionnaires and confirmation at the time of site inspection (Actual).

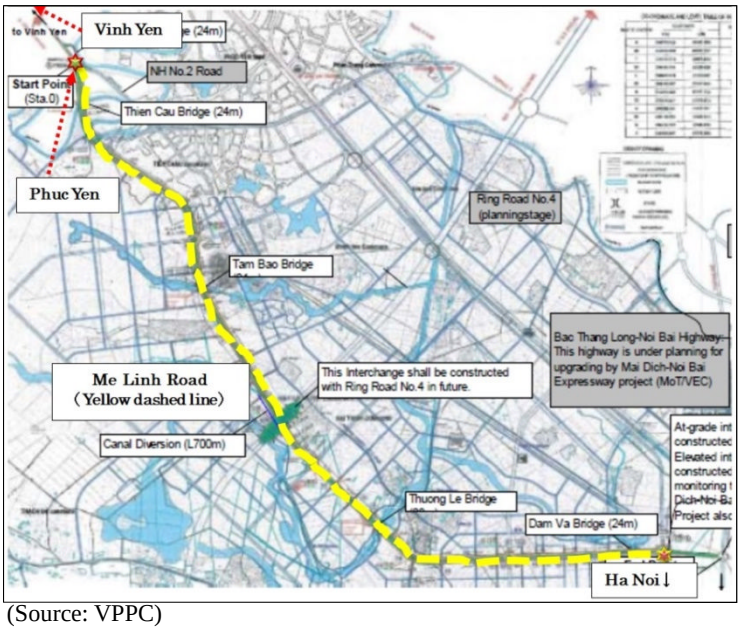
[20] Sub-rating for Effectiveness is to be put with consideration of impacts.

[21] Originally, data for 2018, one year after project completion, should have been obtained to compare with the target values, but this survey was performed in 2018, and therefore, data measurement was not possible, resulting in data for 2017 being used for the comparison.

The following presents analysis concerning each indicator:

【Road Project】

It was expected that the road component of this project would involve connecting Phuc Yen with downtown Hanoi directly. It was also expected to shift traffic volume from National Route 2A, the main thoroughfare for logistics in Vinh Phuc Province, and to promote proper sharing of transportation burdens. The actual figures for 2017 in terms of average daily traffic volume shown in Table 3 exceed the target. This demonstrates that after the completion of the target section (approx. 15km) the growing vitalization of the province's economic and industrial activities resulted in companies opening in industrial parks along with increased transport of supplies and products and factory worker commutes, which boosted transportation demand more than expected. The travel time (between Thang Long Bridge and Phuc Yen) is between 15 and 18 minutes. In actuality, the target section saw the development of intersecting connector roads after completion and four traffic signals were installed at connection points for ensuring traffic safety (Picture 1). In other words, if a vehicle is not stopped by a traffic signal, the travel time ends up at 15 minutes, and if a vehicle is stopped, the travel time is at most 18 minutes[22]. The reason for the development of connector roads is mainly because of development advancing in the vicinity caused by an increase in the transport of supplies and products along with factory worker commutes.



(Source: VPPC)

Figure 1：Location Map of Me Linh Road Developed by This Project

[22] During the time of this field survey, an actual vehicle was driven on a number of occasions to measure and confirm the travel time (13 times). It was also confirmed that there is no major difference in terms of peak (morning to early evening) and off-peak (night time) times.

【Water Supply Project】

The amount of water supply presented in Table 3 indicates water supply capacity (m^3/day). This project newly increased the water supply capacity by 30,000 m^3/day. In other words, the end result was a total of 46,000 m^3/day, based on adding the existing 16,000 m^3/day to the new capacity of 30,000 m^3/day from this project. The served population in the target area is around 151,000 people[23], indicating the effect is being realized as initially planned. As of the time of the ex-post evaluation, the maximum water supply capacity in the target area is 77,600 m^3/day (shown in table)[24]. As a background to this, while the construction start and completion of the water supply facility was delayed (started in May 2014, completed in October 2016), there was growing water supply demand from residential and commercial areas along with industrial parks in Vinh Yen. As such a private sector company in the city spearheaded a project to secure additional water supply capacity of 31,600 m^3/day by drawing up groundwater, without waiting for the completion of this project's facilities.

【Sewerage Project】

As for the actual figures for amount of waste water treated in Table 3, the basis for establishing 4,000 m^3/day as the target for amount of waste water treated at the time of the project's appraisal could not be confirmed. Elsewhere, as indicated in 3.2.1 Project Outputs at Efficiency section, this project planned to construct a water treatment plant with a capacity of 5,000 m^3/day in Vinh Yen and this facility was built as planned. The actual amount of waste water treated is between 5,000 and 5,750 m^3/day. According to Vinh Yen City People's Committee in charge of the operation and maintenance of sewage service facilities, the facility is operating at full capacity, and on some days water exceeds the plant's treatment capacity. In addition, BOD concentration (discharge) is between 13 and 20 mg/l, which clears the target[25]. According to the Committee, "If

[23] At the time of the ex-post evaluation, this population was calculated as 151,000 people by multiplying the 34,200 households (actual) connected to city water in Vinh Yen by 4 persons (per household) and then adding the 14,200 people working at companies in the Khai Quang Industrial Zone, which is located in the water supply area. At the time of the project's appraisal, this number was calculated to be 150,540, based on 34,213 households multiplied by 4.4 persons (per household).

