

Ex-Post Project Evaluation 2016: Package II -3 (Cambodia)

September 2017

JAPAN INTERNATIONAL COOPERATION AGENCY

Mitsubishi UFJ Research & Consulting Co., Ltd.

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Kingdom of Cambodia

FY2016 Ex-Post Evaluation of Japanese ODA Loan Project

“Sihanoukville Port SEZ Development Project (E/S)”

“Sihanoukville Port SEZ Development Project”

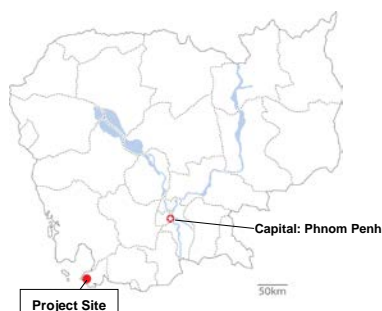
External Evaluator: Masumi Shimamura,
Mitsubishi UFJ Research and Consulting Co., Ltd.

0. Summary

This project developed a Special Economic Zone (hereinafter referred to as “SEZ”) next to the Sihanoukville Port with the aim of increasing direct investment flows into Sihanoukville region and to generate employment. The project is consistent with Cambodia’s development policy and with the development needs at the time of appraisal and ex-post evaluation, as well as Japan’s ODA policy at the time of appraisal. However, due to problems regarding ‘appropriateness of the project plan’ based on the needs assessment undertaken prior to the project appraisal and the ‘project approach’, inputs leading to the achievement of the project purpose were not implemented appropriately. Therefore, the relevance of the project is fair. Although the project cost was within the plan, the project period exceeded the plan; thus, efficiency of the project is fair. Operation and Effect Indicators set at the time of appraisal – amount of direct investment, number of relocating companies and jobs created, amount of exports, and volume of containers handled – resulted in much lower achievement than the target figures . In addition, it can be inferred that the project’s contribution to the macroeconomic growth data (GDP growth rate, amount of direct investment etc.) is very limited. Therefore, the project has generated its effects at a limited level compared with the plan; thus, effectiveness and impact of the project are low. Major problems have been observed in terms of the executing agency’s capacity on institutional and technical aspects of operation and maintenance; thus, sustainability of the project effects is low.

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

1. Project Description



Project Location



SEZ Administration Building

1.1. Background

Since the constitution was established in 1993, Cambodia has been moving from a planned economy to a market economy, and international integration and development have been proceeding at a swift pace. In addition, since Cambodia acceded to the World Trade Organization (WTO) in October 2004, it has taken steps to develop laws and regulations related to investment and economic activities. On the other hand, Cambodia's economic base was weak – as evidenced by the lack of industrial infrastructure and limited supply capacity due to the low level of manufacturing technology, coupled with the restrictive nature of the country's domestic industry (total population: 14.2 million; GDP per capita: about USD 512, as of 2006) – and the high percentage of the younger generation in its population highlighted the urgent necessity of generating employment. Therefore, in order to cover the shortage of domestic funds as well as to transfer production technology and create employment, the government of Cambodia planned to attract foreign investment further through promoting SEZ development, following successful examples of neighboring Asian countries. In addition, Japan-Cambodia Investment Agreement (“Agreement between Japan and the Kingdom of Cambodia for the Liberalization, Promotion and Protection of Investment”) was concluded in June, 2007, and Japanese companies increased attention to Cambodia, as well as raised voices for developing the investment environment immediately. It was expected that development of SEZ specialized in attracting foreign direct investment (hereinafter referred to as “FDI”) through this project would greatly contribute to the development of export related industries in the country as well as the generation of employment opportunities especially for the young.

1.2 Project Outline

The project aims to increase direct investment flows into the region and generate employment by developing an SEZ next to the Sihanoukville Port, thereby, contributing to the economic growth of Cambodia.

Loan Approved Amount/ Disbursed Amount	Sihanoukville Port SEZ Development Project (E/S): 318 million yen / 260 million yen Sihanoukville Port SEZ Development Project: 3,651 million yen / 3,504 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	Sihanoukville Port SEZ Development Project (E/S): March, 2006 / March, 2006 Sihanoukville Port SEZ Development Project: March, 2008 / March, 2008

Terms and Conditions	<p>Sihanoukville Port SEZ Development Project (E/S):</p> <p>Interest Rate 0.9%</p> <p>Repayment Period 30 years</p> <p>(Grace Period) 10 years</p> <p>Conditions for Procurement General Untied</p> <p>Sihanoukville Port SEZ Development Project:</p> <p>Interest Rate 0.01%</p> <p>Repayment Period 40 years</p> <p>(Grace Period) 10 years</p> <p>Conditions for Procurement General Untied</p>
Borrower / Executing Agency	The Royal Government of Cambodia / Port Authority of Sihanoukville (PAS)
Project Completion	<p>Sihanoukville Port SEZ Development Project (E/S): July, 2009</p> <p>Sihanoukville Port SEZ Development Project: April, 2012</p>
Main Contractor	Sihanoukville Port SEZ Development Project: Daiho Corporation (Japan)
Main Consultants	<p>Sihanoukville Port SEZ Development Project (E/S): Khmer Consultant Engineering Corporation Ltd. (Cambodia) / Nippon Koei Co., Ltd. (Japan) / Oriental Consultants Co., Ltd. (Japan) (JV)</p> <p>Sihanoukville Port SEZ Development Project: Key Consultants (Cambodia) / Nippon Koei Co., Ltd. (Japan) (JV)</p>
Feasibility Studies, etc.	<ul style="list-style-type: none"> • JICA, The Study on Regional Development for the Phnom Penh - Sihanoukville Growth Corridor (M/P, June, 2003) • JICA, Pilot Study for Knowledge Assistance for the Development Plan of Industrial Site in Sihanoukville (August, 2005)
Related Projects	<p>[Japanese ODA Loan] (Loan Agreement signing year and month in parentheses)</p> <ul style="list-style-type: none"> • Sihanoukville Port Urgent Expansion Project (November, 2004)

	<ul style="list-style-type: none"> • Greater Mekong Power Network Development Project (Cambodia Growth Corridor) (March, 2007) • Poverty Reduction and Growth Operation (October, 2007) <p>[Technical Cooperation Project]</p> <ul style="list-style-type: none"> • Development Study, The Study on Regional Development for the Phnom Penh - Sihanoukville Growth Corridor (2001-2003) • Development Study, Study on Economic Policy Support Program in Cambodia (2005-2007) • Dispatch of JICA Experts <ul style="list-style-type: none"> - Advisor for Sihanoukville Autonomous Port on Port Planning and Development (dispatched to PAS, 2005-) - ODA Loan Expert (2011-2013) - Advisor on Customs Policy and Administration (dispatched to the Ministry of Economy and Finance/General Department of Customs and Excise, 2007-) - Advisor on Improvement of Investment Environment (dispatched to the Japan Desk of Council for Development of Cambodia (CDC), 2007-) - Aid Coordination and Effectiveness Advisor (dispatched to CDC, Cambodian Rehabilitation and Development Board (CRDB), 2009-) - [World Bank] • Poverty Reduction and Growth Operation (PRGO) (2007-2008) <p>[Asian Development Bank]</p> <ul style="list-style-type: none"> • Greater Mekong Power Network Development Project (Cambodia Growth Corridor) (Co-finance with JICA)
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2. Outline of the Evaluation Study

2.1 External Evaluator

Masumi Shimamura, Mitsubishi UFJ Research and Consulting Co., Ltd.

2.2 Duration of Evaluation Study

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

Duration of the Study: September, 2016 – September, 2017

Duration of the Field Study: November 15, 2016 – December 2, 2016, January 31, 2017 – February 10, 2017

3. Results of the Evaluation (Overall Rating: D¹)

3.1 Relevance (Rating: ②²)

3.1.1 Consistency with the Development Plan of Cambodia

At the time of appraisal, the government of Cambodia placed “Private Sector Development and Employment” as the important area in *Rectangular Strategy-Phase I* and *National Strategic Development Plan* (hereinafter referred to as “NSDP”) (2006-2010), and aim to achieve its objective, expand a base for growth by promoting investment and strengthening competitiveness through strengthened governance. In addition, the government clearly indicated to investors that it would introduce SEZ and strengthen governance as measures to achieve the objectives stipulated in Rectangular Strategy. Furthermore, based on the issues stated below (“3.1.2 Consistency with the Development Needs of Cambodia”), the government of Cambodia planned to attract foreign investment further through promoting SEZ development for the purpose of covering shortage of domestic funds as well as transferring production technology and creating employment. The project purpose aiming to increase direct investment flows by developing an SEZ is consistent with the above policies.

At the time of ex-post evaluation, the government of Cambodia places “Private Sector Development and Employment” as one of priorities in *Rectangular Strategy-Phase III* and NSDP (2014-2018), and endeavors to achieve improvements of the legal framework for efficient management of SEZs. In addition, the government indicated to transform/evolve Cambodia’s industry from a labor intensive structure to a technology driven structure by 2025 in its *Industrial Development Policy (2015-2025)*. In order to realize this vision, the government aims to achieve sustainable and inclusive high growth, employment generation, enhancement of value addition and improvement of income etc. Furthermore, as one of priority measures to be taken by 2018, developing and transforming Sihanoukville Province into a multi-purpose SEZ has been addressed as an objective. As quantitative targets in the *Industrial Development Policy*, the followings are clearly indicated: increasing the GDP share of industrial sector from 24.1% of GDP in 2013 to 30% in 2025, increasing the export of non-textile manufacturing products from 1% in 2013 to 15% of all exports by 2025, increasing export of processed agricultural products from 7.9% in 2013 to 12% of all exports by 2025 etc. Although policy change of “transformation from labor intensive industries to technology driven industries” has taken place, the importance of this project to promote SEZ is unchanged at the time of ex-post evaluation; thus, consistency with the development plan is maintained.

¹ A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

² ③: High, ②: Fair, ①: Low

3.1.2 Consistency with the Development Needs of Cambodia

At the time of appraisal, Cambodia's economic base was extremely vulnerable as seen in its underdeveloped industrial base, very small manufacturing capacity due to low production technology, and limited domestic market (total population was 14.2 million and GDP per capita was about USD 512 in 2006). In addition, since the ratio of the youth³ in overall population was high, generation of employment was a pressing challenge (while the unemployment rate of the population aged 15-64 in 2007 in Cambodia was low; 0.7% (source: National Institute of Statistics, the Cambodia Socio-Economic Survey 2007), it was anticipated at the time of appraisal that new work force of more than 250,000 would flow into the labor market every year until 2010). The project, by establishing SEZ, was expected to contribute to FDI attraction, development of export related industries as well as generation of employment especially for the youth; thus, it was consistent with the development needs of Cambodia.

At the time of ex-post evaluation, Cambodia has been maintaining high economic growth rate of 7% with total population of 15.7 million and GDP per capita of about USD 1,220 (predicted figure for 2015), which is more than double the GDP per capita compared with that at the time of appraisal. In addition, the ratio of the youth⁴ in overall population is high and generation of employment continues to be a challenge just as in the situation at the time of appraisal. (Although the unemployment rate of the population aged 15-64 in 2014 in Cambodia is low; 0.1%, the Cambodia Socio-Economic Survey clearly states that this figure does not adequately capture the real situation of Cambodia since it includes the figures on underemployment (for example, even if a person works for a short time about one hour during the survey period, the person is considered as being employed) (source: National Institute of Statistics, the Cambodia Socio-Economic Survey 2014).) While Cambodian economy has been supported by industries including textile, agriculture and construction so far, the government has addressed policy transition in order to realize its vision stipulated in *Industrial Development Policy (2015-2025)*. To this end, diversification of industrial structure, reinforcement of industrial base infrastructures, creation and fostering of high value-added industries with international competitiveness as well as strengthening collaboration among industries have become issues to be tackled. In addition, in recent years, Japanese companies have been moving into Cambodia – its characteristics are that these companies have been utilizing SEZs which the government of Cambodia promotes to develop. With the establishment of ASEAN Economic Community in the late 2015, division of labor in the region has been advancing and Cambodia has been drawing

³ The ratio of population below the age 25 in total population was 56.0%. (Source: General Population Census of Cambodia, 2008)

⁴ The ratio of population below the age 25 in total population is 50.3%. (Source: CIA World Fact Book 2016)

increased attention as part of international supply chain development – as a manufacturing base for Thai-plus-one and Vietnam-plus-one. (Refer to Attachment 1 for situation of other SEZs in Cambodia.) Regarding areas of investment, Cambodia function as a production base and investments in not only light industries such as textile and shoemaking, but also automotive components industries utilizing international supply chain have been taking place. On the other hand, problems have been pointed out such as shortage of economic infrastructures, underdeveloped legal framework and lack of enforcement, cumbersome approval procedures, necessity of human resource development for engineers who will serve as critical industrial actors etc. For these reasons, development of both hard infrastructures (physical infrastructures) and soft infrastructures (legal, institutional and technical aspects) is critical in order to accelerate direct investment.

3.1.3 Consistency with Japan's ODA Policy

The *Country Assistance Program for Cambodia (February, 2002)* placed Mekong Regional development as priority area and introduced a policy for active support both in terms of hard infrastructure and soft infrastructure. In addition, it also stipulated a policy to support the legal system etc. which would contribute to promotion of private investment. This project, aiming to increase direct investment flows by developing SEZ, is consistent with the above policy.

The *Medium-Term Strategy for Overseas Economic Cooperation Operations (September, 2005)* regarded “infrastructure development and policy and institution improvement to activate private economic activities in growth corridor area (Phnom Penh, Sihanoukville etc.)” as a pillar for assistance in Cambodia. Furthermore, the *Country Assistance Strategy for Cambodia (October, 2004)* placed priority on promotion of growth corridor in Phnom Penh and Sihanoukville, integration of economic cooperation, trade and investment, and assistance based on development partnership. This project, aiming to increase direct investment flows by developing an SEZ next to the Sihanoukville Port, thereby, contributing to the economic growth of Cambodia, is consistent with the above policy.

3.1.4 Appropriateness of the Project Plan and Approach

As mentioned later in “3.3 Effectiveness”, the actual figures of the operation and effect indicators set at the time of appraisal – amount of direct investment, number of relocating companies and jobs created, amount of exports and volume of containers handled – are significantly below the target. In addition, as indicated in “3.4 Impacts”, contribution of this project to the macroeconomic growth indicators (GDP growth rate, amount of direct investment etc.) is very limited and the project purposes (increasing direct investment flows to this SEZ and generating employment) have not been realized. The fact that

reflection of the results of JICA's needs survey to the project inputs was inappropriate, in other words, recommendations indicated in the needs survey were not fully reflected as inputs of this project, and this can be considered as a factor for this project not attaining its purpose.

Prior to appraisal of the project, JICA conducted a study and identified target industries, sorted out their needs and provided recommendation for marketing strategy etc. The results of the study showed that expected targeting industries were export-oriented and labor-intensive industries in the areas of garments, textile, shoes, toys, machinery, food-processing etc. and the following recommendations were made; (1) develop high quality SEZ in terms of both infrastructure and services⁵, (2) clarify focus on targeting industries and countries, (3) set competitive leasing price (at USD25-USD30 per square meter), and (4) implement proactive promotions to attract companies. As regards promotion activities and provision of services to tenants, it was the first experience for the Port Authority of Sihanoukville (hereinafter referred to as "PAS"), a public institution and executing agency, to undertake SEZ operation. Since operation and management of SEZ were not a specialty of PAS, promotion activities were carried out by the JICA ODA loan expert and the project consultants, and capacity development of PAS was implemented based on the results of the study.

Although needs study was conducted and supports were provided to PAS, such initiatives were not embodied as sufficient inputs which would lead to achieving project purpose, thus it can be said that they did not lead to generate outputs. As regards (1), although the specification of infrastructures is high, as recommended by the needs survey, level of service cannot be regarded as sufficient to the point that would cater the private sector's sense of speed, cost awareness, and profit making; thus, further improvement is necessary. In other words, recommendations from the survey were not sufficiently reflected as project inputs. Regarding (2), while the target of the SEZ is export-oriented, labor-intensive industries as recommended by the survey, problems remain in appealing about the SEZ externally as mentioned in (4) below. With regards to (3), although competitive leasing price of USD25-USD30 per square meter, compared to that of other SEZs, were recommended as a result of the needs survey, the Cambodian side, in need of recovering

⁵ According to local hearing survey, this SEZ and Phnom Penh SEZ were the only SEZs which have developed waste water treatment plans from the beginning of development, among SEZs in Cambodia. In other SEZs, facilities which should have been developed for environmental consideration were not developed. Hence, it should be noted that leasing price of this SEZ is relatively high because that of other SEZs do not reflect such development costs. For example, a Chinese SEZ – Sihanoukville SEZ – located near this SEZ (refer to Attachment 1) has not developed waste water treatment facilities at the time of opening in June 2012, and it has been pointed out that environmental consideration was insufficient. However, according to the Chinese SEZ management office, waste water treatment facilities have been developed, targeting completion in the end of February, 2017. (It was under construction when the evaluation mission observed the Chinese SEZ during field study.) In addition, there are many SEZs without their own generating facilities and it was pointed out that some SEZs were encountering serious problem of power shortage.

the cost, set the initial standard of actual leasing price higher than that of the other SEZs. The needs survey has pointed out that the project cost was high and therefore, a part of project scope was expected to be deleted. However, result of the preliminary calculation was still high as USD77.4 per square meter, and it was pointed out in the needs survey that setting a leasing price at this standard was not realistic⁶. (Refer to BOX 1 for comparison of leasing prices.) Considering the business environment surrounding enterprises, companies need to reduce costs in a trend of wage level going upward, thus, business judgment may well be made that it would be difficult to move into SEZs with high leasing price. As a result, it can be regarded that the number of tenants to this SEZ stagnated. In addition, when considering the fact that leasing price did not decrease after opening of the SEZ, it can be considered that price competition principle, based on leasing price of other SEZs, did not work. As regards (4), PAS is passive and only has pamphlets as a tool for advertisement, thus, it cannot be said that PAS has been carrying out proactive promotion activities. In other words, although needs survey was conducted and various supports were provided to strengthen capacity of PAS, it cannot be said that inputs were appropriately carried out. Therefore, these initiatives did not lead to necessary outputs for generating outcomes that this SEZ aimed for. In addition, the fact that a Chinese SEZ was developed in a place just 12km away from this SEZ and that there were companies which decided to relocate themselves to this Chinese SEZ with cheap leasing price can be regarded as one of factors that the project purpose was not achieved. (Refer to Attachment 1 regarding the Chinese SEZ.)

This project has been highly relevant to the country's development plan and development needs, as well as Japan's ODA policy. However, problems have been observed regarding appropriateness of the project plan and approach – changing plans based on the needs survey and taking measures during implementation were insufficient, and inputs indispensable for achieving project purpose were not injected appropriately. Therefore the relevance of the project is fair.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

The project developed an SEZ next to the Sihanoukville Port. Table 1 and 2 show the comparison between the planned and actual project outputs.

⁶ However, it was recommended not to reflect costs of water supply, waste water treatment plant, power generation facilities etc. since such facilities can generate income from sale of services (possible to recover the costs). (In this way, it was pointed out that leasing price could be kept to the level around USD 30 per square meter.) However, (while a part of project scope was deleted, based on the needs survey) the actual leasing price was set at a level necessary to recover input costs of this project including water supply, waste water treatment and power generating facilities etc.

Table 1: Comparison of Planned and Actual Project Outputs for Sihanoukville Port SEZ Development Project (E/S)

Plan	Actual
Consulting Services	
(1) Basic design, detailed design, preparation of bid documents, assistance in tendering	(1) As planned
(2) Assistance in preparation of rules and regulations (decrees, implementing regulations, laws etc.)	(2) As planned
(3) Assistance in establishing implementation system (establishment of a committee on conflict resolution and One-Stop-Service office, preparation of draft service agreement on SEZ management, training of Council for Development of Cambodia (hereinafter referred to as “CDC”) and PAS staffs etc.)	(3) As planned
(4) Assistance in investment promotion activities	(4) As planned

Source: Results from questionnaire survey to executing agency

Regarding Sihanoukville Port SEZ Development Project (E/S), Consulting Services were implemented as planned.

Table 2: Comparison of Planned and Actual Project Outputs for Sihanoukville Port SEZ Development Project

Plan	Actual
Civil Works and Procurement of Facilities	
(1) Development of industrial premises (70ha)	(1) As planned
(2) Development of roads, water supply facilities, waste water treatment plants, drainage, private power generators, communication facilities etc.	(2) Scope was changed < Additional scope > • Development of rental factory building (1 lot x 2,700m ²) • Procurement of private power generators (2units) < Complete deletion from the project scope > • Deletion of detour road connecting to National Road No.4 and flyover bridge connecting the SEZ and Sihanoukville Port site < Change of location > • Change of location of service apartment and dormitory construction (the location was shifted from outside the SEZ to inside the SEZ site)
Consulting Services	
(3) Construction supervision	(3) As planned
(4) Assistance in preparation of rules and regulations	(4) As planned
(5) Assistance in establishing implementation system	(5) As planned

(6) Assistance in investment promotion activities	(6) As planned
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Source: Results from questionnaire survey of executing agency

Development of rental factory building (1 lot x 2,700m²) and procurement of private power generators (2units) were added to the project scope for Sihanoukville Port SEZ Development Project. Private power generators were installed because it became clear that the power supply from the originally planned Electricity Authority of Cambodia (hereinafter referred to as “EDC”) would not be sufficient. The additional scope is judged to be appropriate considering that development and procurement were carried out utilizing the unused balance of Japanese ODA loan from the perspective of facilitating investment promotion.

On the other hand, detour road connecting to National Road No.4 and flyover bridge connecting the SEZ and Sihanoukville Port site were deleted from the project scope. According to PAS, construction of detour road was deleted to avoid effects of land acquisition and relocation on neighboring residents. Flyover bridge was deleted as a result of considering its economic viability based on traffic volume. Both measures are deemed appropriate in light of their reasons. In fact, traffic volume at site was not so much and it was confirmed that construction of a bridge is not necessary.

Change of location of service apartment (residence for managers of tenants (such as foreign managers etc.)) and dormitory construction was due to security problems, and it is considered appropriate that the location was shifted to inside the SEZ site. However, the location within the SEZ had room for reconsideration. The development site is separated by a fence and adjacent to a so called red-zone, a nightlife district, and the place is hardly regarded as having a good living environment. Thorough examination of effects of such situation on living environment of service apartment and dormitory could have been conducted, and it was necessary to construct these residences in an environment where residents can live comfortably.

The consulting services of Sihanoukville Port SEZ Development Project have included construction supervision, assistance in preparation of rules and regulations, assistance in establishing implementation system, and assistance in investment promotion activities, and they were implemented as planned. As regards operation, management and promotion of the SEZ, assistance in establishing the SEZ Department within PAS and recruiting its personnel, assistance in preparation of regulations on SEZ operation and management (preparation of rules within the SEZ, operation and management guidance for PAS, and formats of various contracts including lease agreement and management services agreement), and assistance in preparation of marketing plans were carried out. In addition,

training for staff of PAS regarding basic practical business actions – preparing PR documents, communicating with investors (manners to interact with them through emails and telephones), giving presentations to investors, implementing administrative procedures etc. were also conducted. The inputs of international consultants for these services were 16MM as planned, whereas those of local consultants decreased by 3MM – from the original plan of 7MM to 4MM. According to PAS, this was because necessary services were covered by international consultants. Interviews with relevant stakeholders revealed that the contents of training for PAS staffs remained basic, and it cannot necessarily be considered as sufficient to realize implementation of effective promotion activities and service provision that would satisfy tenants.



Rental Factory



Inside the SEZ Site



Service Apartments



Dormitory

3.2.2 Project Inputs

3.2.2.1 Project Cost

The project cost (total cost for Sihanoukville Port SEZ Development Project (E/S) and Sihanoukville Port SEZ Development Project) was initially planned to be 4,240 million yen (out of which 3,969 million yen was to be covered by Japanese ODA loan). In actuality, the total project cost was 4,121 million yen (out of which 3,764 million yen was covered by Japanese ODA loan), which is within the plan (97% of the planned amount) (Refer to Table 3).

Table 3: Comparison of Planned and Actual Project Cost

	Plan	Actual	Difference
Sihanoukville Port SEZ Development Project (E/S)	Total project cost: 318 million yen (ODA loan portion: 318 million yen) Foreign currency: 294 million yen Local currency: 24 million yen	Total project cost: 260 million yen (ODA loan portion: 260 million yen) Foreign currency: 185 million yen Local currency: 75 million yen	-58 million yen
Sihanoukville Port SEZ Development Project	Total project cost: 3,922 million yen (ODA loan portion: 3,651 million yen) Foreign currency: 2,579 million yen Local currency: 1,343 million yen	Total project cost: 3,861 million yen (ODA loan portion: 3,504 million yen) Foreign currency: 1,021 million yen Local currency: 2,840 million yen	-61 million yen
Total	4,240 million yen (ODA loan portion: 3,969 million yen) Foreign currency: 2,873 million yen Local currency: 1,367 million yen	Total project cost: 4,121 million yen (ODA loan portion: 3,764 million yen) Foreign currency: 1,206 million yen Local currency: 2,915 million yen	-119 million yen (97% of the planned amount)

Source: Results from questionnaire survey of executing agency

While there was additional scope (total additional cost for additional scope was about 506 million yen), due to deletion of scope (the concrete amount of reduced cost due to deletion of scope is unknown), reduction of construction cost as a result of contract negotiation, and depreciation of local currency riel to yen during project implementation, total project cost was within the plan.

3.2.2.2 Project Period

The overall project period (from the start of Sihanoukville Port SEZ Development Project (E/S) to the completion of Sihanoukville Port SEZ Development Project) was planned as 59 months, as opposed to 74 months in actuality, which is longer than planned (125% of the initial plan). (Refer to Table 4)

Table 4: Comparison of Planned and Actual Project Period from the Commencement of Sihanoukville Port SEZ Development Project (E/S) to the Completion of Sihanoukville Port SEZ Development Project

Plan	Actual	Difference
March 2006 (Loan Agreement date of Sihanoukville Port SEZ Development Project (E/S)) ~ January 2011 (completion of construction work)	March 2006 (Loan Agreement date of Sihanoukville Port SEZ Development Project (E/S)) ~ April 2012 (completion of construction work)	

59 months (4 years and 11 months)	74 months (6 years and 2 months)	+15 months (+1 year and 3 months) (125% of the initial plan)
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Source: Prepared by the evaluator based on the information provided by JICA and results from questionnaire survey of executing agency

Comparison between planned and actual project period for Sihanoukville Port SEZ Development Project (E/S) and Sihanoukville Port SEZ Development Project is shown in Table 5 and 6, respectively.

Table 5: Comparison of Planned and Actual Project Period for Sihanoukville Port SEZ Development Project (E/S)

Item	Plan (At Project Appraisal)	Actual (At Ex-post Evaluation)
Loan Agreement	Mar. 2006	Mar. 2006
Selection of Consultants	Jan. 2006–Jun. 2006 (6 months)	Mar. 2006–Apr. 2007 (14 months)
Consulting Services	Jun. 2006–May 2008 (24 months) (at the end of the assistance in bidding)	May 2007–Jul. 2009 (27 months) (at the end of the assistance in bidding)

Source: Information provided by JICA, and results from questionnaire survey of executing agency

Table 6: Comparison of Planned and Actual Project Period for Sihanoukville Port SEZ Development Project

Item	Plan (At Project Appraisal)	Actual (At Ex-post Evaluation)
Loan Agreement	Mar. 2008	Mar. 2008
Selection of Contractors	Apr. 2008–Dec. 2008 (9 months)	May 2008–Sept. 2009 (17 months)
Consulting Services	Aug. 2008–Jan. 2012 (42 months) (Construction supervision, investment promotion activities etc.)	Sept. 2009–Dec. 2013 (52 months) (Construction supervision) May 2010–Dec. 2011 (20 months) (Investment promotion activities etc.)
Construction Work	Jan. 2009–Jan. 2011 (25 months)	Oct. 2009–Apr. 2012 (31 months)
Land Acquisition and Relocation	N.A.–Apr. 2008 (N.A.)	N.A.

Source: Information provided by JICA, and results from questionnaire survey of executing agency

Main reasons for the project delay were due to delay in selection of consultants and contractors as well as delay in construction. According to PAS, the construction was delayed mainly due to delay in land acquisition/taking measures for relocation of local residents, and additional scope. However, concrete duration did not become clear. As a result, consulting service period for construction supervision was extended.

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

Both financial internal rate of return (FIRR) and economic internal rate of return (EIRR) could not be calculated. As regards FIRR, the balance has remained mostly in deficit from the completion of construction to the time of ex-post evaluation, and there is no concrete prospect of new companies to be relocated. Regarding EIRR, there are only three tenants and it was difficult to predict future benefit (value addition due to investment).

Although the project cost was within the plan, the project period exceeded the plan. Therefore, efficiency of the project is fair.

3.3 Effectiveness⁷ (Rating: ①)

3.3.1 Quantitative Effects (Operation and Effect Indicators)

Table 7 summarizes the operation and effect indicators with targets set at the time of project appraisal and their actual figures between 2014 and 2016.

Table 7: Operation and Effect Indicators (Note 1)

	Target	Actual (Note 2)		
	2013	2014	2015	2016
	2 Years After Completion	1 Year After Completion	2 Years After Completion	3 Years After Completion
Amount of direct investment (million dollars)	150	23	23	23
Number of relocating companies (companies)	26	3	3	3
Number of jobs created (people)	15,000	200	200	493 (Note 3)
Amount of exports (amount of exports by relocating companies) (million dollars/year)	87	N.A.	8.75	3.37
Volume of containers handled (additional volume) (TEU/year)	30,000	N.A.	158	282

Source: Information provided by JICA, and results from questionnaire survey of executing agency

Note 1) Regarding indicators, volume of containers handled is the volume of containers handled by relocating companies in the SEZ for exports and imports in Sihanoukville Port. For other indicators the SEZ is set as the target.

Note 2) Figures to be compared with the targets are those in 2015, and figures in 2014 and 2016 are shown as reference.

Note 3) Number of jobs created is the actual figure as of November 2016.

When comparing target and actual figures (actual figures in 2015), all the figures resulted in much lower achievement than the target figures. As regards actual figures in 2016, no improvement is observed except for number of jobs created and volume of containers handled (status of achievement of each indicator in 2015 is; amount of direct investment: 15%, number of relocating companies: 12%, number of jobs created: 1%,

⁷ Effectiveness is to be evaluated together with Impact.

amount of exports: 10%, and volume of containers handled: 1%).

At the time of appraisal, companies of export-oriented and labor-intensive industries including garments, textile, shoes, toys, machinery, food-processing etc. were expected to relocate themselves into the SEZ. However, among the three tenants, one company is 100% domestic market oriented and another company is small with only 13 workers. There is only one company that falls under the category of export-oriented and labor-intensive industry. Among three companies, two operate in rental factories and one operates in a factory constructed on purchased land (lease).

As mentioned above, when considering the business environment surrounding enterprises, companies need to reduce costs in a trend of wage level going upward. As a result, there may well be companies that decided to move into the nearby Chinese SEZ with cheap leasing price, and not into this SEZ.

3.3.2 Qualitative Effects (Other Effects)

3.3.2.1 Improvement of Trust from Investors through Enhancing Investment Environment

From the results of actual figures (achievement rates) of operation and effect indicators (for all items) and interviews with the three companies in the SEZ, it is difficult to say that this project has contributed to the “Improvement of Trust from Investors through Enhancing Investment Environment”.

3.3.2.2 Export Promotion through Attraction of Direct Investment to Cambodia and Increase of Employment through Development of Labor Intensive Industries etc.

From the results of actual figures (achievement rates) of operation and effect indicators (amount of exports and number of jobs created), it is difficult to say that this project has contributed to the “Export Promotion through Attraction of Direct Investment to Cambodia and Increase of Employment through Development of Labor Intensive Industries”.

BOX 1: Current Situation of the SEZ

Ex-post evaluation of similar Japanese ODA loan projects in the past have identified some lessons learned that location, infrastructure development, investment conditions, land lease conditions, attraction of enterprise and investor services and living conditions are important. Thus, current situation of the SEZ of this project is summarized below. In addition, situation of other SEZs in Cambodia are compiled in Attachment 1.

- Location: The SEZ is located next to Sihanoukville Port which is the only deep sea port in

Cambodia. Loading and unloading of cargo can take place in a short time with low cost.

- **Infrastructure development:** As regards to the status of infrastructure surrounding the SEZ, a port, roads (National Roads No.3 and 4) and rail road – three large transport infrastructures – have been developed. In addition, the situation of power supply in Sihanoukville is relatively good⁸ while power problems are generally pointed out throughout the country. As regards to the status of infrastructure within the SEZ, the quality of the developed infrastructure is high.
- **Investment conditions:** Common incentives for all SEZs in Cambodia are applied. In addition, taking various administrative procedures at the One-Stop-Service office within the SEZ administration office are possible. Furthermore, as an investment incentive specific to this SEZ, “free container transport charge⁹” is applied for companies using the port.
- **Land lease conditions:** According to PAS, the leasing price is set at a level necessary to recover input costs of this project (both Japanese ODA loan portion and Cambodian government portion). The leasing price was higher compared to that of other SEZs at the time of commencement of the SEZ operation, but the gradual rise of the leasing price in other SEZs in recent years has come to minimize its difference.

Table 8: Comparison of Land Lease Conditions at the Time of Ex-post Evaluation (3ha, lease period of 50 years)

This SEZ	Sihanoukville SEZ (Chinese SEZ)	Phnom Penh SEZ
USD 62/m ² (No change since the commencement of the SEZ operation in 2013)	USD 40/m ² (About USD 20/m ² at the time of commencement of the SEZ operation in 2012)	USD 80/m ² (About USD 40-50/m ² about 4-5 years ago)

Source: Prepared by the evaluator based on the information provided by executing agency

This SEZ is the only publicly managed SEZ in Cambodia and land lease conditions are decided by the Board of Directors consisting of following members. According to the interviews with PAS, Chairman and CEO of PAS is given certain discretion in terms of lease negotiation, however, the degree of discretion was not disclosed.

⁸ Power situation has greatly improved after the completion of thermal power plants by the Independent Power Producers (located in Stung Hav District, about 15km north of Sihanoukville City) in 2013, and commencement of operation of Sihanoukville substation and transmission line. According to PAS, power rate for the SEZ is USD 0.126/kwh at the time of ex-post evaluation (assuming that power consumption is 15,000kwh per month).

⁹ So far, companies within the SEZ was charged USD 50 per container in case of using their own trailer when transporting containers from Sihanoukville Port to the SEZ, however, they will not be charged when using PAS trailers.

(Members of the Board of Directors)

- Chairman and CEO of PAS
- Representative of PAS Labor Association
- Governor of Sihanoukville Provincial Government
- Representative of Cabinet Council of Ministers
- Minister of Economy and Finance
- Minister of Public Works and Transport
- Minister of Commerce

- Attraction of enterprises and provision of services to tenants: Concerning activities to attract enterprises, it is limited to PR through participation of seminars etc. organized by JETRO, and there is no proactive initiative by PAS. As regards provision of services to companies in the SEZ, some companies pointed out that “even though we have raised requests and claims, it cannot be understood easily”.
- Living conditions: From the point of view of living conditions of Japanese (foreign) representatives, education, medical services etc. are not sufficient and the environment is not well equipped to bring over their families (spouse and children) at ease. Service apartment within the SEZ is located adjacent to a so called red-zone, a nightlife district, and the place is hardly regarded as having a good living environment.

3.4 Impacts

3.4.1 Intended Impacts

As for the amount of direct investment and exports, please refer to Attachment 2 at the end of the report for macroeconomic data on GDP growth, GDP per capita. Economic impact of this project cannot be verified clearly since other factors apart from this project have effects. In addition, when considering the extremely low achievement rates of operation and effect indicators, it can be inferred that the contribution of this project to these macroeconomic growth data is highly limited.

3.4.2 Other Positive and Negative Impacts

3.4.2.1 Impacts on the Natural Environment

The project falls under A category of “Japan Bank for International Cooperation Guidelines for Confirmation of Environmental and Social Considerations” (established in April, 2002) because it is a development project of a large-scale infrastructure.

Environmental Impact Assessment (hereinafter referred to as “EIA”) Report was approved in March, 2006 by the Ministry of Environment. The project was implemented as planned in accordance with the environmental mitigation measures prepared based on the EIA. During the construction period, PAS has conducted environmental monitoring and compiled the monitoring results in reports and submitted to the Ministry of Environment on

a quarterly basis. In addition, the Ministry of Environment has carried out on-site inspection during construction period. Table 9 summarizes the results of monitoring.

Table 9: Major Results of On-site Inspection by the Ministry of Environment and Environmental Monitoring

Item	Measures Taken Place
Solid Waste Disposal	The Project consultants instructed contractors to gather solid waste to a certain place and to carry out treatment appropriately. In addition, PAS has outsourced collection and treatment of solid waste to a private solid waste management company.
Pollution Measures for Water Discharge	Contractor carried out quarterly water inspection (pH, TSS, COD, and BOD) to check whether waste water discharged from the SEZ to the sea is treated appropriately. As a result, it was confirmed that Cambodia's environmental standards were complied except for TSS (Total Suspended Solids). As regards TSS, which exceeded the standard of the Ministry of Environment, PAS took pollution measures for waste water by frequently removing sedimentation at the outlet.
Air Quality	Construction site was watered to prevent sand dust on the site
Water Quality	Contractor set up additional toilets in the site from original three to six.
Noise	No particular effect has been pointed out.
Vibration	No particular effect has been pointed out.
Soil	No particular effect has been pointed out.

Source: Prepared by the evaluator based on the information provided by executing agency

PAS has been carrying out environmental monitoring with Sihanoukville Provincial Government (Department of Environment) (most recent monitoring was conducted in August, 2016) and no particular effect on natural environment has been pointed out.



Waste Water Treatment Plant



Drainage

3.4.2.2 Land Acquisition and Resettlement

Comparison between planned and actual resettlement and land acquisition is summarized in Table 10. Planned and actual areas of land acquisition and number of resettled residents are unknown since PAS has no record.

Table 10: Comparison between Planned and Actual Resettlement and Land Acquisition

Plan		Actual	
Area	Resettlement	Area	Resettlement
N.A.	About 20 households in total were planned to be relocated. Following are the breakdown: <ul style="list-style-type: none"> • Total of 17 households at the planned site for access road and detour road development. • 3 households within the SEZ site. 	N.A.	9 households in total were relocated. Following are the breakdown: <ul style="list-style-type: none"> • 4 households living at the site for access road development and 3 households living at the site for detour road construction were relocated. • 2 households within the SEZ site were relocated.

Source: Results from questionnaire survey of executing agency

Due to implementation of the project, total of 9 households were located after receiving compensation. The reason for the decreased number of relocated households from the planned number (20 households) was due to the deletion of detour road development from the project scope, and exclusion of project site (PAS gave up acquiring this particular piece of land) since an agreement with one household within the SEZ site could not be reached regarding the amount of compensation.

Land acquisition process was adequately conducted, including consultation with local residents, in conformity with the Cambodia's procedures and JBIC Guidelines (2002), and no problem has been observed. PAS has initially planned to develop an alternative relocation land in the Resettlement Action Plan, however, residents who needed to be resettled received compensation and desired to move to nearby land (they made arrangements on their own), therefore, development of alternative land was not necessary as a result. According to the interviews with the relocated residents by the project, no complaint was raised and all the residents have resettled by themselves after receiving compensation. It should be noted that 700 households who had lived within the project site completed to resettle before the implementation of the project. Interviews revealed no complaint and PAS also explained that compensation was provided without any problems.