[24] In other words, the maximum water supply capacity at the time of the ex-post evaluation totals 77,600 m^3/day, comprising 16,000 m^3/day existing supply added to the private sector company's 31,600 m^3/day added to the project's 30,000 m^3/day.

[25] The BOD concentration of sewage flowing into the sewage treatment plant (intake) is 100 mg/l. This means that the BOD concentration of sewage water flowing into the project's sewage treatment plant is on average 100 mg/l, and this level is lowered after the treatment process. Furthermore, in August 2018, the VPPC issued a provincial order requiring residents of Vinh Phuc Province to enroll in sewage services and specifying penalties in case household wastewater is dumped into ponds, lakes or rivers by residents who are not enrolled in sewage services.

this project were not implemented, Vinh Yen's sanitation level would still be low. Prior to the start of the project, sewage flowed into Dam Vac Lake and regulating ponds located in the city for flood prevention, causing foul odors and making the water color black. However, today this is no longer the case."[26]

【Electricity Project】

As Table 3 shows, the distribution loss rate and outage time due to accidents are declining in both cities. As a result, it can be said that the initial target has been met. In Vinh Yen, electricity sales volume is at or above the target. The reason for this is because of increased electricity demand. However, electricity sales volume is below the target in Phuc Yen. The reason is because the electricity project did not cover Me Linh since it was transferred to the people's committee of neighboring Hanoi in 2008, as discussed in 3.2.1 Project Outputs at Efficiency section. The Hanoi People's Committee has already increased the number of transformers for distribution and made repairs using its own funds. Through this survey, interviews were held with resident representatives in the project's targeted area and senior management of VPEC Phuc Yen's city maintenance and management office. These interviews yielded the following comment, "The distribution loss rate is declining. This is because of improvements and upgrades to the electricity supply system made by this project. Prior to the start of this project, 10 kV distribution lines were mainly used, but through this project 22 kV lines were laid, upgrading the distribution grid." In addition, the VPPC commented, "There is high electricity demand in the province. Of particular note, this demand is rising about 18% per year in the industrial sector between 2016 and 2020."

Picture 1: Traffic Light Installed on Road

Picture 2: Developed Water Treatment Plant (Vinh Yen Water Treatment Plant)

[26] According to Vinh Yen City People's Committee, the number of residents connected to the sewage system with the completion of this project is around 45,500 people (as of October 2018). The coverage includes the four areas of Dong Da, Lien Bao, Khai Quang, and Ngo Quyen areas, accounting for around 44% of sewage connection demand. At the time of the ex-post evaluation, sewage connection demand remains high. As such, the VPPC is currently exploring other options using financing from the World Bank.

Picture 3: Developed Waste Water Treatment Plant (Vinh Yen Waste Water Treatment Plant)

Picture 4: Developed Distribution Networks and Transformers

3.3.1.2 Qualitative Effects (Other effects: Promotion of investment in Vinh Phuc Province through development of roadways, water supply, sewerage, and electricity project)

Through interviews[27] with persons in charge of administration at Japanese companies operating at industrial parks in Vinh Phuc Province and community representatives of Vinh Yen and Phuc Yen, the current status of effects of infrastructure development and contributions was confirmed as a result of developing the road, water supply and sewage services, and electricity infrastructure from this project. The following are examples of comments received during these interviews:

[Heads of administration at Japanese companies in industrial parks]

The road developed by this project has shortened travel time. The time it takes to access Hanoi has been reduced compared to before the project. As for water services, there are no particular problems in terms of both water quality and supply time. Water tariffs are lower than those in the Hanoi Capital Region. As for electricity, the electricity supply is stable. There are also extremely few outages. Even if there are (unexpected) disconnections near factories, VPEC responds quickly and there is almost no impact on production line operations.

[27] The interviewees included four persons from four companies manufacturing products for export including Japan and two community representatives from Vinh Yen and Phuc Yen, mainly community heads and supporters (total of four persons). Key informant interviews were conducted.

[Community representatives from Vinh Yen and Phuc Yen]

Traffic volume on road is increasing annually. The number of people working in industrial parks is on the rise, which makes this road highly convenient. In terms of water, supply was interrupted occasionally prior to the start of the project, but now it is not interrupted and water pressure does not decline. As for sewage, there was a foul odor from Dam Vac Lake before, but now it has lessened. As for electricity, there was always a worry about electricity supply up to 2014. People in the community said unstable electricity supplies damaged home electronics and there were outages. This is no longer the case since 2015 (when the project's distribution grid improvements were well underway). Street lights were installed making it easier to walk at night. The level of electricity rates is acceptable.