3.4.2.3 Prevention of HIV/AIDS for Construction Workers

As part of health care of construction workers, training program on HIV/AIDS prevention was conducted at a clinic within Sihanoukville Port premises. Concretely, two doctors in the port clinic conducted peer training to the group leaders of construction workers on HIV/AIDS prevention. Based on this, those leaders trained new workers. In addition, condoms and leaflets were distributed, and HIV tests were also conducted for

those who applied. According to PAS, such initiatives were carried out based on its past experience of HIV/AIDS prevention measures during implementation of ODA loan project (Sihanoukville Port Urgent Expansion Project) which JICA has provided support as part of Special Assistance for Project Implementation (SAPI). Almost all construction workers (300 or more workers) seem to have received the training.

This project has achieved its objectives at a limited level. Therefore effectiveness and impact of the project are low.

3.5 Sustainability (Rating: ①)

3.5.1 Institutional Aspects of Operation and Maintenance

The operation and maintenance of the SEZ after project completion is undertaken by the SEZ Department established within PAS. The organizational structure of the SEZ Department is shown as follows.

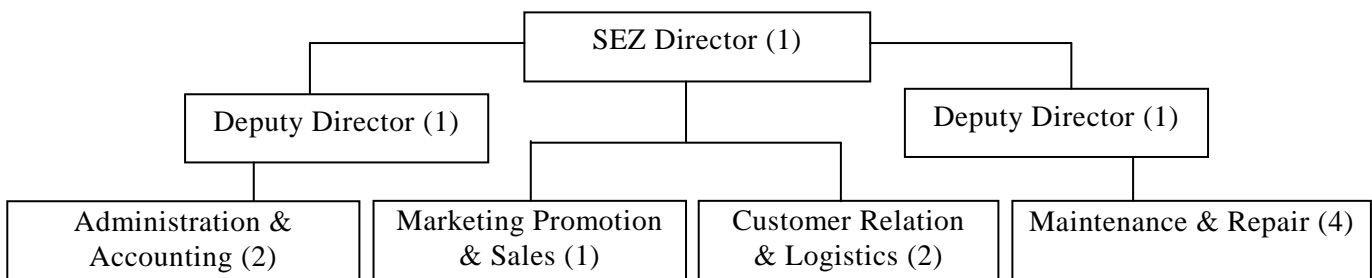


Figure 1: Organizational Structure of SEZ Department

Source: Prepared by the evaluator based on the information provided by executing agency

Note) Number of officers is in parentheses.

The SEZ Department is the secretariat of One-Stop-Service office, consisting of one Director, two Deputy Directors, two Administration and Accounting officers, one Marketing Promotion and Sales officer, two Customer Relation and Logistics officers and four Maintenance and Repair officers – four Divisions and twelve officers in total.

Maintenance and Repair Division in charge of operation and maintenance of infrastructure facilities consists of four officers and no particular problem is observed. For other Divisions, one to two officers are assigned to each Division, which is a minimum system. Marketing Promotion and Sales Division only has one officer, which cannot be considered as an adequate system that can carry out proactive promotion activities to attract companies. In addition, Customer Relation and Logistics Division only has two officers, which is not enough to provide sufficient services that will satisfy companies in the SEZ.

Most decision making regarding SEZ needs to go through the approval process of PAS and the authority of SEZ Department is highly limited, hindering its flexible responses.

One-Stop-Service office has branch office of relevant ministries/organizations¹⁰ and services are provided regarding various administrative procedures. No officer is on duty at all times but comes to the office to work when necessary. Companies in the SEZ had no particular complaints about these officers not on duty at all times.

Supervision of SEZs in Cambodia, including this SEZ, is undertaken by Cambodian Special Economic Zone Board (hereinafter referred to as “CSEZB”) established under the CDC. In addition, Trouble Shooting Committee established under the CDC is in charge of dealing with problems that each SEZ is difficult to resolve. Roles and authority of the SEZ Department, CSEZB and Trouble Shooting Committee are clear and interviews revealed no particular unclear point in terms of institutions.

Therefore, some problems have been observed regarding the institutional aspects of operation and maintenance.

3.5.2 Technical Aspects of Operation and Maintenance

As regards infrastructure facilities, taking account of the system of Maintenance and Repair Division and good conditions of operation and maintenance of facilities at the time of ex-post evaluation, no particular problem has been identified for its technical capacity. Technical level of operation and maintenance officers on the ground is deemed sufficient to carry out ordinary maintenance work (As regards waste water treatment plants, contractors provided maintenance training to operation and maintenance officers during project implementation. For other facilities, guidance through on the job training is provided.). Maintenance plans and manuals have been prepared, renewed when necessary, and have been utilized by those in charge on the ground. According to PAS, a system has been established to get assistance from PAS main body regarding electricity, and 24-hour backup system has been introduced on a rotating basis.

Regarding the soft side (preparing rules and regulations, establishing implementation system, carrying out activities to attract investment etc.), among the PAS officers who have received training as part of consulting services of the project, three of them – Director of the SEZ Department (1), an officer in Administration and Accounting Division (1) and an officer in Marketing Promotion and Sales Division (1) – are engaged in SEZ operations. Three officers are few and PAS is passive in actual promotion activities; thus sustainability of know-how transfer is limited. An ODA loan expert (May, 2011-March, 2013) has made

¹⁰ There are branch offices for officers of General Department of Customs and Excise, Camcontrol, Ministry of Commerce, Ministry of Labor and Vocational Training, and Sihanoukville Provincial Government. (Camcontrol is an inspection authority under the Ministry of Commerce. This is a system particular to Cambodia – separately from customs, this inspection is required for import and export procedures.)

efforts in promotion activities to attract companies, and was hired directly by PAS as SEZ advisor after the project completion but the advisor contract was going to expire at the end of December in 2016.

Therefore, some major problems have been observed regarding the technical aspects of operation and maintenance.

3.5.3 Financial Aspects of Operation and Maintenance

The operation and maintenance cost of the SEZ is allocated from the operation and maintenance cost of PAS. According to PAS, the SEZ Department has not prepared budget plans for operation and maintenance of the SEZ so far, and whenever expenses occur, the SEZ Department makes requests to PAS and allocations are made. In other words, financial management is fully dependent on PAS main body. Table 11 shows the actual allocation and expenditures for operation and maintenance after the completion of the project.

Table 11: Operation and Maintenance Cost of the Project (Unit: USD)

2014		2015		2016	
Actual Allocation	Actual Expenditure	Actual Allocation	Actual Expenditure	Actual Allocation	Actual Expenditure
430,485	430,485	727,329	727,329	642,711	642,711

Source: Results from questionnaire survey of executing agency

On the other hand, revenue of the project is shown in Table 12. The number of relocating companies remains to be three, and revenue from lease fee (from one company) and rental fee (from two companies) for factories is the same in 2015 and 2016.

Table 12: Revenue of the Project (Unit: USD)

	2014	2015	2016
Revenues from lease and rental fees for factories	187,299	288,529	288,529
Public Utilities (electricity, water supply, waste water) (as of October, 2016)	354,204	419,555	286,873
Total	541,503	708,084	575,402

Source: Results from questionnaire survey of executing agency

When looking at the project alone, it is in deficit – expenditure exceeds revenue except for 2014, which is the following year that SEZ started its operation. However, as mentioned above, operation and maintenance cost of the project is covered by PAS’s main operation when necessary; therefore, there is no problem in terms of financial arrangements.

Income statement and balance sheet of PAS are shown in Tables 13 and 14 below.

Table 13: Income Statement of PAS (Unit: million Riel)

	2012	2013	2014	2015
Incomes	132,590.8	146,606.6	169,041.5	198,913.9
Service	130,999.9	144,930.3	168,183.0	197,952.3
Other Incomes	1,590.9	1,676.3	858.5	961.6
Operation Expenses	-107,420.9	-115,449.9	-136,910.8	-148,210.5
Combustibles and Spare Parts	-42,255.1	-48,981.4	-48,986.8	-48,133.1
Salaries and Other Expenses	-35,013.3	-41,208.2	-50,070.1	-56,508.1
Administrative and General Expenses	-7,871.0	-10,052.6	(Note 1)	(Note 1)
Accumulated Depreciation	-16,919.7	-16,379.5	-16,765.3	-23,191.5
Other Expenses	-6,352.8	-8,436.5	-20,992.1	-21,312.7
Net Profit from Exchange	6,187.6	14,258.7	-96.5	934.9
Deferred Tax on Profit	-4,643.9	-3,329.8	(Note 1)	(Note 1)
Minimum Tax	-552.7	-1,320.6	(Note 1)	(Note 1)
Operation Incomes	25,170.0	31,156.7	32,130.7	50,703.4
Financial Income	185.3	325.8	12,505.8	1,604.6
Financial Expense	-11,630.6	-11,568.3	-12,854.3	-13,449.5
Financial Income (Loss)	-11,445.3	-11,242.5	-348.5	-11,844.9
Income before Tax	13,724.7	19,914.2	31,782.2	38,858.5
Income Tax	-2,744.9	-1,237.9	-3,002.7	-9,613.9
Total Net Income	10,979.7	18,676.3	28,779.5	29,244.6

Source: Prepared by the evaluator based on the information provided by executing agency

Note 1: Included in Other Expenses

Note 2: Partial inconsistency of figures exists due to rounding error

Table 14: Balance Sheet of PAS (Unit: million Riel)

	2012	2013	2014	2015
Current Assets	871,479.0	901,351.7	932,074.8	1,026,718.3
Long-Term Current Assets	822,517.9	843,054.8	855,993.4	942,071.1
Short-Term Current Assets	48,961.1	58,296.8	76,081.4	84,647.1
Liabilities and Equity	871,479.0	901,381.7	932,074.8	1,026,718.3
Equity	442,712.3	460,803.6	485,708.3	515,410.1
Non-Current Liabilities	411,759.6	416,939.8	418,064.0	483,614.5
Current Liabilities	17,007.0	23,638.3	28,302.5	27,693.7

Source: Prepared by the evaluator based on the information provided by executing agency

Note: Partial inconsistency of figures exists due to rounding error

As regards finance of the entire PAS, government subsidy is not injected. Since the operation of the port is robust, revenue and operating profits are soaring – net income in 2015 is about three times higher than that in 2012 – achieving a strong performance. Current assets and equity are steadily increasing, and the entire PAS is expanding.

The reason why the project continues to exist even with loss for the SEZ operation every year is because the SEZ is publicly operated and deficit is covered by PAS's main operation. The SEZ is regarded as merely one of the projects undertaken by PAS – thus, it is not financially independent. The fact that there is no problem in financial aspects of operation

and maintenance from a standpoint of the entire PAS has led to lose a sense of urgency. It is considered that deficit-covering from PAS will continue in future unless massive overhaul of current management system takes place.

Therefore, problems have been identified regarding the financial aspects of operation and maintenance when looking at this project alone.

3.5.4 Current Status of Operation and Maintenance

As regards infrastructure facilities, it is confirmed that they are operated and maintained without particular problems at the time of ex-post evaluation. Troubles which arose so far – cracks and caving of asphalt pavement road within the SEZ, leak in the roof of dormitory etc. – have been appropriately coped with and problem is not occurring. Inspection of facilities such as water supply facilities, waste water treatment plants, electrical, fire alarm system, service apartment, dormitory etc. is carried out every two weeks based on maintenance and management plan. Maintenance manuals have been prepared and utilized by those in charge on the ground. In addition, necessary spare parts have been procured on a timely basis so far. As the second-best measure in case no progress is made as to attracting new companies, PAS has been considering utilizing some part of the SEZ site as port facility (container depot).

On the soft side (preparation of rules and regulations, investment promotion activities etc.), companies in the SEZ have not pointed out any problems regarding enforcement of SEZ rules and regulations, provision of various incentives and One-Stop-Services. As regards after-the-sale service, after the current Director of the SEZ Department took office in January, 2015, monthly meetings have been held between the Department and the companies as requested from tenants. However, companies pointed out that “even though we have raised requests and claims, it cannot be understood easily” and “it requires long time for the Department to take actions and cannot cater the sense of speed of the private sector”. PAS has currently been preparing to conclude 10MW power purchase agreement with EDC to secure stable power supply. As part of the preparation, PAS needs to be qualified as a power wholesaler and is now under negotiation with the Ministry of Mines and Energy (MME), EDC and the Ministry of Commerce, however, there was no concrete prospect at the time of ex-post evaluation. In addition, PAS has offered a special incentive for this SEZ, “free container transport charge”, taking advantage of its location next to the port. In this way, PAS (thinking that it will lead to promotion) is having a relook at the after-the-sale service for tenants as a top priority issue and has been exploring countermeasures on its own. However, it has not become the winning hit for investment attraction at the time of ex-post evaluation. As regards promotion activities to attract companies, no proactive initiative by PAS/SEZ Department is observed. As regards

marketing activities through participation in seminars, PAS is passive and there is room for making further self-help efforts. Operation and management work of SEZ is totally different from that of the original mission of PAS. It is inferred that the fact that PAS is undertaking a business which is outside of its domain has affected motivation and working attitude of relevant officers negatively.

Therefore, major problems have been observed regarding the current status of operation and maintenance on the soft side.

In light of the above, major problems have been observed in terms of the institutional and technical aspects on the soft side; thus, sustainability of the project effects is low.

BOX 2: Role and Contribution (JICA's Assistance/ Assistance Situation to this Project)

While the number of tenants has been stagnating, JICA has been conducting interviews with PAS and companies within the SEZ so far, clarifying the problems and providing recommendations to PAS as well as following up the situation repeatedly. In addition, JICA has accompanied potential companies which have shown interest to the SEZ whenever necessary, and has given explanation and provided relevant materials at seminars at industrial parks (in Tokyo, Hamamatsu, Nagoya, Osaka and Kyoto) organized by JETRO. There were several attempts to dispatch SEZ advisors, however, it did not realize because the conditions did not match with the candidates. Currently, JICA has been conducting "Project Study on Assistance to SEZ Development" and clarifying and analyzing the problems for its future assistance.

As mentioned above ("3.1.4 Appropriateness of the Project Plan and Approach"), prior to appraisal of the project, JICA conducted a study and identified the needs of target industries and provided recommendation for marketing strategy etc. In addition, ODA loan expert implemented promotion activities to attract companies. Promotion activities and capacity development of PAS etc. were also conducted by consultants of this project. Furthermore, the ODA loan expert, after completion of the assistance period (2011-2013), was directly hired by PAS as PAS advisor and has provided educational guidance. However, these inputs did not lead to outputs that achieve project purpose at the time of ex-post evaluation. Even when such problems became clear, extensive support measures, such as implementation of Special Assistance for Project Sustainability (hereinafter referred to as "SAPS"), were not undertaken even until the time of ex-post evaluation. It is hoped that some measures will be implemented in future based on the on-going Project Study.



Entrance to the SEZ



Sihanoukville Port
(Buildings with Triangle Roofs in front
are the Office Building of PAS)

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project developed an SEZ next to the Sihanoukville Port with the aim of increasing direct investment flows into Sihanoukville region and to generate employment. The project is consistent with Cambodia's development policy and with the development needs at the time of appraisal and ex-post evaluation, as well as Japan's ODA policy at the time of appraisal. However, due to problems regarding 'appropriateness of the project plan' based on the needs assessment undertaken prior to the project appraisal and the 'project approach', inputs leading to the achievement of the project purpose were not implemented appropriately. Therefore, the relevance of the project is fair. Although the project cost was within the plan, the project period exceeded the plan; thus, efficiency of the project is fair. Operation and Effect Indicators set at the time of appraisal – amount of direct investment, number of relocating companies and jobs created, amount of exports, and volume of containers handled – resulted in much lower achievement than the target figures for all indicators. In addition, it can be inferred that the project's contribution to the macroeconomic growth data (GDP growth rate, amount of direct investment etc.) is very limited. Therefore, the project has generated its effects at a limited level compared with the plan; thus, effectiveness and impact of the project are low. Major problems have been observed in terms of the executing agency's capacity on institutional and technical aspects of operation and maintenance; thus, sustainability of the project effects is low.

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

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

It is important that the SEZ Department, in charge of operation and maintenance of SEZ,

takes measures quickly to appeal the strength of the SEZ that it is located next to the port, prepare marketing strategy which surely captures the expectation of the targeted industries and make sure of its implementation. When conducting interviews with companies operating in Cambodia outside the SEZ, they pointed out regarding the location of this SEZ that “the depth of the port is shallow which is about 11m, so feeder vessels are utilized for transportation and reloaded mainly at the port of Singapore” and “because of the proximity to the sea, there might be possibility of brine damage”. The location is the SEZ’s biggest strength and it is important for the SEZ Department to correct such risk perception on the side of private companies by disseminating correct information against such recognition and concerns of companies. To be more concrete, it is important that the SEZ Department makes an appeal to business communities about the situation of port utilization in detail (including companies and types of industries utilizing the port, information on cargo destination in the country etc.), the fact that direct service to the port of Osaka and Kobe is available after October, 2014 (there are stop over points but no reloading), the future plans of port development and expansion, the introduction of special incentive of the SEZ in connection with the port (free container transport charge for companies using the port). It should also provide detailed information based on the information of occupancy in SEZs abroad which are located near the sea. As part of this effort, major revision of brochures and proactive information dissemination are required. Furthermore, it is critical that SEZ Department provides information on its measures to secure stable power supply, and compile and share a list of services with companies in the SEZ to enhance transparency.

4.2.2 Recommendations to JICA

In light of the challenges the SEZ faces, it is important that JICA continuously provides concrete improvement measures to the SEZ Department and follow-up their initiatives. Based on the changes of policy and economic environment in Cambodia as mentioned in “3.1 Relevance”, fully understanding about the situation of competitors in other SEZs, the status of market entry of companies and information on their latest needs are necessary. Based on that it is critical for JICA to provide assistance to improve operation and management system of the SEZ, review marketing strategy and redirect its operation so that the strength of the SEZ can be maintained. Currently, “Project Study on Assistance to SEZ Development” is being conducted by JICA and measures to improve value addition of this SEZ are also being considered. Therefore, it is required to carry out necessary survey and implement support measures, based on the results and recommendations of the study.

4.3 Lessons Learned

The importance of carefully assessing the capacity of operation and management body of SEZ/industrial park projects and selecting appropriate actions

In case where an organization without experience of operation and management of a SEZ/industrial park becomes a counterpart of a SEZ/industrial park project, it is assumed that there is a limitation for achieving high effects from JICA's assistance in operation and management. In this regard, when preparing SEZ/industrial park projects, it is desirable to consider the possibility of utilizing other operating bodies such as outsourcing SEZ/industrial park operation and management works to organizations and companies with proven records. Furthermore, in case where problems arise regarding SEZ/industrial park operation and management, implementing extensive support measures, such as providing timely implementation of SAPS, is important.

Operation and management of SEZ/industrial park is a business which directly deals with private enterprises. As such, operation and management body is required to provide detailed services by sufficiently understanding business mind of the private sector including sense of speed, awareness of cost, and pursuit of profit. To this end, it is indispensable to have a mindset so as to seriously meet the needs of the private sector by listening to their voices and standing in their position. In addition, in order to meet the needs of private sector in a timely manner, strong leadership and quick decision making are important, thus delegation of authority to field manager and establishing support system are critical. Such fundamental reform cannot possibly be achieved overnight and there is limitation in undertaking measures in the form of strengthening knowhow/capacity and technical transfer as part of consulting services within individual projects. Furthermore, it is difficult to reform consciousness of staff at the public sector as far as they remain within a public organization. Therefore, adopting drastic measures such as – temporarily transferring staff to private companies for several years (while paying enough attention to the conflict of interest) or sending staff to business schools abroad for study, and assigning those staff who have had experiences in private companies and those who have acquired business related knowledge to a position responsible for operation and management at the SEZ/industrial park – can be considered. It is also critical to establish a system which would give a boost to delegate authority for decision making to such responsible staff and to exercise agile response on the ground.

End

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs	<p>< Sihanoukville Port SEZ Development Project (E/S) ></p> <ul style="list-style-type: none"> • Basic design, detailed design, preparation of bid documents, assistance in tendering • Assistance in preparation of rules and regulations (decrees, implementing regulations, laws etc.) • Assistance in establishing implementation system (establishment of a committee on conflict resolution and One-Stop-Service office, preparation of draft service agreement on SEZ management, training of CDC and PAS staffs etc.) • Assistance in investment promotion activities <p>< Sihanoukville Port SEZ Development Project ></p> <p>1) Civil Works and Procurement of Facilities</p> <ul style="list-style-type: none"> • Development of industrial premises (70ha) • Development of roads, water supply facilities, waste water treatment plants, drainage, private power generators, communication facilities etc. <p>2) Consulting Services</p> <ul style="list-style-type: none"> • Construction supervision • Assistance in preparation of rules and regulations • Assistance in establishing implementation system • Assistance in investment promotion activities 	<p>< Sihanoukville Port SEZ Development Project (E/S) ></p> <ul style="list-style-type: none"> • As planned • As planned • As planned • As planned <p>< Sihanoukville Port SEZ Development Project ></p> <p>1) Civil Works and Procurement of Facilities</p> <ul style="list-style-type: none"> • Scope was changed <ul style="list-style-type: none"> ➢ Development of rental factory building (1 lot x 2,700m²) was added • Scope was changed <ul style="list-style-type: none"> ➢ Procurement of private power generators (2 units) was added ➢ Detour road connecting to National Road No.4 and flyover bridge connecting the SEZ and Sihanoukville Port site were deleted ➢ Location of service apartment and dormitory construction was changed (the location was shifted from outside the SEZ to inside the SEZ site) <p>2) Consulting Services</p> <ul style="list-style-type: none"> • As planned • As planned • As planned • As planned
2. Project Period	<p>March, 2006 – January, 2011 (59 months)</p>	<p>March, 2006 – April, 2012 (74 months)</p>

3. Project Cost		
Amount Paid in Foreign Currency	2,873 million yen	1,206 million yen
Amount Paid in Local Currency	1,367 million yen	2,915 million yen
Total	4,240 million yen	4,121 million yen
ODA Loan Portion	3,969 million yen	3,764 million yen
Exchange Rate	1 USD = 111 yen (As of November, 2005 and December, 2007)	1 USD = 107.8 yen (Average between 2006 and 2009) 1 USD = 87.7yen (Average between 2009 and 2013)
4. Final Disbursement	< Sihanoukville Port SEZ Development Project (E/S) > June, 2011 < Sihanoukville Port SEZ Development Project > July, 2014	

End

Situation of other SEZs in Cambodia

- Sihanoukville SEZ (SSEZ) (Area: 1,113ha)

A Chinese SSEZ has been developed in a place 12km away from this SEZ and the SSEZ has adopted a marketing strategy with reduced pricing. In the initial stage of its operation, the SSEZ focused its marketing on rental factories and successfully attracting companies. According to SSEZ management office, number of tenants is 105, generating more than 16,000 jobs and about 95% of the companies are using Sihanoukville Port at the time of ex-post evaluation. More 80% of the investor companies in SSEZ are from China and others come from USA, France, Italy, UK, Ireland, Malaysia, Cambodia etc. There were two Japanese companies operating in the SSEZ, however, one has withdrawn from the business in 2015, and the other at the end of 2016. Following is the background of SSEZ development etc.

- February, 2008: Developer (Sihanoukville Special Economy Zone Co., Ltd.) was established. Prime Minister Hun Sen attended a commencement ceremony
- December, 2010: Bilateral agreement on SSEZ development was concluded between Cambodia and China.
- June, 2012: Start of operation of the SSEZ.
- June, 2016: Celebration was held for the 100th tenants with Prime Minister Hun Sen's attendance.

※According to PAS, they were aware about the SSEZ plan at the start of this project. Based on this, PAS has added the development of rental factory to the project scope.

- Phnom Penh SEZ (PPSEZ) (Area: 350ha)

This SEZ is located in a place about 8km from Phnom Penh International Airport and about 18km from Phnom Penh City. Developer is a joint venture company consisting of Cambodian and Japanese capital. The SEZ is located in capital Phnom Penh and situated at the center of Southern Economic Corridor, connecting the Mekong Region. Many Japanese companies are operating in this SEZ and Mekong River is utilized for transportation to Japan. Possible route is Phnom Penh → Ho Chi Minh City → Japan (Osaka/Tokyo)

Table I: Comparison of Logistics Costs (cost in case of 20FT container)

<ul style="list-style-type: none"> • Phnom Penh → Ho Chi Minh City → Japan (Osaka/Tokyo) utilizing Mekong River: USD 1,560-1,760 • Phnom Penh → Sihanoukville → Japan (Osaka/Tokyo) via Singapore: USD 1,700
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Source: Cambodia Investment Climate (JICA Cambodia Office, January, 2016)

- Manhattan SEZ (Area: 157ha)

This SEZ is located about 6km from the Vietnam border (Bavet). As regards international airport, Ho Chi Minh City International Airport is closer than Phnom Penh International Airport, and access to Ho Chi Minh City Port is convenient. (This SEZ can be utilized for “Vietnam Plus One” candidate companies.)

Table II: Comparison of Logistics Costs (cost in case of 20FT container)

• Bavet → Ho Chi Minh City → Japan (Osaka/Tokyo): USD 1,700

Source: Cambodia Investment Climate (JICA Cambodia Office, January, 2016)

- Tai Seng Bavet SEZ (Area: 99ha)

This SEZ is located about 6km from the Vietnam border (Bavet). Just as Manhattan SEZ, access to Ho Chi Minh City is convenient. (This SEZ can be utilized for “Vietnam Plus One” candidate companies.) Refer to above (Manhattan SEZ) for logistics costs.

- Poipet SEZ (Area: 467ha)

This SEZ is located in Poipet, north-west Cambodia, and about 20km from the Thailand border (Poipet border). Export and import is possible using in Laem Chabang Port in Thailand. (This SEZ can be utilized for “Thailand Plus One” candidate companies.)

The main ports utilized by each SEZ are plotted on the map.

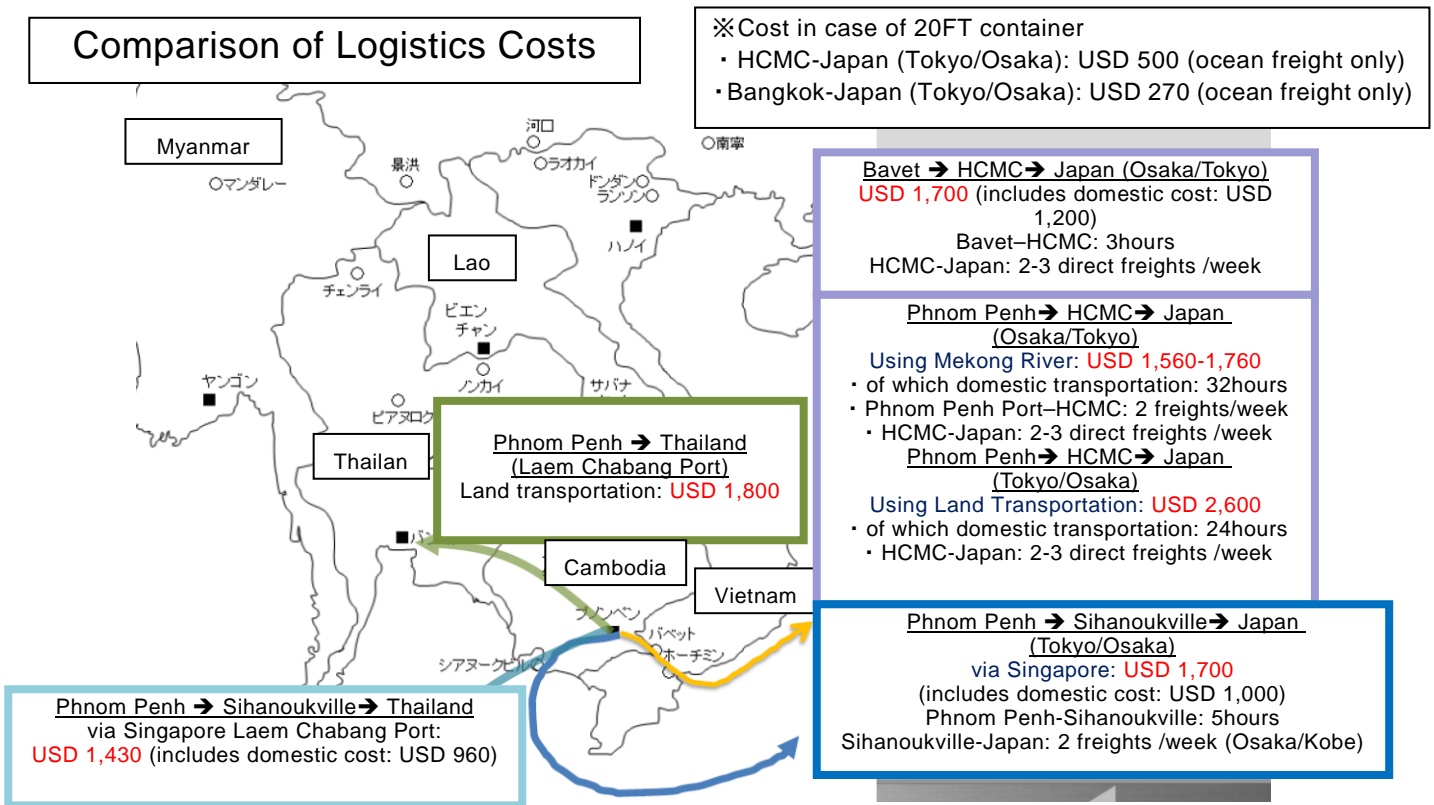


Figure I: Comparison of Logistics Costs

Source: Cambodia Investment Climate (JICA Cambodia Office, January, 2016)

Macroeconomic Growth Data

• GDP Growth Rate

Although figures declined from 2008 to 2009 due to the effect of world financial crisis, they recovered after 2010 and have been maintaining an average of about 7% in recent years. (Figure II)

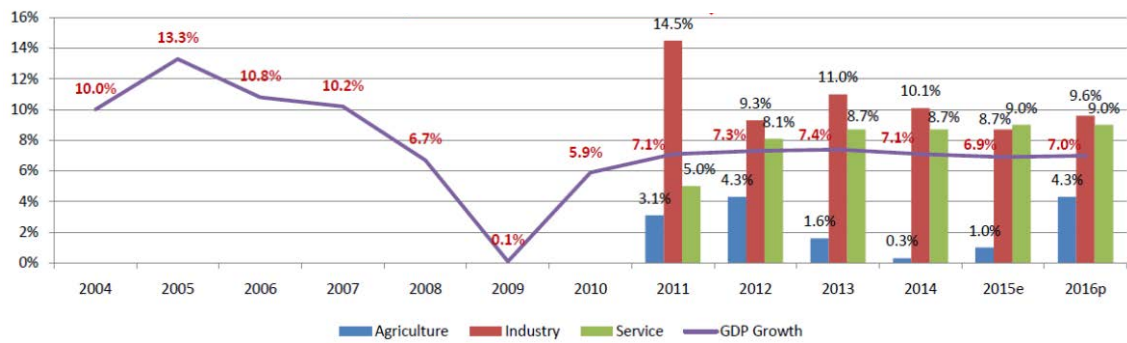


Figure II: Trend of GDP Growth Rate (2004-2016)

Source: Council for Development of Cambodia (CDC)

• GDP Per Capita

Although figure slightly declined in 2009, it has been steadily increasing after 2010. It exceeded USD 1,000 in 2013 and predicted to become USD 1,325 in 2016. (Figure III)

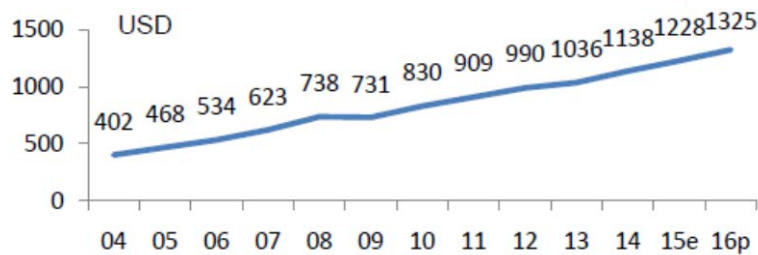


Figure III: Trend of GDP Per Capita (2004-2016)

Source: Council for Development of Cambodia (CDC)

- Amount of Direct Investment

Amount of direct investment (commitment base) for the past five years has been fluctuating by year and significant changes can be observed for industries and infrastructure by sector. (Figure IV) When looking at the share by country (foreign investment), while Japan falls within a ranking of third to seventh, China has been maintaining at the top, greatly leaving second ranking and below far behind. (Table III)

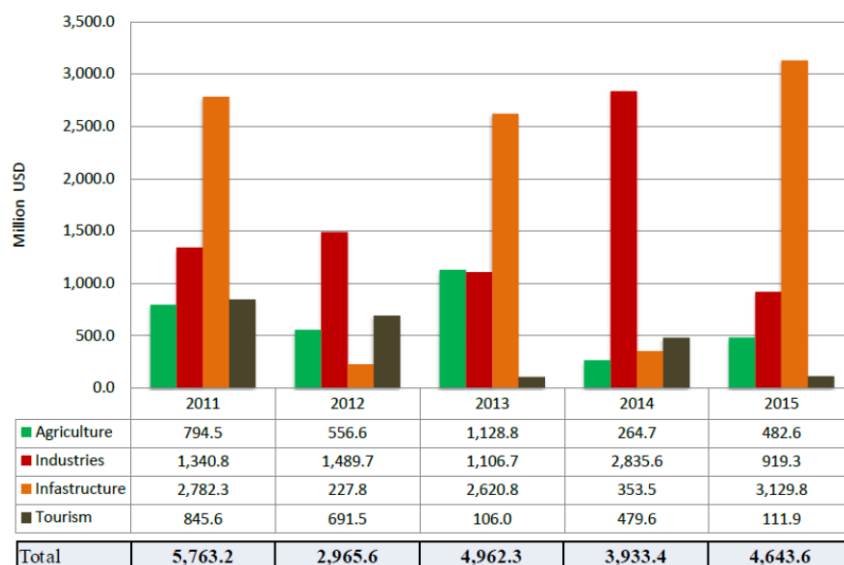


Figure IV: Trend of Amount of Direct Investment (by sector, commitment base)

Source: Council for Development of Cambodia (CDC)

Table III: Trend of Amount of Direct Investment (by country, commitment base)

Year	2011		2012		2013		2014		2015	
Total Amount	USD 5,763.2 million		USD 2,965.6 million		USD 4,962.3 million		USD 3,933.4 million		USD 4,643.6 million	
Ranking	Country	%	Country	%	Country	%	Country	%	Country	%
1	Cambodia	41.24	Cambodia	42.08	Cambodia	66.80	Cambodia	64.00	Cambodia	69.28
2	China	30.55	China	20.69	China	15.68	China	24.44	China	18.62
3	Vietnam	11.99	Korea	9.89	Vietnam	6.10	Malaysia	4.72	UK	3.00
4	UK	4.30	Japan	9.15	Thailand	4.37	Japan	1.72	Singapore	2.18
5	Malaysia	4.20	Malaysia	6.81	Korea	1.76	Korea	1.66	Vietnam	1.92
6	Korea	2.91	Thailand	4.53	Japan	1.59	Vietnam	1.26	Malaysia	1.69
7	USA	2.47	Vietnam	2.89	Malaysia	1.09	UK	1.13	Japan	1.28
8	Japan	1.15	Singapore	2.59	Singapore	1.03	Singapore	0.89	Thailand	1.18
9	Australia	0.43	UK	0.51	UK	0.43	Thailand	0.88	Korea	0.21
10	Singapore	0.28	USA	0.42	France	0.27	Australia	0.51	Canada	0.19
11	Others	0.48	Others	1.21	Others	0.94	Others	1.36	Others	0.52

Source: Prepared by the evaluator based on the information provided by the Council for Development of Cambodia (CDC)

- Amount of Exports

While amount of exports decreased in 2009, it is increasing after 2010. (Figure V)

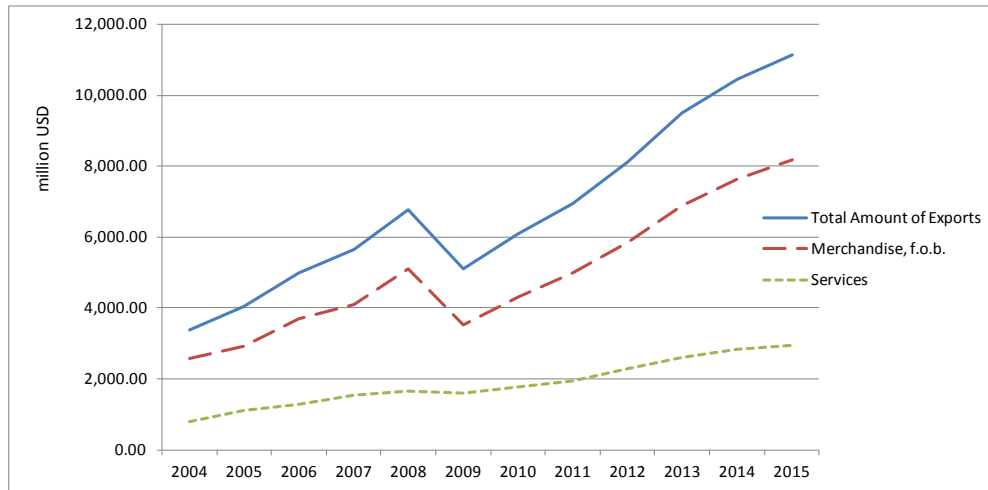


Figure V: Trend of Amount of Exports

Source: Prepared by the evaluator based on the information of the National Institute of Statistics

On Views of Experts

This ex-post evaluation was carried out by referring to views of experts (universities, NGOs, etc.) to reflect more specialized and diverse views, in addition to evaluation based on the DAC five evaluation criteria by the external evaluator. The external evaluator selected and gained cooperation from Dr. Masami Ishida, an expert from the Institute of Developing Economies, Japan External Trade Organization.

Dr. Ishida is Director-General and specializes in development of the Greater Mekong Subregion. For this reason, the external evaluator asked him to share his views based on his expertise and experience. Specifically, he examined the current situation and prospects of regional development in Cambodia from the perspectives of the two projects subject to evaluation: “Greater Mekong Power Network Development Project” and “Sihanoukville Port Special Economic Zone Development Project”. He also brought multiple viewpoints of other infrastructure improvement including roads, trains and ports into the analysis.

The essay of Dr. Masami Ishida is appended to the evaluation report as attachments.

End

The Position of “Sihanoukville Port Special Economic Zone Project” and “Greater Mekong Power Network Development Project (Cambodia Growth Corridor)” in Regional Development of Cambodia Growth Corridor

Dr. Masami Ishida, Director-General,
Institute of Developing Economies, Japan External Trade Organization

1. Cambodia Growth Corridor: the Status of Development of Highway, Port and Railway

The Government of Japan has positioned the sub-region composed of Phnom Penh Municipality and Preah Sihanouk Province, and the in-between provinces of Kandal Province, Takeo Province, Kampong Speu Province, Kompot Province and Koh Kong Province as “Cambodia Growth Corridor” and has supported the economic development of the country (Figure 1). The sub-region is relatively populated in Cambodia and its area and population account for 17.3 and 37.2 percent of the whole of Cambodia respectively, and its population density is 2.2 times as high as the whole Cambodia (based on *Yearbook of Cambodia in 2013*).

The fundamental principle of the development of Cambodia Growth Corridor is to connect the megacity, Phnom Penh and the sole deep seaport, Sihanoukville; and to facilitate the development of the two cities and the provinces in-between by attracting export-oriented firms to the port and its nearby area as a free zone surrounded by fences where customs procedures would be exempted (The Study on Regional Development of the Phnom Penh-Sihanoukville Growth Corridor in the Kingdom of Cambodia: Abridged Edition by Nippon Koei Co., Ltd. and *et al*, Website of JICA). Highway No. 4 and No. 3 are the major axes of the corridor which connect the two cities; Highway No. 4 plays a role of being the major axis of logistics and industrialization as the shortest way connecting the two cities. Highway No. 3 passes Takeo Province of which the population density is 2.2 times as high as that of Kampong Speu Province. It runs side by side with Highway No. 2 to Takao; and it is a composite economic corridor which runs in parallel with Southern Line of Royal Cambodian Railways and the transmission line, which will be introduced later.