3.3.2 Impacts

3.3.2.1 Intended Impacts

Contribution to Vitalization of Socioeconomic Activities in Surrounding Communities

Interviews were conducted with persons in charge of administration at Japanese companies located in industrial parks to gauge the status of investment promotion in Vinh Phuc Province[28], which yielded the following comments. "The advantages of operating in industrial parks in Vinh Phuc Province can be found in its close proximity to the capital of Hanoi[29], reduced cost of transporting products and shortened time, and the high-quality workers that have a low turnover rate." "Japanese companies established operations in the province's industrial parks from an early stage (in the 1990s). Our company is an affiliate of one of these Japanese companies, so we need to operate and supply products at a location close to the major company, which is why the company selected Vinh Phuc Province. In recent years, land prices[30] in the surrounding areas are

[28] The interviewees were 4 people from 4 companies. Key informant interviews were conducted.

[29] Furthermore, staff from Vinh Phuc Province's Department of Planning and Investment (DPI) provided the following comments. "The province offers (1) advantages for transporting goods in terms of roads because of its close proximity to the capital of Hanoi and also the border with China; in terms of air and sea access, the province is close to Hanoi's airport (Noi Bai International Airport) and the Port of Haiphong, (2) most of the province's land is flat, providing advantages in site acquisition, and (3) the climate is stable throughout the year and there is a low probability of natural disasters, which makes the province more attractive relative to other provinces in terms of investment climate." "With regard to investment promotion in the future, I expect there to be more investment from Japan and Europe. This is because companies from these countries and regions have technical prowess and they can operate and market placing importance on environmental protections and legal compliance. This will help to develop the province's economy and establish a foundation to increase standards. In other words, this will improve the quality of investment, which will lead to the successful development of the province."

[30] According to the VPPC, "Land prices have risen for the past 10 years without a doubt, but we cannot comment on prices further because of differing conditions depending on location. With the completion of the project's road, land prices have risen more than 10-fold in the vicinity compared to around 2006 prior to the start of this project."

rising, which is because of infrastructure development taking place in the province, including this project. The number of companies coming here is on the rise, too." "VPPC's procedures are easy and its response is good too. It provides one-stop services at a single contact point. For example, when launching an investment business, the necessary issuance or renewals of approvals from each department of the provincial government can obtained easily at a single contact point. The response is also quick and there have not been any particular problems[31]." Taking into account these comments, it is judged that infrastructure development under this project facilitates the transportation of goods in the province, improves industrial productivity, increases companies expanding there, directly and indirectly supports the creation of employment, and contributes to the vitalization of socioeconomic activities in the province.

3.3.2.2 Other Positive and Negative Impacts

1) Impacts on the Natural Environment

In regard to the *Environmental Impact Assessment* (EIA) report for this project, the EIA report related to the road project was approved by Vietnam's Ministry of Natural Resources and Environment in December 2006. The EIA report for the water supply and sewage service projects was approved in November 2006 and the EIA report for the electricity project was approved in January 2007, each by the VPPC's Department of Natural Resources and Environment (DONRE).

DONRE is responsible for the environmental monitoring of this project. No particular negative impacts or problems concerning the environment have occurred since the completion of this project. As a result, interviews with DONRE and checks of DONRE documents confirmed that no particular countermeasures are being implemented based on the monitoring results. A system is in place to respond immediately in case some problems were to occur.

This survey confirmed that there have been no particular negative impacts during the project implementation and after completion, with regard to impacts on the natural environment caused by each project (air pollution, noise/vibrations, impacts on ecosystem, etc.). The following presents environmental considerations, pollution countermeasures, and status of environmental related monitoring concerning this project.

[31] During an interview, the person in charge of the VPPC's investment promotion office (who has many years of experience in this line of work and a wealth of knowledge) commented, "During the project implementation, I learned things directly related to my daily work from the Japanese consultant. I learned about Japanese approaches to work, such as streamlining document procedures, established quicker processes and fixed operations, along with negotiating and coordinating methods when dealing with companies. This was very useful. I gained knowledge and experience. I recognize the importance of providing information on Vinh Phuc Province to entrepreneurs and responding to the needs of entrepreneurs, by determining what methods of investment to use and which areas to invest in."

【Road Project】

In terms of countermeasures against air pollution, through questionnaire responses and interviews with VPPC, it was confirmed that the construction company installed a metal fence prior to performing work in order to minimize impacts on the environment, such as dust, noise and water sources. In addition, during construction, heavy machinery was not used at night in consideration of noise. No concerns have arisen since the completion of the project and no special measures have been taken. In addition, the land around the road section that was constructed is mainly farmland and there are nearly no homes or commercial facilities in the vicinity. In addition, there are no complaints from farmers around after the project completion. Table 4 contains environmental related monitoring data[32] for the area around the road section as reference. Each data measured in the surrounding areas is within the range of Vietnamese regulatory standard.

(Reference) Table 4: Data on Air Pollutants, Noise and Vibrations (Top)
/ Vietnam's Regulatory Standards (Bottom)

Sulfur Dioxide (SO2)	Nitrogen Dioxide (NO2)	Carbon Monoxide (CO)	Noise	Vibration
21 - 83 μ g/ m^3	16 - 47 μ g/ m^3	2,210 - 4,660 μ g/m^3	52 - 67 dBA	0.012 - 0.038 m/ s^2
＜350 μ g/ m^3	＜200 μ g/ m^3	＜30,000 μ g/ m^3	<70dBA	<0.055m/ s^2

Source: VPPC's documents
Note: The top represents data from March 2016 (measurement data at 18 locations). The bottom shows Vietnam's regulatory standards (QC VN 05:2013/BTNMT、QCVN 26&27:2010/BTNMT).

【Water Supply Project】

The water service project introduced a system that uses river water from the Lo River as a source of water in order to eliminate impacts on the environment associated with the depletion of groundwater. At the time of the project's appraisal, the treatment method to be introduced was the commonly used method and no problems were expected to arise in terms of treatment technology or water quality. For reference, Table 5 contains environmental related monitoring data for the Lo River water intake area used to supply water. Each water quality data of water source is within the range of Vietnamese regulatory standard.

[32] Data for Tables 4 to 7 was measured in March 2016. This data for projects other than sewage was measured when the projects were close to the completion of construction. It should be noted that there is no measurement data available after March 2016, and, therefore, the judgment has been made based on the most recent information available. According to the VPPC, there are no major changes between this data and the situation around each project at the time of the ex-post evaluation, and there has been no serious discrepancy from the numbers indicated by each data point.

(Reference) Table 5: Data on Water Quality at Source (Lo River) (Top) / Vietnam's Regulatory Standards (Bottom)

Hydrogen Ion Concentration (pH)	Dissolved Oxygen Amount (Do)	Cadmium (Cd)	Mercury (Hg)	Zinc (Zn)
6.8 - 7.5	4.0 - 5.0mg/l	Not detected - 0.005mg/l	Not detected	0.18 - 0.32mg/l
6.0 - 8.5	<5.0mg/l	<0.005mg/l	<0.001mg/l	<3.0mg/l

Source: VPPC's documents
Note: The top represents data from March 2016 (measurement data at 4 locations for pH and 5 locations for others). The bottom shows Vietnam's regulatory standards (QC 09-MT: 2015).

【Sewerage Project】

Sludge from the waste water treatment plant is disposed of appropriately after dehydration[33]. For reference, Table 6 contains environmental related monitoring data for the sewage treatment plant that was constructed. Each data measured at the treatment plant is within the scope of Vietnamese regulatory standard.

(Reference) Table 6: Monitoring Data of the Sewage Treatment Plant (Top) / Vietnam's Regulatory Standards (Bottom)

Total Suspended Particulate Matter (TSP)	Hydrogen Ion Concentration (pH)	Ammonia Nitrogen (NH4-N)	Floating Evaporation Residue (TSS)	Chemical Oxygen Demand（COD）	Noise
120 μ g/ m^3	7.5	0.43mg/l	32mg/l	16.4mg/l	58 dBA
＜300 μ g/ m^3	6.0 - 8.5	＜0.9mg/l	＜50mg/l	<30 mg/l	<70dBA

Source: VPPC's documents
Note: The top represents data from March 2016 The bottom shows Vietnam's regulatory standards (QC 08&09-MT: 2015/ BTNMT, QCVN 26: 2010/BTNMT).

【Electricity Project】

During the construction period, noise was controlled using countermeasures such as the use of low noise heavy machinery. In addition, there were no particular complaints from residents at the time of distribution line work and the installation of equipment. Tree felling, road closures, and disposal[34] of used supplies and equipment, etc. were also carried out appropriately. For reference, Table 7 contains various monitoring data measured around the distribution facilities constructed and the head office and branch offices of VPEC in Vinh Yen and Phuc Yen. Each data measured in the surrounding areas is within the range of Vietnamese regulatory standard.

[33] According to Vinh Yen City People's Committee, sludge is taken out and dried. After a certain period of storage, it is transferred to a disposal site and disposed.
[34] According to VPEC, it was treated as large waste and carefully treated for disposal.

(Reference) Table 7: Monitoring Data Measured Around Distribution Facilities and the Head Office and Branch Offices of VPEC (Top) / Vietnam's Regulatory Standards (Bottom)

【Vinh Yen City】

Sulfur Dioxide (SO2)	Nitrogen Dioxide (NO2)	Carbon Monoxide (CO)	Total Suspended Particulate Matter (TSP)
109 - 241μg/ m^3	88 - 125g/ m^3	1,116 - 2,648μg/ m^3	150 - 230μg/ m^3
＜350μg/ m^3	＜200μg/ m^3	＜30,000μg/ m^3	＜300μg/ m^3

Source: VPPC's documents

Note: The top represents data from March 2016 (measurement data at 6 locations). The bottom shows Vietnam's regulatory standards (QC VN 05:2013/BTNMT).