At Sihanoukville Port, container and multi-purposed terminals have been developed since 1999 with ODA loan from Japan and the container throughput and total cargo throughput had increased by 1.9 times and by 2.7 times respectively between 2005 and 2015. On the other hand, multiple small cargo ships at maximum level of 200 TEU shuttle once a week between Phnom Penh Port, which is located 25 – 30 km down the Mekong River from Phnom Penh, and ports around Ho Chi Minh City. The cargo transported to Ho Chi Minh City and its suburbs is transshipped to megacarriers with destination to North America and Japan. Container throughput of Phnom Penh Port had increased 4.8 times during the same period and its disparity

with Sihanoukville Port had reduced from 7.0 times to 2.7 times; both ports have improved through friendly competition and complement each other (the numbers including the container throughput are based on brochures of these ports).

2. Current Situation of Electricity Generation and Transmission and the Position of Greater Mekong Power Network Development Project (Cambodia Growth Corridor)

Electricity issue is one of the largest bottlenecks in the economic development of Cambodia. To begin with, the share of population with access to electricity is 16.6 percent as of 2000 and 56.1 percent as of 2014 according to the statistics of the World Bank; the share as of 2014 is the lowest in the Asia after Timor – Leste, North Korea and Myanmar. The electricity price is 13 – 16 cent per kwh as of 2016 and the value is also much higher than those of the majority of other ASEAN countries which are usually less than 10 cent (*JETRO Censor*, May in various years). The reasons why the electricity price in Cambodia is so high are partly because the electricity including Phnom Penh Municipality are much dependent on diesel power generation with higher unit price and partly because Cambodia has bought electricity from neighboring countries including Vietnam in order to complement the insufficiency of domestic electricity supply in the background. The electricity price, however, showed slight improvement compared with 19 cent as of 2011; it may be because the operation of Kam Chay Hydroelectric Power Station and a coal-fired power station at Stung Hav, which will be explained later, have been started and they have been connected by the transmission line.

The development of the transmission line in the Cambodia Growth Corridor has started with the construction of the 230 kV transmission line which carries electricity supplied by Vietnam from the border with Vietnam to Phnom Penh by way of Takeo Substation in 2009 with the assistance of the Asian Development Bank (ADB) and KfW Development Bank (*Kreditanstalt für Wiederaufbau*: KfW) in the circumstance that electricity in the municipality and its suburbs have expanded with the economic development since the beginning of the 2000s. In 2011, the 230 kV transmission line from Takeo Substation to Kompot was constructed by the assistance of the KfW Development Bank and a Chinese firm constructed Kam Chay Hydroelectric Power Station with the capacity of 193.2 MW.

The Greater Mekong Power Network Development Project (Cambodia Growth Corridor) co-financed by the Government of Japan and the ADB was a project which intended to directly connect the transmission line further from Kompot Substation to Sihanoukville. Later the development of two coal-fired power stations with the capacities of 200 MW and 405 MW, respectively, was decided and the Greater Mekong Power Network Development Project was also changed to a plan which transmits to Sihanoukville by way of Stung Hav Substation. The 203 kV transmission line between Kompot and Stung Hav was constructed in 2013, the

coal-fired power station with the capacity of 200 MW and the 115 kV transmission line assisted by the Government of Japan between Stung Hav and Sihanoukville were completed in 2014 and the operation of the coal-fired power station with the capacity of 405 MW is scheduled to start in 2017.

With the construction of the transmission line between Kompot and Sihanoukville, first, the two-way transmission line between Sihanoukville and Phnom Penh was completed; electricity supply to Phnom Penh increased indirectly, the electricity price also showed a slight downward trend, as previously noted, and the imports of electricity from foreign countries also decreased. Second, the share of electrified-households was 50 percent in the urban area and 8 percent in the rural area of Kompot Province; 60 percent in the urban area and 13 percent in the rural area of Preah Sihanouk Province before the implementation of the project. In the year of 2016 it expanded to 100 percent, 80 percent, 95 percent, 86 percent respectively. The project has contributed to the improvement of the people's access to electricity. Third, at Sihanoukville Special Economic Zone (SEZ), described later, I heard that blackouts have decreased since about 2015 and the electricity supply has been stabilized; it was clear that stable electricity supply has been permeating not only for household use but also for industrial use. In 2017, the ODA loan agreement with Japan on the Sihanoukville Port New Container Terminal Development Project was signed; the stable electricity supply is also expected to be a positive factor for the project in terms of supplying stable electricity to the new container terminal and expanding imports and exports through the improvement in productivity in the two SEZ in Sihanoukville, which will be described later.

3. The Position of Sihanoukville Port Special Economic Zone Project

It was Sihanoukville Port Special Economic Zone Project that the Government of Japan promoted as the tramp card for attracting export-oriented firms by designating Sihanoukville Port as a free zone; the loan agreements for the engineering service to establish the SEZ and for the construction were signed in 2006 and in 2008 respectively; the Sihanoukville Port SEZ was completed in April, 2012 and Sihanoukville Autonomous Port (*Port Autonome de Sihanoukville*: PAS) has operated the SEZ. The SEZ was physically separated from the port and has not become free from customs procedures, but it is a large sales point that it takes almost no time for transportation because the SEZ is so close to the port. A firm producing beer-bottle-cases started operation on 13 March in 2013 and three firms have been in operation as of 2017; this number, however, is far less than 26 firms, the number for the initial target.

On the other hand, Sihanoukville SEZ also exists 13 km away from Sihanoukville Port along Highway No. 4, in Preah Sihanouk Province. The SEZ is shared and operated with a joint venture of Hongdou Group at Wuxi in China and International Investment Group in Cambodia

and was established based on a decree dated on 11 March in 2008. At the SEZ, the first-invested-firm started its operation in October, 2008 and 105 firms including exporting firms of garments, electronics and machinery have conducted operation as of 2017.

I would like to consider the reasons why the number of firms received by the SEZs is so different between Sihanoukville Port SEZ and Sihanoukville SEZ. The major reason is that the former's land lease price was set higher at USD 62 per square meter for 50 years because the former's SEZ specification was designed with a sales point of "infrastructure with Japanese standard" which was fully equipped with industrial wastewater treatment facilities while the latter set the price at USD 40. At Sihanoukville SEZ, the construction of industrial wastewater treatment facilities was about to be completed when we visited in February 2017; speculations that the SEZ could set a lower price because the SEZ left the construction of the industrial wastewater treatment facilities as a least priority cannot be entirely denied. In addition, another reason can be enumerated that the investment boom in Cambodia started in 2010 and the completion of Sihanoukville Port SEZ was in April 2012, so the SEZ was late for getting on the investment boom. Furthermore, I heard that when the ex-post evaluators of the project interviewed tenant firms, the firms pointed out that "proposing requests and claims are hard to be understood by the staff," "it takes much time for supporting us without a sense of speed required generally by 'the private sector'"; the SEZ has challenges in the service contents.

In the light of the situation, roles in attracting export-oriented firms which were expected to be played by Sihanoukville Port SEZ at the beginning resulted in an ironic consequence that the roles were not played by the said SEZ, but by Sihanoukville SEZ. It is very difficult to say whether Sihanoukville Port SEZ will recover by receiving investors, considering that the minimum wage has been raised every year and the disparity of the minimum wages between Cambodia and Thailand which was four times in January, 2013 have decreased by 1.4 times in 2017 and the competitiveness of Cambodia as bases for exporting has been weaker than ever before. Yet there is a positive factor that the industrial coverages for attracting investment has expanded. Since electricity supply has been stabilizing, it can attract power-intensive industries which used to be inappropriate for Sihanoukville Port SEZ because it had problem of electricity supply; it is expected to attract firms, for instance, in the sector of electric and electronics industry in future. In the situation that export competitiveness has been weakened, it may be needed not to insist on attracting export-oriented firms; it may be needed to quickly correspond to changes in situations by reading ahead, based on the reflection of the past experience that the SEZ missed the investment boom.

4. Development Situations along Highway No. 4 and Highway No. 3

Here I would like to discuss the provinces between Phnom Penh and Sihanoukville and the

highways which connect these provinces. Along Highway No. 4, Phnom Penh SEZ did not exist when I visited for the first time in 2004; then the location of business establishment has expanded to a part of Kampong Speu Province and the extension of suburbanization has been progressed. There is a mountain pass, however, in Kampong Speu Province, which is about 100 km away from Phnom Penh; locating business establishments is not considered to progress in this area and “middle cities” do not exist between Phnom Penh and Sihanoukville along Highway No. 4. Rather, the suburbanization can extend in the direction of Highway No. 41, which separates from Highway No. 4 on the way to Sihanoukville and join Highway No. 3 before reaching Kompot because Highway No. 41 runs so as to keep a distance with the mountainous section and has just been improved by China Road Bridge Corporation (CRBC). On the one hand, the number of ready-mixed concrete plants and some business establishment has increased at the suburb of Sihanoukville, maybe reflecting a construction boom, however, we cannot see spillover effects which extend the suburbanization of business establishment to other provinces.

Along Highway No. 3, business establishments such as cement factories in Kampot Province and rice mills have been seen gradually. Highway No. 3 seems to have potentials for business establishment, considering small-scale businesses such as beneficiary banks for mobile banking from cities like Phnom Penh have progressed in Takeo and Kompot, the “middle cities” along Highway No. 3, and the transmission line and railway run in parallel.

Summary and Prospects in Future

Connectivity between Phnom Penh and Sihanoukville through the highways, railway and transmission line has been improved; especially, the development of electricity generation and transmission line have improved surrounding residents’ access to electricity to a large extent, stabilize the electricity supply to Sihanoukville Port and to its nearby SEZs and have contributed much to the improvement in electricity supply along Highway No. 3 and in Phnom Penh and Sihanoukville.

On the one hand, five years have passed since the completion of Sihanoukville Port SEZ, which was expected as a receiver to attract export-oriented firms in 2012, but the number of tenant firms has been limited to three, so the position of the SEZ in the Growth Corridor has yet to be clear. On the other hand, 105 firms have invested at Sihanoukville SEZ as of 2017; the latter SEZ have played the expected role and contributed to the economic development in Sihanoukville. It has become much difficult for Sihanoukville Port SEZ to attract export-oriented firms in the future in the circumstances that wages in Cambodia are not so lower than that of Thailand as was already described. If it is possible to improve the current situations, in addition to the improvement in the SEZ’s service and in its selling price, and the shift from

focusing on attracting export-oriented firms, development of human resources with techniques and/or skills which are appropriate for the wage level are required. Considering to outsource its operation to private firms in Thailand or Singapore which have shown successful performances in managing industrial estates or to Japanese trading firms, instead of a public organization, Sihanoukville Autonomous Port, can be also recommended.

Discussing the economic development of provinces between Phnom Penh and Sihanoukville along Highway No. 4 and Highway No. 3, respectively, the extension of suburbanization of business establishment has been progressing along Highway No. 4 from Phnom Penh and has expanded to a part of Kampong Speu Province between the two cities. There is a mountain pass, however, from an area slightly less than 100 km away from Phnom Penh and such mountainous areas are usually not suitable for locations of business establishment and “middle cities” do not exist between the two cities. The possibility that the extension of the suburbanization could take place between one of both edge cities and the “middle city” is small. The possibility that such an extension could progress along Highway No. 41, which has been improved so as to avoid the mountainous area, can be considered in some cases. Industrial locations along Highway No. 3 have not been progressed compared with those along Highway No. 4 around Phnom Penh. However, considering that the two middle cities, Takeo and Kompot exist and business establishment which is distinctive in such “middle cities” can progress, it is possible that extension of suburbanization of business establishment from one of the “middle cities” could take place and attracting business establishment could be advantageous in the aspects of electricity supply and of using passenger/cargo railways because the transmission line and railway run in parallel, it could be considered that Highway No. 3 facilitates the development of provinces between the two edge cities in future.

Considering the future developments, Highway No. 4 will continuously play the role of the main artery of logistics as the shortest route connecting the capital and the port. The extension of suburbanization of business establishment along Highway No. 4 starting from Phnom Penh will be limited by the existence of the mountain pass, but it can continue to extend along Highway No. 41 in some cases. The extension of suburbanization of business establishment starting from Sihanoukville has not progressed as much, but it can be possible that such an extension including the related industries will take place if further firms locate themselves in the two SEZs in Sihanoukville. Along Highway No. 3, business with scales of 50 – 1,000 employees will gradually be established on the one side and there is a possibility that branded commercial facilities like convenience stores that exist in any city can progress, in the same way that bank branches have been established in response in time to the demand in the “middle cities”.

Summarizing so far, the construction of transmission line between Kompot and

Sihanoukville, combined with the results of the development of nearby electricity power generations, has contributed to the economic development of the Growth Corridor in the access to electricity, the stable electricity supply and the electricity supply for the port and SEZs. It cannot be denied that the number of located export-oriented firms has not been changed by the development of Sihanoukville Port SEZ, but ironically has increased in Sihanoukville SEZ, developed by a Chinese and Cambodian joint venture firm. We can say that locating export-oriented firms in Sihanoukville has been progressed and the cities at both edges have been developed by this SEZ. Regarding the development of the provinces between the two cities, the extension of suburbanization of business establishments have progressed to a part of Kampong Speu Province on the one hand, but have not progressed to its extension because of the existence of the mountain pass. On the other hand, the extension of suburbanization of business extensions along Highway No. 3 has not been progressed like along Highway No. 4, however, there is a possibility that the extension of suburbanization of business extensions starting from the “middle cities,” Kampot and Takeo will be progressed in future.

Figure 1. Cambodia Growth Corridor



Note: Relative position relations of transmission lines, roads and railways might not reflect the reality.

Source: Created by the author.

Kingdom of Cambodia

FY 2016 Ex-Post Evaluation of Japanese ODA Loan Project

“Niroth Water Supply Project”

External Evaluator: Masumi Shimamura, Midori Kondo

Mitsubishi UFJ Research and Consulting Co., Ltd.

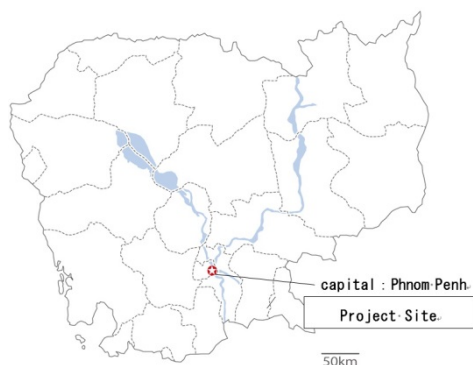
0. Summary

This project, which aims to provide a safe and constant water supply by developing a water supply facility, thereby contributing to improve living environment of residents including the poor in Phnom Penh city and the surrounding area and to improve the investment environment, is consistent with Cambodia’s national development policies and with development needs as well as Japan’s ODA policy; thus, the relevance of the project is high. Project cost was slightly higher than the original plan and project period exceeded the original plan, thus the efficiency of the project is fair. Operation and Effect Indicators set at the time of appraisal have been greatly achieved except for Water Quality (Color). Regarding the Water Quality (Color), the target figure set at the time of appraisal was not well grounded, and the actual figures significantly excelled from the standard of the World Health Organization (hereinafter referred to as “WHO”) and the safety of the water is recognized, thus, it can be considered that it does not push down the evaluation of effectiveness of this project. The indicators of the whole service area, such as the number of households with water supply connections, have shown much higher actual achievement than expected at the time of appraisal, and from the results of beneficiary survey, it is considered that the effectiveness regarding the safety of water quality and the stable supply is high. As for impacts of this project, through stable supply of cheap and safe water, improvement of household expenditure, enhancement on the convenience of living and reduction of water related medical symptoms were seen; and, it was confirmed from the results of beneficiary survey etc. that there was impact on enhancement of the living environment of the households. In addition, the share of the water treatment plant which was constructed by this project in the Greater Phnom Penh area is 32%, It has been providing stable water supply to major industrial parks and commercial area, thus it can considered that this plant is playing an important role to improve the investment environment. Furthermore, it is considered that there were some contributions to poverty alleviation through subsidy program which assists water connection fees by the executing agency. Therefore, there are much more impacts than expected at the time of the appraisal, thus, effectiveness and impact of the project are high. No negative impact on natural environment, land acquisition and relocation has been observed. No major problem has been identified in the institutional, technical and financial aspects of the operation and maintenance as well as in the current status; thus, sustainability of the project effects is high. In addition to the efforts for reducing operating costs, such as reduction of the non-revenue water rate and high fee collection rate, efforts for expansion of income sources have been tackled by

the executing agency, and the executing agency continues to maintain its stable management.

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

1. Project Description



Project Location



Water Treatment Plant constructed by this project

1.1 Background

In Cambodia, since the mid-1990s, the water supply systems have started to develop mainly in the capital Phnom Penh city, and the number of water supply facilities has expanded and the capacity of human resources has been developed. However, in the Greater Phnom Penh area including Phnom Penh city and its surrounding area, water demand has been rapidly increasing with the increase of population and commercial facilities, and it was necessary to improve the water supply capacity urgently.

In respond to the rapid increase of water demand in the Greater Phnom Penh area, this project aims to secure a stable water supply by developing new water supply facility.

1.2 Project Outline

The objective of the project is to provide a safe and constant water supply by developing water supply facility in Greater Phnom Penh¹, thereby contributing to improve living environment of residents including the poor in Phnom Penh city and the surrounding area, and also to improve the investment environment.

Loan Approved Amount/ Disbursed Amount	3,513 million yen / 3,492 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	March, 2009 / March, 2009

¹ Phnom Penh city (12 districts) and the capital city of Kandal province (Takhmao city) are targeted area of this project.

Terms and Conditions	Interest Rate 0.01%; Repayment Period 40 years (Grace period) (10 years) Conditions for Procurement General Untied
Borrower / Executing Agency	The Royal Government of Cambodia / Phnom Penh Water Supply Authority (PPWSA)
Project Completion	August, 2014
Main Contractor (Over 1 billion yen)	Moya Asia Limited (Singapore)
Main Consultant (Over 100 million yen)	Safege (Société Anonyme Française d' Etude de Gestion et d' Entreprises) (France)
Feasibility Studies, etc.	Government of France, F/S " Private Sector Study and Aid Fund (FASEP)" (May - October 2008)
Related Projects	<p>【Technical Cooperation】</p> <ul style="list-style-type: none"> • Development Study "The Study on the Master Plan of Greater Phnom Penh Water Supply in Cambodia" (1992 - 1993) • Small-Scale Development Partnership project (Construction of Monitoring System for Distribution Block) (2001 - 2002) • Technical Cooperation Project " The Project on Capacity Building for Water Supply System" (2003 - 2006) • Development Study "The Study on the Master Plan of Greater Phnom Penh Water Supply in Cambodia (Phase 2)"(2004 - 2006) • Technical Cooperation Project " Capacity Building for Water Supply System in Cambodia (Phase 2)" (2007-2012) • Technical Cooperation Project " Project on Capacity Building for Urban Water Supply System in Cambodia (Phase 3) " (2012-2017) <p>【Grant Aid】</p> <ul style="list-style-type: none"> • "Phnom Penh Water Supply Development Plan" (1992) • "Phnom Penh Water Supply Development Phase 2" (1997 - 1999) • " The Project for Expansion of Phum Prek Water Treatment Plant" (2001 - 2003) • " The Project for Introduction of Clean Energy by Solar Electricity Generation System " (2010 - 2013) <p>【ADB】</p> <ul style="list-style-type: none"> • "Phnom Penh Water Supply and Drainage Project-Part A-" (1997-1999) <p>【World Bank】</p> <ul style="list-style-type: none"> • " Chrouy Changvar Water Treatment Plant Construction

	<p>Project" (2000 - 2001)</p> <ul style="list-style-type: none"> • "Urban Drainage Network Development Project" (2003) • "Provincial and Peri-Urban Water Supply Project" (2003-2008) • "Construction of Water Tower in Takhmao" (2006-2009) <p>【Government of France (Grant Aid)】</p> <ul style="list-style-type: none"> • "Improvement of filter basin of Phum Prek Water Treatment Plant " (1993) • "Development of distribution pipes of Phum Prek Water Treatment Plant" (1993) • "Chamkar Mon Water Treatment Plant Construction Project" (1993 - 1994) • "Expansion and Improvement of Chamkar Mon Water Treatment Plant" (1996 - 1997) <p>【French Development Agency (AFD)】</p> <ul style="list-style-type: none"> • "Expansion of Chrouy Changvar Water Treatment Plant" (2007 - 2009) • "Raw Intake Station & Raw Water Transmission Mains (Niroth 1) " (2009-2013) • "Extension of Greater Phnom Penh Water Supply System GPPWSS-Cham Chao Transmission Main and Niroth Water Production Facilities (Phase 2) " (2013-2017)
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2. Outline of the Evaluation Study

2.1 External Evaluator

Masumi Shimamura, Midori Kondo, Mitsubishi UFJ Research and Consulting Co, Ltd.