【Phuc Yen City】

Sulfur Dioxide (SO2)	Nitrogen Dioxide (NO2)	Carbon Monoxide (CO)	Total Suspended Particulate Matter (TSP)
88 - 142μg/ m^3	74 - 112g/ m^3	1,869 - 2,583μg/ m^3	100 - 200μg/ m3
＜350μg/ m^3	＜200μg/ m^3	＜30,000μg/ m^3	＜300μg/ m3

Source: VPPC's documents

Note: The top represents data from March 2016 (measurement data at 8 locations). The bottom shows Vietnam's regulatory standards (QC VN 05:2013/BTNMT).

2）Land Acquisition and Resettlement

Table 8 shows the results of land acquisition and resettlement. At the time of the project's appraisal, the project anticipated land acquisitions of approximately 790,000 m² and 16 households for resettlement (the compensation amount and number of land owners were unknown at the time of the project's appraisal). However, as described below, land acquisition and resettlement for the project exceeded the initial expectation.

Table 8: Resettlement and Land Acquisition of this Project

	Area of Land Acquisition	Amount of Paid Compensation	Target Person (Land Owner)	Relocated Households
Road	1,416,100m^2	875,871 million VND	4,257	42 Households
Water Supply	20,999m^2	22,330 million VND	Approx. 1,800	Not
Sewerage	52,849.8m^2	8,727 million VND	849	Not
Electricity	Approx. 3,100m²	1,543 million VND	578	Not
Total	Approx.1,493,049 m²	908,471 million VND	Approx. 7,484	42 Households

Source: Answers to the questionnaire, VPPC's documents, Documents provided by JICA

The procedures for land acquisition and resettlement for this project were carried out following the *Resettlement Action Plan* established by VPPC. The amount of compensation paid for land

acquisition and the number of land owners exceeded VPPC's expectations. According to VPPC, "Several revisions to the land law of the central government occurred while the project was underway. Given the influences of revisions, land acquisition and resettlement required time in terms of confirming legal procedures and inheritors[35]. Through the confirmation work of the inheritors, it was found that the target households for land acquisition increased. In addition, land prices were on an upward trajectory after the start of this project, resulting in difficulty negotiating compensation amounts. As one example, today the price of farmland (located in the vicinity of the road section) at the time of the ex-post evaluation is about four times higher relative to 2006 when the project began. Much time was also needed for price negotiations." However, community representatives of Vinh Yen and Phuc Yen commented, "We understood regarding the public works projects. We also understood the need for compensation procedures and land acquisition.[36]" Furthermore, according to VPPC, the organizational structure for land acquisition procedures and compensation payment was stable and consistent since the start of the project. The road sector was covered by around 80 to 90 staff at the provincial government, while water supply and sewage services along with electricity were covered by around 60 to 70 staff. It was confirmed that procedures were carried out smoothly inside the provincial government while diligent efforts were made to coordinate with local community representatives and negotiate with the affected residents. VPPC provided livelihood assistance for the relocation of homes or moving expenses, provided compensation for crops, and necessary costs for changing jobs to the families (42 households) who had to relocate (however, this survey was not able to obtain information concerning specific monetary amounts). At the time of the ex-post evaluation, interviews and document reviews confirmed that there have been no particular voices of dissatisfaction among the affected residents. Based on the above, it is considered that land acquisition and resettlement did not cause any major problems.

The project almost achieved the facilitation of transportation and reduced travel time through the road development project, stable water supply and increase in the population served through the water service project, increase in sewage treatment and reduction in BOD concentration

[35] Apart from this, with regard to road project, VPPC estimated the road width to widen in the future and made a decision to acquire large area in advance (i.e., VPPC judged that it would be desirable to acquire the land at early stage, estimating that the land price will rise in the future). At the same time, the number of relocated households also increased from the initial estimate.

[36] It should be kept in mind that it is not necessarily the opinion of the affected people, and it does not represent the opinion of the affected people. Meanwhile, before the start of the project, VPPC had agreed on land acquisition through dialogue with affected people.

through the sewage project, and reduced electricity distribution loss, reduced power outage time, and increased sales volume through the electricity project. In addition, taking into consideration that positive comments were received from project stakeholders concerning investment promotion and investment climate, it is believed that the project is contributing directly and indirectly to the vitalization of socioeconomic activities in Vinh Phuc Province. Based on the above, this project has largely achieved its objectives. Therefore effectiveness and impacts of the project are high.

3.4 Sustainability (Rating: ③)

3.4.1 Institutional / Organizational Aspect of Operation and Maintenance

The Executing Agency of this project is VPPC. The organizations in charge of the operation and maintenance of each project are as follows. For the road, Vinh Phuc Public Road Company No. 1 Unit, under the supervision of the VPPC's Department of Transport and Traffic (DOT)[37], is in charge. For the water supply services, under the VPPC's Department of Construction (DOC), is in charge. For the sewage services, Vinh Yen City People's Committee[38] under VPPC is in charge. For electricity, VPEC, under the umbrella of Power Company No. 1 (PC1), an affiliated company of Vietnam Electricity (EVN), is in charge. For investor assistance, the VPPC's DPI is in charge, with the support of the industrial zone committee (VPIIZMB). The following provides an explanation about the relevant teams for each project.

1) Road Project

Six staff from Public Road Company No. 1 Unit carry out repairs, paving, road and ditch cleaning, and weed removal on a daily or regular basis.

2) Water Supply and Sewerage Project

There are around 20 staff of Wessec No. 1's water services division and around 30 staff under the sewerage division of Vinh Yen City People's Committee. They carry out inspections and cleaning of the project's water supply facilities and equipment, confirm operations of pumps, perform oil changes, inject chlorine, and control water distribution on a regular basis. As for

[37] As already mentioned, some sections of the developed road were transferred to Hanoi People's Committee, which is adjacent to Me Linh District. Therefore, the Department of Transportation under the Committee is responsible for the operation and maintenance.

[38] At the time of the ex-post evaluation, on-site operation and maintenance for the sewage project has been outsourced to a local company, Trong Hieu Services and Environment Co., Ltd.

sewage facilities and equipment, they perform inspections, cleaning, removal of sediment and waste, confirm operation of pumps, and test water quality on a daily or regular basis.

3）Electricity Project

Four staff of VPEC conduct inspections of facilities and equipment, including distribution grid and transformers, etc., confirm operations, carry out cleaning, and change the oil inside transformers on a daily or regular basis.

4）Support for Investors

DPI is in charge of all duties concerning investment promotion. DPI carries out promotion and assistance for investment and business, issuance of approvals and receipt of applications for companies from outside the province opening in industrial parks, information provision to investors and companies inside and outside of Vietnam, along with correspondence and collaboration with ODA or NGO-funded programs. Eight staff from DPI's international economic office are in charge. In addition, 42 staff at VPIIZMB play a supporting role indirectly to DPI's duties by providing investment advisory services for investors and companies (consulting for site surveys, construction design and establishment of representative offices, etc.), advice concerning legal procedures, taxes, imports/exports, and transactions for companies in operation, provision of information for production and business activities of companies investing in industrial parks. It promotes the consolidation of investment procedures with DPI (one-stop service).

In light of the above, it is judged that there are no particular problems with the project's operation and maintenance system because no problems were observed in terms of the operation and maintenance structure related to each facility and equipment, status of securing personnel for the investor support system, and coordination system between the VPPC and DPI.

3.4.2 Technical Aspect of Operation and Maintenance

The above organizations in charge of the operation and maintenance of facilities and equipment as well as DPI each have highly experienced staff with a wealth of knowledge in the operation of facilities and equipment, along with high level of maintenance skills. Through questionnaires and interviews, it was confirmed that there are no problems with their experience and skill level. Staff have generally been on the job for a long period of time and have a wealth of experience (many staff have worked there from before the project, with an average service time of between 10 and 15 years, although this varies by department), and they are fully aware of the importance of operation and maintenance work. Each organization and DPI have operational and maintenance manuals and work is carried out following these manuals as necessary. Information on

maintenance techniques is shared among staff. In addition, staff from each department participate[39] in training on a regular basis, while newly hired staff take part in field training at an appropriate time while on the job at each of their respective departments. In light of the above, it is determined that there is no technical problem in terms of operation and maintenance of this project.

3.4.3 Financial Aspect of Operation and Maintenance

Table 9 shows the most recent budget amount or actual spending for operation and maintenance related to the facilities and equipment built for this project along with the budget for investment promotion work. The condition of both is explained below.

Table 9: Operation and Maintenance Budgets

(Unit: Million VND)

	2016	2017	2018
Road Project	N/A	95	99
Water Supply and Sewerage Project	2,452	8,043	9,857[40]
Electricity Project	5,611	4,618	3,239
Budget for Investment promotion[41]	19,200	16,100	19,250

Source: Answers to the questionnaire

In terms of the operation and maintenance budget for the road project, while the project was completed in May 2016, the warranty period continued until October 2017, and as a result, the amount allocated to operation and maintenance over the past several years is limited. According to the Public Road Company No. 1 Unit in charge of operation and maintenance, "The target section on the Vinh Phuc Province side is short, which does not require a large budget. Also, the amount allocated for operation and maintenance is still small because little time has passed since the road was handed over. Going forward, however, the amount required for operation and maintenance will be calculated by the provincial government and the amount allocated is expected to take into account the rate of inflation." In regard to the water supply and sewage projects, according to senior management of Wessec No. 1 and Vinh Yen City People's Committee,

[39] As examples, in the road project training is conducted on road surface paving, in the water supply project on cleaning water filtering tanks and handling chemicals, in the sewage project on management and operation of pumps along with chemicals, in the electricity project on the electricity supply system and technical operation of equipment, and in the investment promotion work on improving coordination, increasing software skills, lectures on laws and regulations related to business, and methods of public investment, etc.

[40] The year 2018 represents the approved budget amount taking into account the actual results of previous year while 2016 and 2017 provide actual spending amounts. In addition, the reason why the actual amount of 2016 is lower than other years is because maintenance costs were reined in since it was right after the completion and the warranty period was still in effect (see 3.2.2 Project Inputs at Efficiency section).