2.2 Duration of Evaluation Study

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

Duration of the Study: September, 2016 – September, 2017

Duration of the Field Study: November 29, 2016 –December 10, 2016, January 31, 2017 – February 3, 2017

3. Results of the Evaluation (Overall Rating: A²)

3.1 Relevance (Rating: ③³)

3.1.1 Consistency with the Development Plan of Cambodia

At the time of appraisal, Government of Cambodia, in *Rectangular Strategy-Phase I* and *National Strategic Development Plan* (hereinafter referred to as “NSDP”) (2006-2010), stipulated to ensure “access to safe water” as substantive policy. Moreover, in *Master Plan for*

² A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

³ ③: High, ②: Fair, ①: Low

Greater Phnom Penh of Phnom Penh Water Supply Authority (hereinafter referred to as “PPWSA”), which has planned its target year for 2020, “to realize stable access to water”, “to ensure safe water supply”, and “to enlarge the water supply area” were set as key goals and the necessity for expanding water supply capacity was pointed out.

At the time of ex-post evaluation, Government of Cambodia aims in *National Strategic Development Plan* (NSDP) (2014-2018), as policy targets, to enlarge the water supply area in rural area and urban area as well. Moreover, in the PPWSA’s *The Third Master Plan for Greater Phnom Penh Phase III*, it is planned to achieve some goals such as to provide water supply in the area where water consumption is high, to respond to a growing water demand and to achieve a network coverage (water supply coverage) of 100% in Greater Phnom Penh.

3.1.2 Consistency with the Development Needs of Cambodia

At the time of appraisal, in the surrounding area of Phnom Penh city, with population expansion and increasing commercial facilities, it was predicted that the water demand would rise sharply and it would exceed the existing water supply capacity. Since the water supply facilities in order to respond to water demand were not sufficiently developed, it was an urgent issue to improve supply-demand balance as soon as possible.

At the time of the ex-post evaluation, through this project, the water supply capacity of Greater Phnom Penh increased about twice as much compared with the capacity before the project (2009). However, the water demand has increased with the growth rate exceeding the initial forecast, and from the water demand forecasts from 2015 to 2030, the water demand is expected to double from 480,000m³/d in 2015 to 940,000 m³/d in 2030. Figure 1 compares existing water supply capacity with the future water demand.

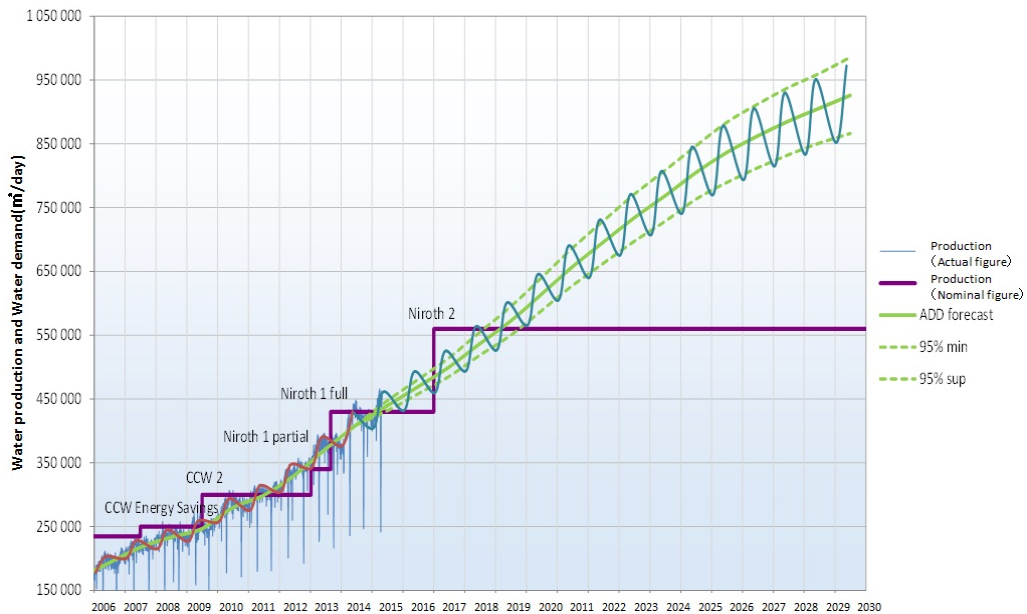


Figure 1: Forecast of Water Demand and Water Supply⁴

Source : Information provided by executing agency

Note : Purple = existing water supply capacity (including Niroth water treatment plant Phase 2 completed in January 2017)

Therefore, even at the timing of ex-post evaluation, to expand water supply capacity corresponding to a rapid increase of water demand is an urgent issue, and the importance of this project remains unchanged at the time of ex-post evaluation.

3.1.3 Consistency with Japan’s ODA Policy

The Country Assistance Program for Cambodia drawn up in 2002 indicated “Sustainable economic growth and realization of a stable society” and “Assistance for socially vulnerable people” as the specific priority areas for assistance. The objective of this project, which aims to bring the impact of improving the living environment of residents including the poor and contributing to improving the investment environment, is consistent with the priority areas mentioned above.

In the same *Country Assistance Program*, the “Mekong Region Development” was regarded as a priority area, and it stipulated to provide assistance actively utilizing both technical cooperation and financial assistances. Furthermore, in *Medium-Term Plan on Official Development Assistance* (February 2005), it was emphasized to promote sustainable economic growth through effectively combining ODA schemes and collaborating with other international organizations. This project has effectively combined with the assistance of other donor (AFD)

⁴ a green solid line =forecast of water demand

by utilizing Japanese technical cooperation and financial cooperation schemes, and it was consistent with the Japanese government's policy at the time.

Therefore, this project has been highly relevant to the country'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 developed a water treatment plant with capacity of 130,000 m³/d to increase water supply capacity in Greater Phnom Penh. Table 1 shows the comparison of planned and actual project outputs.

Table 1 : Comparison of Planned and Actual Project Outputs

Plan (at the time of appraisal)	Actual (at the time of ex-post evaluation)
1) Civil Works, Procurement of Equipment etc.	1) Civil Works, Procurement of Equipment etc.
<JICA portion> (1) Water Treatment Plant (2) Sludge Pipe (3) Treated Water Pumping Station (4) Treated Water Tank (5) Treated Water Transmission Mains (6) Sewer and Ancillaries <AFD portion> (1) Intake Tower (2) Raw Water Transmission Main	<JICA portion> (1) Water Treatment Plant (2) Sludge Pipe (3) Treated Water Pumping Station (4) Treated Water Tank (5) Treated Water Transmission Mains (6) Sewer and Ancillaries (7) Transmission network extension to Takhmao Pipe of DN 400mm =3,500m Pipe of DN 500mm =7,200m <AFD portion> (1) Intake Tower (2) Raw Water Transmission Main
Consulting services	
<AFD portion> Assistance in tendering, Construction supervision (Quality Management, Process Management etc.) Inputs of consulting services: Foreign Consultants: 70M/M, Local Consultants: 218M/M, Total :288 M/M	<AFD portion> Assistance in tendering, Construction supervision (Quality Management, Process Management etc.) Inputs of consulting services: Foreign Consultants: 80M/M, Local Consultants: 146M/M, Total :226 M/M
Out of the scope of this project⁵	
<AFD portion and PPWSA's own fund > (1) Distribution network extension	<AFD portion and PPWSA's own fund > (1) Transmission network extension (2) Distribution network extension

Source : Information provided by JICA (Planned figures at the time of appraisal), and results from questionnaire survey of executing agency (Actual figures at the time of ex-post evaluation)

Regarding civil works, expansion of transmission pipes was added to the project scope. This was to extend the transmission pipes to the area where the water pressure was low (Takhmao city), and it was necessary for ensuring smooth water supply; thus it is judged that it was appropriate, commensurate with inputs. In addition, regarding the water distribution portion which was outside of the scope of this project, the main distribution pipes completed in May 2012⁶. For the others, there is no change in the output.

⁵ Although the total project cost does not include the water distribution part in this project, from the perspective of the whole effect of this project, the outputs of the water distribution part and the timing of development were reviewed.

⁶ Water supply has started from the following month (October 2013) when the water treatment plant was completed.

As regards to inputs of consulting services (M/M), when compared with the plan at the time of appraisal, it decreased by 61.33 M/M in total. The reason for this decrease was, due to the prompt procurement, the work of construction supervision was completed in a shorter period than expected, and the period of consulting service was shortened from 36 months to 30 months.

3.2.2 Project Inputs

3.2.2.1 Project Cost

The total project cost of this project was initially planned to be 6,532 million yen (out of which 3,513 million yen was to be covered by Japanese ODA loan), whereas the actual total project cost was 6,686 million yen (out of which 3,492 million yen was to be covered by Japanese ODA loan), exceeding the plan. (102% of planned).

Although the project period was extended from the planned period, the actual cost was about 2% increase from the planned cost because of depreciation of the local currency (Cambodia Riel) compared with Japanese yen during project implementation etc.

3.2.2.2 Project Period

The overall project period was planned as 50 months, from March 2009 (conclusion of Loan Agreement) to April 2013 (completion of warranty period) as opposed to 66 months in actuality, from March 2009 (conclusion of Loan Agreement) to August 2014 (completion of warranty period), which is longer than planned (132% of the initial plan). (Refer to Table 2)

Main reason for project delay was due to delay of approval procedures for selection of consultants and contractors (the selection period for consultants was 2.1 times compared with the plan at the time of appraisal, and the selection period for contractors was 2.1 times compared with the plan at the time of appraisal) .

Table 2 : Comparison of Planned and Actual Project Period

Item	Plan (at the time of appraisal)	Actual (at the time of ex-post evaluation)
Selection of consultants	Feb, 2009 – Jul., 2009 (6 months)	May, 2009– May, 2010 (13 months)
Consulting services	Sep, 2009 – Aug, 2012 (36 months)	Aug, 2010 – Feb, 2013 (31 months)
Selection of Contractors	Jan, 2009 – Sep, 2009 (9 months)	Jan, 2009 – Jul, 2010 (19 months)
Construction (JICA)	Nov, 2009 – Apr, 2012 (30 months)	Aug, 2010 – Sep, 2013 (38 months)
Construction (AFD)	Nov, 2009 – Dec, 2012 (38 months)	Aug, 2010 – Sep, 2013 (38 months)
Extension of Transmission pipes (additional scope)	N/A	Oct, 2010 – May, 2012 (20 months)
Start of operation	N/A	Oct, 2013
Warranty period	May, 2012 – Apr, 2013 (12 months)	Oct, 2013 – Aug, 2014 (11 months)

Source : Information provided by JICA, and results from questionnaire survey of executing agency

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

The financial internal rate of return (FIRR) calculated at the time of project appraisal was 5.6%, on the assumption that sales from water tariffs generated from the project to be considered as benefit, expenses for construction cost and operation and maintenance cost to be regarded as cost, and project life assumed to be 30 years. The FIRR recalculated at the time of ex-post evaluation based on the same assumptions as the appraisal turned out to be 12.3%. The main reason for the higher figure in comparison with the figure at the time of appraisal can be attributed to the increase of water tariffs with the expansion of new connection to residents and commercial facilities than planned.

Therefore, both the project cost and project period exceeded the plan. Therefore, efficiency of the project is fair.

【Box.1 Close collaboration in the co-finance project】

In addition to being a co-finance project by AFD and JICA, this project did not include the water distribution network portion in its project scope, so it was pointed out that it was necessary to grasp the process of the whole project including the AFD portion and the water distribution portion, for ensuring its effectiveness of this project.

When confirming what collaborative system was taken among JICA, AFD and the executing agency in this project, it became clear that the close collaboration was promoted with the following efforts.

- Do not lose the substance of meetings - Discussion on the substance at the site and instant problem solving

During project implementation, a regular meeting was held every month⁷, where in addition to

⁷ While agreeing to hold meeting on a monthly-basis, the actual meeting for discussion was set by judging the timing when consultation was necessary.

AFD and JICA, the executing agency (PPWSA), contractors and consultants joined. This regular meeting aimed not to become “a meeting losing its substance” or “meeting for reporting” , and attached great importance at “bringing each other the issues and needs” while looking at the site, hence a place to open their mouths frankly on each other’s problems and circumstances was built.

For example, during the construction work, a meeting style was adopted where all stakeholders visited the construction site, and had a meeting in the water treatment plant after seeing the container facilities, maintenance site etc. During the discussion, the progress was shared based on the “spread sheet” in which the responsible work and scope and works of each stakeholder were described.

Furthermore, in addition to the regular monthly meeting, there were forums for instant discussions with JICA, AFD, the executing agency, and consultants when challenges and problems occurred. In this project, the yen has fluctuated from appreciation to depreciation during the implementation period and thus the cash flow fluctuated, so it became necessary to adjust the portion in charge and the funding plan. For this reason, JICA, AFD and the executing agency were conducting close discussions on disbursement and financial arrangements while monitoring the fund flow. In addition, even in the cases where compliance with the procurement guidelines and approval procedures of the government for amendment of contracts were necessary, a system in which all stakeholders collaborate was adopted. Regarding the explanatory materials and application documents to the government, the efforts to speed up procedures by discussing the description of these documents, among all stakeholders like JICA, AFD, and the executing agency, including consultants were made.

- Pursuing the “effectiveness” of the project – JICA and AFD as facilitators

According to the executing agency, AFD and JICA were being beyond financiers, demonstrating their roles as “facilitators”.

At the timing of appraisal and preparation for this project, JICA and AFD had set up the project design that maximized the effectiveness of the project through co-financing while taking into account the organizational aspects and financial aspects such as procurement and fund management. Moreover, during the construction work, the donors played a catalytic function, such as making consultants and contractors work collaboratively to confirm finely the quality of construction in order to ensure the project effects.

- Long-term allocation of the same staff and collaboration with national staff

During the implementation of this project, the same staff was consistently engaged in supervision of this project at the JICA office as the contact person for this project. The same staff was placed for a long period, from procurement procedures and construction management to the start of operation, and effective collaboration based on past history and discussions was realized. At the JICA office, a policy to utilize national staff was promoted, and along with the Japanese staff, the Cambodian national staff was allocated as a counterpart. Between the national staff and the Japanese staff, the leveling and sharing of information were promoted thoroughly and the substantial work was assigned to the national staff. In this system of two staffs with the involvement of a Japanese staff with a specialized background and the national staff, the amount of information entering the JICA side also increased, and from here it is considered that such personnel allocation structure pushed closer cooperation. In addition, since there are some areas and information that can be involved and available only by national staff, it can be said that JICA was able to approach with careful attention to the cultures and protocols unique to Cambodia. The executing agency side also had a similar structure, and the staffs who had been engaged for a long time since JICA’s technical cooperation project were consistently allocated as the counterpart of this project.

As a result of these collaborations, leading to the early actualization of the project effect in the end can be said as a good practice.

In this project, not only the AFD portion completed at the same time as the facilities of JICA portion (September 2013), but also the distribution network out of the scope of this project completed at an early stage (May 2012). Water supply was started from the following month

(October 2013) when the water treatment plant was constructed, and this can be regarded as the outcome of these close collaborative structures which were continuously conducted.

【Box.2 Stakeholder management taken by the executing agency】

PPWSA puts the philosophy of “all in all” (teamwork toward the same goal) in carrying out the project. This is a slogan of team management aiming for the same goal not only for employees but also for stakeholders as a whole, including contractors and consultants, local communities and local governments.

One example of good stakeholder management by PPWSA is that the executing agency formed good relations with contractors, local communities, and local authorities during construction work.

At the time of appraisal, it was planned to close the roads and lay a bypass during the construction of the water transmission mains, and there was a concern about the occurrence of large-scale traffic jam and an influence on the local residents’ life. However, according to the interview with the residents and window for complaints, complaints from residents were hardly seen. As a background for this, the executing agency had frequently visited local authorities and resident communities, and had been making continuous efforts to gain cooperation and trust for this project from the mayors, village chiefs, and resident communities. Indeed, when setting up a bypass, cooperation from the local community, such as placing traffic control police officers and providing public information, has been obtained, and from here, it can be said that the efforts taken by the executing agency increased the acceptability of local residents.

In addition, efforts were made to build a good relationship with the contractor, and it was confirmed that the executing agency tried to make efforts to build a relationship with the contractor as a team member aiming for the final goal of “stable supply of a safe drinking water”. Not only the staffs in charge of this project but also all the stakeholders of the major departments frequently visited the construction site, and, regarding the invoices from the contractors, they were thoroughly approved in the executing agency within 3 days, hence it has promoted to ensure contractor’s motivation toward this project.

In this way, efforts were made to extract understanding and cooperation for this project through close dialogue with local residents and local authorities and establishing continuous relationships of trust. In addition, efforts were made to encourage stakeholders in the project to raise their awareness of participation and to change mindset from “be a stakeholder” to “be a collaborator”. Through its “stakeholder management” that increases collaborators, enhancing organizational soundness, ensuring smooth project implementation and improving its service quality were worthy of special mention.

3.3 Effectiveness⁸(Rating: ③)

3.3.1 Quantitative Effects (Operation and Effect Indicators)

3.3.1.1 Operation and Effect Indicators of this project

Regarding each Operation and Effect Indicators set at the time of project appraisal, Table 3 shows the comparison of the target figures and actual figures from 2014 to 2016.

⁸ Sub-rating for Effectiveness is to be put with consideration of Impact.

Table 3 : Operation and Effect Indicators of This Project

	Baseline	Target	Actual *Note 1)		
	2008	2015	2014	2015	2016 ⁹ *Note 2)
	Appraisal Year	2 Years After Completion	Completion Year	1 Year After Completion	2 Years After Completion
Production Capacity of Niroth Water Treatment Plant (m ³ /d)	-	130,000	(Nominal) 130,000 (Actual) 122,798	(Nominal) 130,000 (Actual) 143,894	(Nominal) 130,000 (Actual) 155,206
Water Quality (Turbidity) (Unit: NTU)	-	2	0.42	0.41	0.60
Water Quality (Color) (Unit: TCU)	-	0.7	1.69	1.21	1.95

Source : Information provided by JICA, and results from questionnaire survey of executing agency

Note 1) Figures to be compared with the target are the one of 2016, and the figures of 2014 and 2015 are indicated as reference

Note 2) Annual average figures were calculated based on actual results from January to September 2016

The Operation and Effect Indicators, except Water Quality (Color), exceeded the target figure at the year of 2015, and this shows that performance is greatly exceeding the target figure at the target year of 2016.

Regarding Production Capacity (m³/d), the actual amount of water production (actual figure) exceeded 140,000 m³/d from July 2014, and the actual figure of 2016 is 19% increase of the target figure set at the time of appraisal. Moreover, Water Quality (Turbidity) also achieved considerably low figure (0.4-0.6 NTU) with 30% or less when compared to the WHO standard (2 NTU or less).