[41] This budget differs from the nature of the budget for operation and maintenance for the road, water supply and sewage services, and electricity projects. The budget is considered to be for a project administered by DPI and VPIIZMB.

"Basically, the annual operation and maintenance budget is established based on the actual figures of the previous fiscal year, and almost the entire amount is approved after procedures are carried out inside the provincial government. Going forward, the budget is expected to rise if demand increases for water supply and sewage services from industrial parks and residential areas. There has not been any insufficiency in maintenance work due to budget shortfalls." As for the electricity project, the budget allocated for operation and maintenance is declining. According to senior management of VPEC, "Electricity revenue has been on the rise and a sufficient budget has been secured. In reality, in Vinh Phuc Province, the distribution loss rate has been lowered and old facilities and equipment are being replaced with new ones, including by this project. As a result, there is no longer a need to commit a large sum to personnel and budgeting compared to before. More and more parts of the electricity system function automatically, which reduces costs." In terms of investment promotion work, according to senior management of DPI and VPIIZMB, "A broad budget is committed to projects for the introduction of investment climate in Vinh Phuc Province, public relations, seizing opportunities, market and needs-based research, investor support, and attracting investment, etc. The budget varies every year based on the amount required to address needs, but in the future, the budget will change according to the number of companies opening in the province and investment trends." Based on the above comments, it can be said that VPPC is spending the necessary and appropriate budget and there are no concerns financially in terms of operation and maintenance.

Tables 10 to 13 contain the financial statements of Wessec No. 1 and Vinh Yen City People's Committee which uses an independent accounting system (profit and loss statement and balance sheet: most recent 3 years)[42]. When reviewing these documents, no particular points of concern are observed.

(Reference) Table 10: Profit and Loss Statement of WSSEC No. 1 (Water Supply)

(Unit: million VND)

	2015	2016	2017
Sales	91,358	102,547	123,085
Gross profit	21,101	23,402	20,799
Operating activity revenue	888	1,929	4,365
Profit after tax	1,362	1,386	5,099

Source: WSSEC No. 1 (Water Supply Division)

[42] Because the water tariff and sewage tariff revenue systems differ, data was submitted by each respective division. Furthermore, as for the electricity project, VPEC, which also uses independent accounting system, is a part of its parent company Northern Power Corporation, and as a result, there is no profit and loss statement or balance sheet concerning this project. However, according to senior management of VPEC, "Electricity revenue in Vinh Phuc Province has risen over the past two to three years. With the falling distribution loss rate and reinforcement of the distribution grid, VPEC is financially stable."

(Reference) Table 11: Balance Sheet of WSSEC No. 1 (Water supply)

(Unit: million VND)

	2015	2016	2017
Short-term assets	31,304	40,567	41,258
Total assets	162,755	213,027	214,085
Liabilities (Including short-term liabilities)	66,072 (9,577)	85,897 (21,756)	96,158 (32,549)
Capital	96,683	127,130	117,928

Source: WSSEC No. 1 (Water Supply Division)

(Reference) Table 12: Profit and Loss Statement of Vinh Yen City People's Committee (Sewerage)

(Unit: million VND)

	2015	2016	2017
Gross income	1,770	5,069	10,401
Profit before tax	8	149	721
Profit after tax	6	109	577

Source: Vinh Yen City People's Committee (Sewerage Division)

(Reference) Table 13: Balance Sheet of Vinh Yen City People's Committee (Sewage)

(Unit: million VND)

	2015	2016	2017
Total assets	3,816	5,004	8,662
Total liabilities	1,319	2,389	3,070
Net assets	2,497	2,615	5,592
Short-term financial assets	2,486	2,864	5,813
Short term liabilities	1,319	2,389	3,070
Capital	1,167	475	2,743

Source: Vinh Yen City People's Committee (Sewerage Division)

3.4.4 Status of Operation and Maintenance

At the time of the ex-post evaluation, the operation and maintenance status of the road, water supply and sewage treatment facilities, along with power distribution facilities, equipment and related facilities built by this project is good. There have been no failures or deficiencies since the completion of the project. Maintenance work is classified into regular one and daily one, and performed accordingly. In addition, every year each organization establishes maintenance plan and performs maintenance following this plan.

In terms of the investment support service system, including one-stop services provided by DPI and VPIIZMB, VPPC plans to enhance and expand one-stop services and carries out activities where DPI and VPIIZMB, which indirectly supports DPI, are responsible for duties in order to

promote investments from inside and outside the country. Interviews with the VPPC confirmed that there are no particular problems with the coordination and duties of both organizations.

No major problems have been observed in the institutional / organizational, technical, financial aspects and current status of the operation and maintenance system. Therefore, sustainability of the project effects is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project involved infrastructure development, including road, water supply and sewage services and electricity, along with reinforcing the capacity of investor support system in the industrial park area of Vinh Phuc Province, in order to facilitate vehicle transportation, respond to demand for water supply and sewage services, and reinforce the electricity supply; thereby contributing to the promotion of investment and stimulation of socioeconomic activities. Relevance of this project is high because the Government of Vietnam has indicated the importance of infrastructure development through *the Strategy for Socioeconomic Development for the Period of 2001-2010* and *the five-year Socioeconomic Development Plan from 2016-2020*, etc., and the project maintains consistency with the development needs for Vietnam's industrial development and urban growth along with Japan's ODA policy. As for efficiency, the project's outputs were almost according to plan, but project costs slightly exceeded the initial plan slightly due to an increase in land acquisition and compensation costs. The project period also slightly exceeded the initial plan slightly because of the time required for land acquisition and to complete bidding and contractual procedures. Therefore, the efficiency is fair. In terms of quantitative effect indicators, the project almost achieved the facilitation of transportation and reduced travel time through the road development project, stable water supply and increase in the population served through the water supply project, increase in sewage treatment and reduction in BOD concentration through the sewage project, and reduced electricity distribution loss, reduced power outage time, and increased sales volume in the electricity project. In addition, the project led to the achievement of investment promotion and socioeconomic stimulation, and as a result, the project has a high effectiveness and impact. There are no particular concerns in terms of the institutional, technical or financial aspects of the organizations in charge of the operation and maintenance of the project. There are no particular problems in terms of the operation and maintenance status of the facilities and equipment. Thus, sustainability of the effects realized

through this project is high.

In light of the above, this project is evaluated to be highly satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

None

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

(Need to ensure that land acquisition period and costs are realistic at the time of the planning, establish a robust executing structure, and strive to prevent adverse impacts on project progress)

The Executing Agency of the project had established a sufficient system for land acquisition procedures from the start of the project, but delays occurred in land acquisition procedures and project costs also exceeded the initial plan. Both the Executing Agency and the donor side need to be aware that in countries with robust economic growth such as Vietnam gaps between the initial plan and the actual situation easily appear, due to such factors as land prices rising more than anticipated. As such, they must always be aware of instances where the land acquisition process may take longer time than anticipated (sometimes it is also necessary to anticipate changes in legislation or social situation). Of course, procedures must be followed properly, but at the time of the project planning, the project period up to completion needs to be established realistically, anticipating the risk of delays in land acquisition and increased costs wherever possible. During the project implementation, it is important for the Executing Agency to constantly be aware of the entire project's progress and strive to prevent delays, always with an eye on speeding up the payment of compensation or approval procedures. In a case where there are several organizations involved in land acquisition and the project itself spans multiple sectors (e.g., this project's road, water supply and sewage services and electricity projects), the institutional setup for land acquisition duties must be particularly solid (personnel, budget, concentration of authority, etc.) and awareness is needed for moving ahead with coordination and negotiations among relevant agencies in a systematic and smooth manner.

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1.Project Outputs	1) Civil works and procurement of equipment, etc. a) Road: 4-lane road connecting Me Linh and Hanoi (15 km) b) Water supply: Lo River water intake facility (50,000 m^3/day), water treatment plant (30,000 m3/day), Hop Thinh reservoir (6,300 m^3/day), water transmission pipes (3 km) and water supply pipes (9 km; eastern region including Vinh Yen) c) Sewerage: Vinh Yen sewage treatment plant (5,000 m^3/day), sewage relay pump (6), and sewage and wastewater pipes (16 km) d) Electricity: Standardization of distribution voltage in Vinh Yen and Phuc Yen and expansion of transformers for distribution (22/0.4 kV, 430 locations), and repairs to distribution lines (about 350 km) 2) Consulting services Detailed design, bid assistance, construction management, reinforcement of investor support system of provincial government, reinforcement of PMU's organization, reinforcement of organizational system of operation and maintenance agency	1) Civil works and procurement of equipment, etc. a) Road: As planned b) Water supply: Almost as planned (however, the specification of Hop Thinh reservoir was changed to 7,000 m^3/day) c) Sewerage: Almost as planned (sewage relay pumps reduced to 5 and wastewater pipes reduced to 7.9 km) d) Electricity: Scope reduced Standardization of distribution voltage in Vinh Yen and Phuc Yen and expansion of transformers for distribution (22/0.4 kV, reduced to 325 locations), and repairs to distribution lines (reduced to about 188 km) 2) Consulting services As planned
2.Project Period	March 2007 - July 2014 (89 months)	March 2007 - December 2017 (130 months)
3.Project Cost Amount Paid in Foreign Currency	2,690 million yen	1,970 million yen
Amount Paid in Local Currency	11,359 million yen (1,560,302 million VND)	17,529 million yen (3,577,446 million VND)
Total	14,049 million yen	19,499 million yen
ODA Loan Portion	11,718 million yen	11,277 million yen
Exchange Rate	1USD=JPY116, 1VND=JPY 0.00728 (March 2007)	1USD = JPY97.52 1VND=JPY0.0049 (Average rate for the period of project implementation (2008-

		2016) based on rates issued by the IMF's International Financial Statistics (IFS).)
4. Final Disbursement	January 2017	