Although the Water Quality (Color) achieved the target figure set at the time of appraisal, the target figure was not well grounded and the unit was not clear. In addition, the measurement results conducted by executing agency highly achieved the recommended standard of WHO (15 TCU or less), and the safety of the water is highly confirmed. Thus, it can be considered that this outcome alone does not push down the evaluation of effectiveness of this project.

3.3.1.2 Key indicators of the whole service area (Reference indicators) and other effects

The share of this water treatment plant in the Greater Phnom Penh area was calculated, and quantitative analysis of contribution to water supply in this area was attempted. Table 4

⁹ When seeing the actual figures for 2016, the actual figure of Water Quality (Turbidity) is slightly lower than the previous year. According to the executing agency, it was because of adjustment made to optimize the safety of water quality and economic efficiency, while holding down the input amount of chemicals for water purification and ensuring high water quality.

summarizes the comparison of water supply capacity of 4 water treatment plants in Greater Phnom Penh.

Table 4 : Share of This Water Treatment Plant (2015)

Water Supply Capacity (m ³ /d) of existing water treatment plants (2015)	Total Water Supply Capacity in Greater Phnom Penh (m ³ /d)	Share of each Water Treatment Plant (%) (2015)
Phum Prek Water Treatment Plant 146,449	443,786 *Note 1)	33
Chrouy Changvar Water Treatment Plant 142,011		32
Chamkar Mon Water Treatment Plant 13,313		3
Niroth Water Treatment Plant 142,011		32

Source : Information provided by JICA, and results from questionnaire survey of executing agency

Note 1 : Due to rounding off, it is not consistent with the total of each water supply capacity of the existing water treatment plants.

The share of this water treatment plant in the whole service area is 32%, which implies that the plant plays an important role to ensure supply-demand balance in the Greater Phnom Penh area. Considering that this plant is supplying water to the major industrial area of the Greater Phnom Penh area, it can be said that it is important to facilitate the commercial activities and investment promotion. (Refer to “3.4 Impact” below.)

In addition, as regards the key indicators of whole service area¹⁰, Table 5 compares the target figures at the time of appraisal with the actual figures from 2014 to 2016.

¹⁰ Since the project scope of this project does not include the development of water distribution network, the indicators of whole service area, among the Operation and Effect Indicators, are treated as a reference indicator.

Table 5 : Key Indicators of Whole Service Area (Reference Indicators)

	Baseline	Target	Actual		
	2008	2015	2014	2015	2016
	Appraisal Year	2 Years After Completion	Completion Year	1 Year After Completion	2 Years After Completion
Population served (Unit: person)	1,239,000	1,708,784	1,444,888	1,447,340	2,051,511
Water Coverage Rate	75% ¹¹	-	85%	87%	90%
The number of connections (Unit: household)	177,000	244,122	270,812	289,024	310,835
(1) Phnom Penh City	N.A.	-	260,189	276,894	297,270
(2) Outside of Phnom Penh City *Note 1)	N.A.	-	10,623	12,130	13,565
Service Hours of Water Supply		-			
(1) Phnom Penh City	24hours	-	24hours	24hours	24hours
(2) Outside of Phnom Penh City	N.A.	-	24hours	24hours	24hours
Volume of Water Sold(m ³ /d) *Note 2)	-	N.A.	369,824	405,261	450,347

Source : Information provided by JICA, and results from questionnaire survey of executing agency

Note 1) : The outside of Phnom Penh city refers to the area of capital city of Kandal province (Takhmao city)

Note 2) : During the project implementation, "Volume of Water Sold(m³/d)" was added as Monitoring Indicator. The target figures were not set.

When seeing the key indicators of the whole service area, the Population served, the Water Coverage Rate and the number of connected households as well are experiencing a steady increase. The number of connected households has increased by about 27% in 2016 compared with the target figure at the time of appraisal (244,122 connections). Also, when seeing the Population served, compared with the year 2008 which is the timing of appraisal and year 2014 when the Niroth water treatment plant was completed, it has increased by 16%. Furthermore, the Service Hours of Water Supply has achieved 24 hours even in the suburbs of Phnom Penh city since 2014.

According to the data provided by the executing agency, the number of new connections is 15,864 (2013), 18,497 (2014), 18,212 (2015) and 20,276 (2016). Compared with the year 2014 when this project was completed, the number of new connections has increased by about 19.8%

¹¹ Baseline figure at the timing of the Master Plant developed in 2007

in 2016. Assuming that five people were served per connection (one household), from 2014 to 2016, it comes to have achieved water supply to more than 290,000 new residents¹².

3.3.2 Qualitative Effects (Other Effects)

According to the results of the beneficiary survey¹³, 97% of respondents responded “satisfied” with the water quality (Turbidity and Color), except for smell¹⁴. In addition, about 95% of respondents also indicated “satisfied” with the water supply service by the executing agency and the stability of water supply. From the results of the beneficiary survey, it is also judged that the effectiveness, from the perspective of safety of water quality and stability of water supply, is high.

Furthermore, according to the interview with the executing agency, as an effect of this project on the whole service area, the stabilization effect of the hydraulic pressure in the existing pipes (especially in the western area of Phnom Penh city) was mentioned.

¹² 58,877 households (the number of new connected households from 2014 to 2016) × 5 \persons =294,385 persons

¹³ The service area of Niroth water treatment plant constructed by this project was placed as the targeted area, and 4 administrative districts among the area were selected, and then a questionnaire interview survey was conducted. (residents were selected through random sampling, with 120 valid responses) The method of selecting respondents is as follows.

【Step 1: Selected the targeted administrative districts】

The following 4 administrative districts among the service area of the Niroth water treatment plant were selected so that there is no regional uneven distribution

- Takhmao city (a capital city of Kandal province)
- Dangkor district
- Meanchey district
- Chamkar mon district

【Step 2: Targeted the resident group】

- Residents who had lived in Phnom Penh city since before 2009.
(Residents who were connected to the existing pipes and residents connected to the existing pipes but not started its transmission and were waiting water supply. Residents who understand the changes (changes of water pressure, changes of frequency of water cuts etc.) before and after the project were expected)
- Factory worker housing and apartments (Resident group who lived in the poor area and was targeted of “Clean Water Supply to the Poor” Program were expected)
- Residents who live in the surrounding area of Phnom Penh city
(Residents connected to the new pipes. Residents who had no access to safe drinking water before implementation of this project and understand the changes of living environment etc., before and after the project were expected.)

¹⁴ 88% of the respondents answered that the water quality (smell) was “satisfactory”. According to the executing agency, there are individual differences in the sensitivity of the smell of chlorine, and there are also many residents unfamiliar with the smell of chlorine, hence the degree of satisfaction is low compared with turbidity and chromaticity.



Left : “Tap water in slum area” Right: Local residents who are washing with tap water
Clear water was confirmed

3.4 Impacts

3.4.1 Intended Impacts

3.4.1.1 Impact on the living environment of the households including the poor

Regarding the contribution to improving the living environment of residents including the poor in Greater Phnom Penh by this project, the results are as follows. (Each question has 120 valid responses)

- Improvement of overall living environment:
About 82% of the respondents answered “highly improved” or “improved”¹⁵
- Improvement of the convenience of living:
Approximately 92% of respondents answered “improved”¹⁶
- Reduction of the hours spent for going to draw water:
About 95% of respondents answered “shortened”¹⁷
- Increase of water consumption:
Approximately 88% of respondents answered that water consumption increased due to improvement of access to water¹⁸
- Increase of frequency of sanitation management:
Approximately 90% of respondents answered that the frequency of bathing, washing hands and doing laundry “improved”¹⁹

In all questions, over 80% of respondents answered “improved / increased” or “improved”, indicating that this project has highly contributed to improving the living environment of local

¹⁵ The Answer items are 3 of “Highly improved”, “Improved” and “No change”.

¹⁶ The Answer items are 3 of “Improved”, “Not improved” and “I have no idea”.

¹⁷ The Answer items are 3 of “Yes”, “No” and “I have no idea”.

¹⁸ The Answer items are 3 of “Increased”, “Not increased” and “I have no idea”.

¹⁹ The Answer items are 3 of “Enhanced”, “Not enhanced” and “I have no idea”

residents. As this background, it is identified that a substantial reduction in water tariff for about a quarter was made when comparing water purchase fee from water seller with the water tariff of the executing agency. The stable supply of cheap water enables to save water costs and improve livelihoods, and in addition, it enables to save time to spend for drawing water and purchasing water, which allows the married couples to both work, thus it was confirmed that this project has highly contributed to improving convenience of living for residents²⁰.

3.4.1.2 Impact on the reduction in medical expenditures due to decrease of sickness caused by unsanitary drinking water and daily life water

According to the executing agency, the residents who do not have access to the tap water are purchasing water from water sellers or using rainwater and well water, which indicates that they are using unsanitary water.

According to the results of the beneficiary survey, approximately 87% (104 people) of 120 respondents answered that the health condition and sanitation situation improved as a result of completion of this project. In addition, according to the results of interviews with residents, it was confirmed at almost all households that there used to be medical symptoms of waterborne infectious diseases (diarrhea, abdominal pain, etc.) before the project, but after the completion of the project, no health problems has been seen. Moreover, the frequency of bathing and doing laundry has increased three to six times, highly contributing to improved sanitation habits.

The results of interviews with residents are as follows.

- Frequency of bathing (taking a bath):
(Before connecting to tap water) Once every two weeks → (After completion of this project) Three times a day
- Frequency of doing laundry:
(Before connecting to tap water) Twice a month → (after completion of this project) 3-4 times per week

3.4.1.3 Improvement of the Investment Environment

The service area of this water treatment plant includes areas²¹ where the industrial park of textile industry and special economic zone (SEZ) etc. are intensively located, and from the perspective of improving the investment environment in major industrial areas of Phnom Penh City, it can be said that there was of great significance. According to the executing agency,

²⁰ According to the interview with the residents, the real voices such as “traveling time and waiting time for purchasing water has gone away, and both wife and husband can work together because we could make time, and our life became richer” were confirmed.

²¹ The area along national highway No. 4 and “Chom Chao area”.

starting to supply water to the district where the manufacturing base of a Cambodian major manufacturer is located, has contributed to the business expansion of this company. Others pointed out that the land development and factory attraction were promoted rapidly, and there was an impact in terms of activating commercial activities and investment.

When seeing the number of connections (total) to the commercial facilities in the whole service area, as shown in Table 6, it is about 39% increase from 2012 to 2016. As a result of the construction of this water treatment plant, it was considered that the realization of stable water supply in the all area of Greater Phnom Penh since 2014 has contributed to a certain extent to the increase in the number of commercial facilities.

Table 6 : Number of Connection to the Commercial Facilities in the Whole Service Area (total)

(Unit: number of facilities)

	2009	2010	2011	2012	2013	2014	2015	2016
Commercial Facilities (Number of Connections)	28,791	32,447	34,983	39,033	41,510	44,258	51,256	54,120

Source : Prepared by the evaluator based on the information provided by executing agency

As regards the effects on the local economy and business activities after the completion of the project, according to the results of the beneficiary survey, about 77% of the respondents answered “activated”²² by the project, and it is judged that this project is generating a positive impact on the regional economy as well. (For specific examples, refer to Figure 2) Regarding the activation of the investment environment, about 52% of the respondents answered “activated”²³ by this project, with concrete examples such as increase of land prices and activation of real estate investment, etc. were indicated by residents.

²² The Answer items are 3 of "Activated", "Not activated" and "I have no idea".

²³ The Answer items are 3 of "Activated", "Not activated" and "I have no idea".

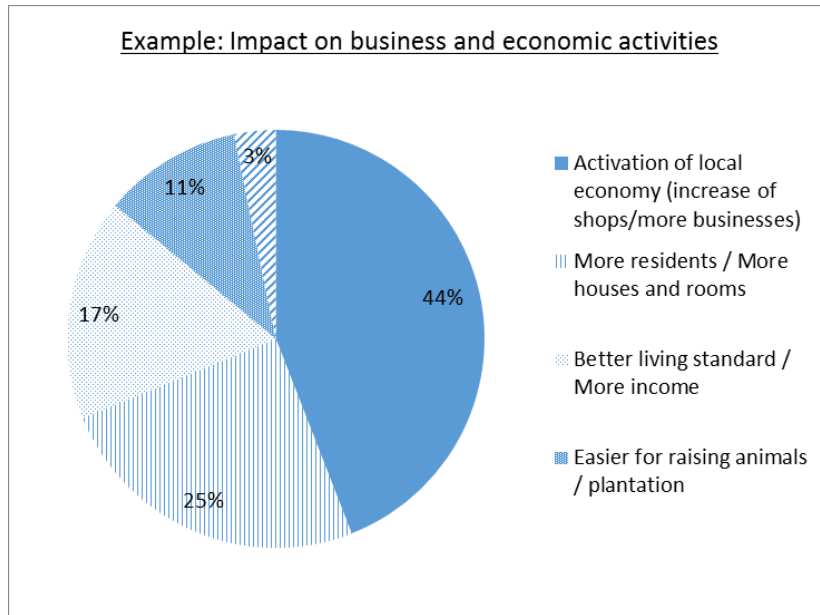


Figure 2 : Impact on local economy and business activities (specific examples)

Source : Prepared by the evaluator based on the results of beneficiary survey (open-ended questions)

The surrounding area of the construction site of this water treatment plant is lined with luxury residential complexes and shopping area, and thus it was confirmed through the site visits, from the perspective of activation of the local economy and improvement of living environment, that there were benefits to the local residents.

3.4.2 Other Positive and Negative Impacts

3.4.2.1 Impacts on the Natural Environment

The executing agency conducted environmental monitoring (water quality of river, sludge etc.) during the project preparation and implementation as well as after the commencement of operation, and the monitoring results were submitted every quarter during construction and every six months during 2 years after the start of operation. Regarding the results of environmental monitoring, there was no problem such as exceeding the standard both during construction and after the start of water supply, and no particular negative environmental impact has been reported at the time of ex-post evaluation. In addition, no negative project effect on natural environment has been identified from the results of interview with the local residents.

3.4.2.2 Land Acquisition and Resettlement

At the time of appraisal, necessary land was already acquired and neither land acquisition nor relocation was expected. In actuality, relocation and land acquisition did not take place.

3.4.2.3 Contribution to Poverty Reduction

Since 1998, the executing agency has been conducting “Clean Water Supply to the Poor” Program, which assists water connection fees to poor households by evaluating²⁴ the economic situation of each household of the service area. In 2016, annual subsidy of connection fee to the poor provided by the executing agency is US\$ 96,484²⁵, and the number of subsidized from 2013 to 2016 is 4,849 households. When calculating based on this figure, about 35 million yen has been subsidized to the poor since this plant has started its operation in 2013 to the time of ex-post evaluation (2016). Of the total number of connections (309,300 households) by 2016, about 10.98% is connected to the poor.

In addition, according to the results of the beneficiary survey, approximately 91% (111 people) of 120 respondents answered that the poverty situation of the poor households “significantly improved” or “improved” by this project. As the reasons for this, “reduction of the burden on households” and “access to safe water use” were indicated.

Cambodia’s poverty rate²⁶ has drastically decreased from 30% (2011) to 14% (2014). According to the results of the beneficiary survey and interview from poor households, through this project, there are certain extents of contribution on the poverty alleviation of the poor in terms of a) significant improvement of the living environment of poor households, b) improvement of livelihoods of poor households. The improvement of the convenience of the whole lifestyle is identified with specific examples for a), such as “improvement of water quality of household water used by the poor, which contributed to the increase of the frequency of sanitary management and enhancement of health condition”, and “saving of time due to reduction of drawing water”. In addition, regarding b), “reduction of household expenses by saving water tariffs drastically compared with one of the past”, “increase in household income due to realization of both husband and a wife to have jobs instead of drawing water”, moreover, “improvement of livelihoods of poor households by subsidies through the program²⁷ which assists connection fee” are identified.

From the above results, this project has achieved its objectives as planned. Therefore effectiveness and impact of the project are high.

²⁴ The executing agency individually evaluates the situation of each household, and sets subsidy rates from 4 categories of 30%, 50%, 70%, and 100%. As criteria for evaluation, based on household income per day, family composition, living environment, presence / absence of assets, ability to read and write etc., the comprehensive evaluation has been conducted.

²⁵ Estimated figure of FY 2016

²⁶ Percentage of the population below the national poverty line (Definition of poverty in Cambodia. People less than a certain income / consumption level (poverty line) is defined as poverty).

²⁷ The amount of about 35 million yen has been provided to the poor, for approximately 4,849 cases (households), since the start of this project to the time of the ex-post evaluation.

3.5 Sustainability (Rating: ③)

3.5.1 Institutional Aspects of Operation and Maintenance

The operation and maintenance after project completion is undertaken by PPWSA's Production and Distribution Department, and 22 staff members are placed on a 24-hour shift system for the operation of this water treatment plant. There is no particular problem in the operation and maintenance system, and enough number of engineers who are responsible for operation and maintenance has been secured.

Moreover, in PPWSA, some measures of organizational structure for enhancing its sustainability have been continuously undertaken. It was confirmed that strengthening the organizational management capacity and improving the sustainability of the project are being pursued by the leadership and know-how of the current General Director, organizational culture, incentives for staff, etc. (Refer to **【Box.3 Organizational Management Efforts to Maximizing Business Performance by PPWSA】** which is described later).

Therefore, no particular problem has been identified regarding the institutional structures of operation and maintenance.

3.5.2 Technical Aspects of Operation and Maintenance

At this water treatment plant, engineers who have gained sufficient experiences through operation and maintenance of the existing water treatment plants and staffs who have technical skills are undertaking the operation and maintenance work. There is no problem with the technical level of staff in charge of operation and maintenance.

During project implementation, some training/ practical training / lesson programs necessary for operation and maintenance were carried out by consultants. Even after starting operation, internal training are provided regularly and it is mandatory to acquire knowledge on the latest maintenance technology. In addition, at the water treatment plant, its operation and maintenance has been taken place in conformity with ISO 9001 (quality management system). From the current satisfactory condition of operation and maintenance of equipment, no particular problem has been identified in terms of technical aspects.

In the series of technical cooperation project²⁸ which had been implemented before this ODA loan project, Kitakyushu City mainly had been providing long-term support with both know-how on organizational management as a waterworks (staffs training and evaluation system to raise the awareness of staffs, water leakage prevention for improving its profitability and customer relationship management methods etc.) and water infrastructure technology

²⁸ 1999 - 2002: Dispatch of experts (4 persons in total)

2001 - 2002: JICA Small-Scale Development Partner Project (total of 8 experts dispatched)

2003 - 2006: JICA Technical Cooperation "The Project on Capacity Building for Water Supply System" (Phase 1) (total of 18 experts dispatched)

(maintenance method of equipment, design and installation methods etc.)²⁹. Thanks to a cooperative support, the skills and management capacity of PPWSA staffs were enhanced, and during the Phase II (2007 - 2012) and Phase III (2012 - 2017) of the technical cooperation project, PPWSA staffs have been contributing to transfer its technology to the local waterworks. Also, since 2012, PPWSA has been expanding its consulting service as a subcontractor, making full use of the know-how on maintenance of water infrastructure and installation method, and from this, regarding the technical aspects as well, high sustainability has been identified.

Therefore, no particular problem has been identified regarding the technical aspects of operation and maintenance.

3.5.3 Financial Aspects of Operation and Maintenance

The operation and maintenance cost for this water treatment plant has been properly allocated, and there is no financial problem.

In addition, regarding the financial situation of the whole PPWSA, the balance sheet in recent years (the past three years) is as shown in Table 7, and fixed, current assets and capital as well are steadily increasing and there is a tendency of expansion.

Table 7: Balance Sheet of PPWSA

(Unit : Million Riel)

	2013	2014	2015	2016
Assets	1,096,221	1,166,051	1,240,120	1,297,729
Fixed assets	846,438	878,093	939,355	1,038,638
Current assets	249,783	287,958	300,766	259,091
Liabilities and Equities	406,100	476,453	549,376	1,297,729
Equity	695,182	736,169	783,968	819,971
Non-current liabilities	347,243	376,626	396,654	399,503
Current liabilities	53,796	53,257	59,498	78,253

Source : PPWSA Balance sheet

In addition, assets and water sales have steadily increased every year, and as shown in Figure 3, net income is increasing.

²⁹ At the time of the ex-post evaluation, while technical support from Kitakyushu city to PPWSA is continuing, it has developed into a collaborative relationship as a business partner.

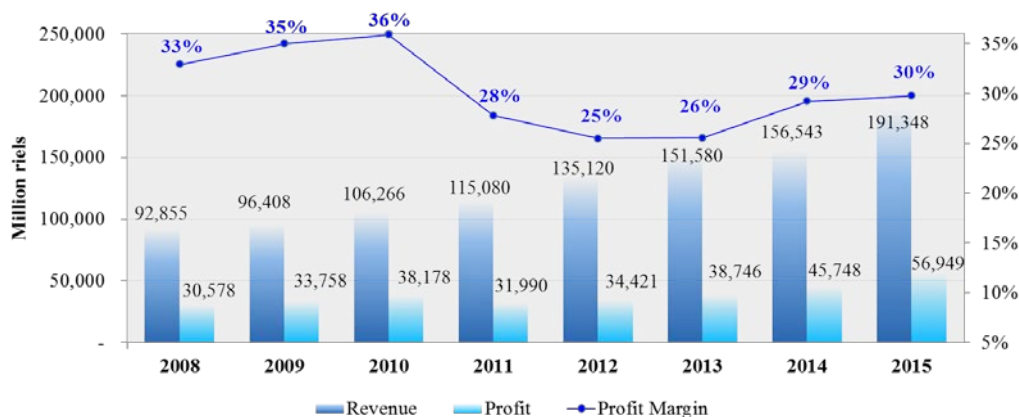


Figure 3 : Trend of Profit Margin from 2008 to 2015³⁰

Source : PPWSA Financial Statement

In addition, when seeing the revenue sources of PPWSA, incomes other than water sales (new water connection revenues, construction service fees as a sub-contractor, installation service fees related to directly connecting of water connection, etc.) are increasing³¹. Consulting service has been started since 2012, and the revenue as a sub-contractor has increased. With the diversification of its business, steady financial management has been realized. The breakdown of income sources of fiscal 2015 is as shown in Figure 4.

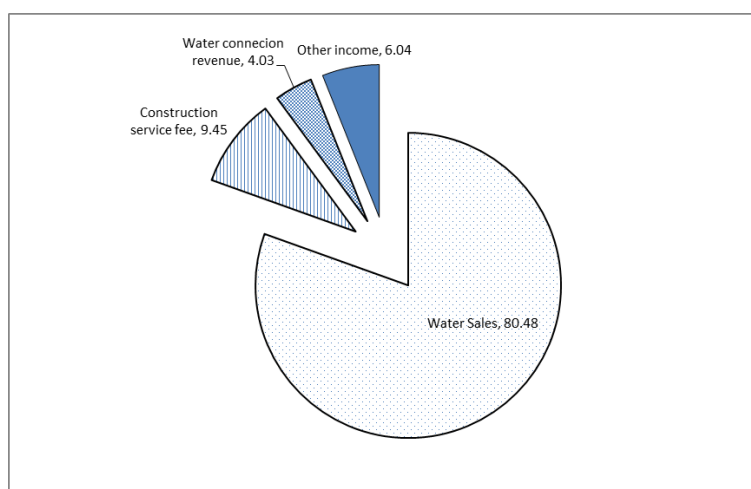


Figure 4 : Breakdown of revenue sources of PPWSA (Fiscal 2015)

(Unit:%)

Source : PPWSA Annual Report 2015

³⁰ Actual figures of fiscal 2016: Revenue 224,858 (Million riels); Profit 50,438 (Million riels); Profit Margin 22%

³¹ The 4 major revenue sources for PPWSA: (1) water fee revenue, (2) new connection fee (distribution network connection fee collected at the time of new connection), (3) construction service fee (construction of distribution pipe, delivery service of parts and equipment, equipment installation / assembly / construction services, etc., service income as subcontractor), (4) others (sales of water meters and spare parts, etc.).

In recent years, (3) and (4) are growing at rates exceeding new connection revenues. (As for (3), it increased by 8.7% in 2015 compared to the previous year, (4) was 19.7% higher than the previous year.)

Due to stable financial management, PPWSA was listed on the Cambodian Stock Market in 2012 and the dividend has been growing steadily. The dividends based on the settlement of accounts of fiscal 2015 is about 50% higher than those of the previous year and about 5.5 times compared with those in Fiscal year 2012.

The collection rate of invoice has become 99.93%, and the non-revenue water rate has been reduced to 5.99% at the time of 2015, from here it is recognized that the efforts to increase financial profitability have been continuing. The trend of the Non-Revenue Water Rate (1995 - 2016) is as shown in Table 8.

Table 8 : Trend of Non-Revenue Water Rate (whole service area (Greater Phnom Penh)) (%)

1995	2000	2010	2011	2012	2013	2014	2015	2016
60	35.5	5.85	5.22	6.51	6.9	7.76	5.99	7.77

Source : Prepared based on the PPWSA Annual Report

Therefore, no particular problem has been identified regarding the financial aspects of operation and maintenance.

3.5.4 Current Status of Operation and Maintenance

PPWSA has conducted water quality management such as water quality test at the water treatment plant (3 times a day) and sampling inspection (every week) at 80 distribution networks. Since start of its operation, water supply has been provided smoothly until the time of ex-post evaluation, and it is operated and maintained without any problems.

For operation and maintenance activities (maintenance and inspection), the manuals have been developed and updated annually. This manual is distributed to all 264 staff members, and it is required to comply with the manual, hence, appropriate maintenance and inspection activities have been carried out.

As for spare parts, enough number of spare parts is always stored in the warehouse, including spare parts that need to be procured from Japan. In addition, through the 5S activities³² which have been introduced since 2016, sorting and setting and standardizing cleaning)of the water treatment plant have been ensured. The water meters installed in each facility and household are also instantly replaceable and repairable, and the water supply capacity of the water treatment plant constructed by this project is always ready for ensuring its water supply with 100% capacity.

Therefore, no particular problem has been identified regarding current status of operation and maintenance.

³² The initial letter S taken from " Sort ", " Set ", " Shine ", " Standardize " and "Sustain". A slogan used for maintaining and improving the workplace environment of manufacturing industry, service industry etc.

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

【Box.3 Organizational efforts to maximize business performance by PPWSA】

As a source for its high performance shown in this project, there are various actions of organization management undertaken by PPWSA. It can be judged that the examples of management style as a public entity taken by PPWSA shall be useful resources for future similar projects. The main points are as follows.

- Empowerment of executive managers and autonomous leadership

While taking over the organizational reform that the former Director General built, under the current Director General, the authority is transferred to the executive officers and “empowerment” is strengthened. In other words, rather than top-down leadership, the organizational function that executive officers themselves can demonstrate its leadership autonomously is emphasized. The executive officers have been given the authority to realize the organizational mission of social contribution, and there is an encouragement to bring out the capabilities of executive officers who are players of organization reform.

- Management policy backed by technology

In PPWSA, born and bred technical staffs are appointed to the executive posts and key positions of each department, including the current Director General. Key Performance Indicators covering 31 items are set by executives who have abundant technical knowledge, and some management policies for enhancing the quality of services and profitability backed up by technical knowledge have been steadily implemented. These indicators are constantly monitored, and a system is adopted in which countermeasures are examined and implemented based on the progress. In addition, at the time of occurrence of troubles and problems at the site, the solution is implemented immediately under the leadership of current Director General and Executive Managers, and it can be said that it is a strength of the born and bred technical staffs managing its organization.

- Organizational culture that holds “helping each other as a "member of family”

In PPWSA, eliminating the walls of vertical hierarchical relationships, among departments, even executive managers and director members, helping each other as a “member of family” has been spread as a culture of internal communication. In addition, emphasis is placed on “trust” among staff members, and recreation and sports activities within the organization are actively carried out in order to maintain good relationships. In addition, when problems occur, cross-departmental team is set up, and management style that emphasizes the relationship of trust is thoroughly promoted.

- Organizational design and personnel system that motivates employees and work incentives

In PPWSA, tasks assigned to each staffs are “visualized”, and by directing young staffs with its responsibilities and authority clearly, efforts to derive employee’s willingness and motivation have been taken. In addition, some projects that are expected to achieve clear target figures and results, operations are carried out in the style of internal contract. For example, the team responsible for reducing the non-revenue water rate is an internal contract, and by establishing a flexible and diversified organizational design, a mechanism is set up that maximizes the ability of staff to perform their duties.

Moreover, staff evaluation is conducted every quarter, and the evaluation result is reflected to the salary grade. At the evaluation, its emphasis is placed not on the skills and ages, but on the high awareness, and there is an award system in which certificates are given to talented staff each year.

In addition, there is a regulation in which when the revenue of the organization exceeds the revenue at the time of plan, bonuses are provided to executive officers and all staffs with the same allocation. It is clearly stipulated in internal regulations and external open documents, and from here, it can be said to be an approach to enhance the motivation of staff. Indeed, even at the time of the ex-post evaluation, payment of bonus for three months has been realized in the past three years (from FY 2013 to FY 2015).

- Diversified management for expanding revenue sources

Efforts have also been made to enhance sustainability from a financial perspective. In PPWSA, there are three revenue sources as described above besides the water fees, and stable financial management is realized with diversification of business. For example, in 2012, a new branch was set up to expand the consulting business, and revenue as a sub-contractor (construction of water distribution pipes, delivery services of parts and equipment, and installation/assembly/construction services etc.) has been increasing steadily year by year. In this way, efforts have been made to improve sustainable competitiveness by transforming from general business models as public waterworks and moving into new business fields.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project, which aims to provide a safe and constant water supply by developing a water supply facility, thereby contributing to improve living environment of residents including the poor in Phnom Penh city and the surrounding area and to improve the investment environment, is consistent with Cambodia's national development policies and with development needs as well as Japan's ODA policy; thus, the relevance of the project is high. Project cost was slightly higher than the original plan and project period exceeded the original plan, thus the efficiency of the project is fair. Operation and Effect Indicators set at the time of appraisal have been greatly achieved except for Water Quality (Color). Regarding the Water Quality (Color), the target figure set at the time of appraisal was not well grounded, and the actual figures significantly excelled from the standard of the WHO and the safety of the water is recognized, thus, it can be considered that it does not push down the evaluation of effectiveness of this project. The indicators of the whole service area, such as the number of households with water supply connections, have shown much higher actual achievement than expected at the time of appraisal, and from the results of beneficiary survey, it is considered that the effectiveness regarding the safety of water quality and the stable supply is high. As for impacts of this project, through stable supply of cheap and safe water, improvement of household expenditure, enhancement on the convenience of living and reduction of water related medical symptoms were seen; and, it was confirmed from the results of beneficiary survey etc. that there was impact on enhancement of the living environment of the households. In addition, the share of the water treatment plant which was constructed by this project in the Greater Phnom Penh area is 32%, It has been providing stable water supply to major industrial parks and commercial area, thus it can be considered that this plant is playing an important role to improve the investment environment. Furthermore, it is considered that there were some contributions to poverty alleviation through

subsidy program which assists water connection fees by the executing agency. Therefore, there are much more impacts than expected at the time of the appraisal, thus, effectiveness and impact of the project are high. No negative impact on natural environment, land acquisition and relocation has been observed. No major problem has been identified in the institutional, technical and financial aspects of the operation and maintenance as well as in the current status; thus, sustainability of the project effects is high. In addition to the efforts for reducing operating costs, such as reduction of the non-revenue water rate and high fee collection rate, efforts for expansion of income sources have been tackled by the executing agency, and the executing agency continues to maintain its stable management.

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

4.2 Recommendations to the Executing Agency and JICA

Importance of new support to ensure more stable water supply service

According to PPWSA, the water tariff that is a major source of income is the decision of the Cambodian government and has not been revised since 2001. Also, with the current water tariff system, it is not allowed to raise the tariff or collect the basic water tariff in consideration of the inflation rate introduced in neighbouring countries, hence this tariff is not an appropriate tariff from the perspective of financial aspect nor a fair tariff in light of social realities. Despite this situation, PPWSA has made its own management efforts to get into the black through reduction of operating costs and expansion of income sources by diversifying business. Its high performance was observed in this ODA loan project as well, but it should be noted that PPWSA has been making the corresponding self-help efforts for this high performance.

In other words, this executing agency is a public service agency in a developing country, and stable operation has been maintained by the self-help efforts of PPWSA, in a situation that always includes potential risk such as external pressure from political situation and changes in the social environments. In the social structures peculiar to developing countries, there is a high probability of being influenced by various external factors that are outside the control of PPWSA. In light of the fact that this project is a public service management in the environment as described above, it is important to consider new support to ensure stronger and stable water supply service (such as dispatch of advisors to develop Cambodian government's water policy and systems).

Although remarkable achievements and impacts have been recognized, due to the expansion of the water supply area of PPWSA, the water demand has increased rapidly, and the need for early expansion of water supply capacity has enhanced.³³ Considering that the support

³³ PPWSA plans to expand water supply at an early stage through financial support under concessional terms from donors, as PPWSA is difficult to cover all the funds necessary for expansion on its own in the current financial

for PPWSA which effectively introduced financial cooperation after a series of technical cooperation is recognized as a good practice which has promoted its synergistic effects of both technical cooperation and financial assistances by making full use of know-how of Japanese local authorities, examining Japan's continuous involvement (such as financial cooperation) is considered to be meaningful.

4.3 Lessons Learned

Synergistic effects of technical cooperation and ODA loan utilizing municipality's experience

As a point worthy of special mention for this project, a series of technical cooperation³⁴ has contributed to promote maximization of the performance of this ODA loan project. Through the long-term capacity building for the executing agency, assistance by the ODA loan was introduced at the stage of sufficiently enhancing its technical capacity and organizational structure, hence, showing high performance from the perspective of sustainability and effectiveness. In other words, by providing financial cooperation at the timing when the organizational structure / human resources development for self-sustaining management was realized, it can be said that it was possible to maximize the impact. Therefore, high effectiveness is recognized as an assistance package effectively combining technical cooperation and financial cooperation.

In addition, the fact that not only private consultants but also Japanese municipalities have been involved as the technical cooperation partners can be considered as a background of the high performance of this project. As mentioned earlier, long-term technical cooperation by municipalities, mainly by Kitakyushu city, has been implemented before this ODA loan project. Technical cooperation unique to Japanese municipalities that have practical experience at site has played a major role in the background of PPWSA, the executing agency, in being listed on the stock market and raised to a profitable management.

In the future, when maximizing the impact of similar projects, it is considered effective to combine with technical cooperation unique to the municipalities who have practical experience on the ground.

Importance of building good relations with local authority and local communities

In this project, it is worthy of special mention as a lesson-learned that the executing agency has built a good relationship with local communities / local authority, and has made an effort to create a sense of unity of the project and a sense of union among concerned parties. On supervision of the project, the executing agency has undertaken various actions to activate communication with the local community (see Box 2 for details). As a result, almost no

situation.

³⁴ Beginning with the dispatch of experts in the 1990s, technical cooperation projects and grant aid have been implemented until the middle of the 2000s.

complaints from local residents occurred, and as regards construction work, active support from the local community has been obtained. In this way, managing the stakeholders of the project including the community and local authority as a team and emphasizing the process leading to build confidence contributes to the smooth operation of the project, which can be regarded as a good practice.

A close collaborative system among three parties (other donors, JICA, executing agency) in co-finance project

Although it is not easy in co-finance projects to align the completion timings of JICA's and other donor's scope of finance and to lead to the early actualization of the project effects, in this project, not only did the scope of JICA and the scope of AFD complete its construction at the same timing but also the water distribution network outside of the scope of this project was completed in May 2012, and water supply has started since the following month (October 2013) when the water treatment plant was completed.

One reason for this is that as stated in Box 1, a close collaboration system among the three parties (AFD, JICA and PPWSA) was continuously implemented. Also, in the supervision of this project, the same staffs in charge have been consistently engaged at JICA Cambodia Office and the PPWSA side, and such an allocation structure can be considered as a background for realizing the close cooperation. In co-finance projects, the collaborative system at the project supervision stage can have a direct impact on the timing of the project effect, hence this example of concrete collaboration system and process adopted in this project is considered to be useful for similar projects.

End

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs	1) Civil Works, Procurement of Equipment etc. <JICA portion> (1) Water Treatment Plant (2) Sludge Pipe (3) Treated Water Pumping Station (4) Treated Water Tank (5) Treated Water Transmission Mains (6) Sewer and Ancillaries <AFD portion> (1) Intake Tower (2) Raw Water Transmission Main 2) Consulting services • Assistance in tendering, Construction supervision (Quality Management, Process Management etc.)	1) Civil Works, Procurement of Equipment etc. <JICA portion> • (1)~(6) As planned • Additional output (7) Transmission network extension to Takhmao - Pipe of DN 400mm =3,500m -Pipe of DN 500mm =7,200m <AFD portion> As planned 2) Consulting services • As planned
2. Project Period	March, 2009 – April, 2013 (50 months)	March, 2009 – August, 2014 (66 months)
3. Project Cost		
Amount Paid in Foreign Currency	6,169 million yen	—
Amount Paid in Local Currency	363 million yen	—
	(13,595 million riel	—
Total	6,532million yen	6,686 million yen
ODA Loan Portion	3,513 million yen	3,492 million yen
Exchange Rate	1 KHR = 0.0267yen (As of October, 2008)	1 KHR = 0.0222yen (Average between 2009 and2014)
4. Final Disbursement	July , 2014	

Kingdom of Cambodia

FY 2016 Ex-Post Evaluation of Japanese ODA Loan Project

“Greater Mekong Power Network Development Project”

External Evaluator: Masumi Shimamura, Mamiko Yano

Mitsubishi UFJ Research and Consulting Co., Ltd.

0. Summary

This project constructed and upgraded 230kV double-circuit power transmission lines and related facilities in the aims to strengthen the electricity supply capacity of the southern Cambodia, Kampot-Sihanoukville region, to respond to the demand for electricity of Sihanoukville and to improve the electrification rate along the area surrounding the transmission lines. This project was in line with development policy including Cambodia's energy/electricity policy, development needs, Japan's ODA policy, in terms of increasing investment in power generation and transmission business and improving electrification rate in rural areas. As such, the relevance of the project is high. Although the project cost fell within the plan, the project period greatly exceeded the plan, so that the efficiency is fair. For operation and effect indicators set at the time of appraisal, both electrification rate and distribution loss rate achieved the targets. By this project, it is evaluated that electric power supply has increased significantly in the target area and stable power supply has been realized. Through interviews with large consumers, increase in employment and the number of factories and offices, and improvement of productivity, income and living environment are confirmed. Based on the above, the project has achieved its objectives, so that the effectiveness and impact of the project are high. Regarding the operation and maintenance of this project, there are no particular problems with respect to systematic and technical aspects. Regarding the financial aspect, according to the financial data of Electricité Du Cambodge (hereinafter, “EDC”) the operation and maintenance cost of the transmission lines and substations is properly supplied. Transmission lines and substations are well operated and maintained, and even when problems arise, they are being handled appropriately and quickly. Therefore, the sustainability of the effect expressed by this project is high.

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

1. Project Description



Figure 1 Project Location Map



Figure 2 the Stun Hav 230/22kV
Transmission Grid Substation

1.1 Background

Cambodia constitutes a part of the Mekong region¹, and in 2007 when the loan agreement was concluded, the political situation was stable and the economy was steadily growing. However, since economic disparity with current ASEAN member countries (Thailand, Malaysia, etc.) was still large in income and living standards, it was a challenge to resolve such disparity and promote "development of the Mekong region" as a unified region. Especially regarding electricity supply, the electrification rate was the lowest level (about 17%) in Southeast Asia and needed to be improved urgently due to the fact that the capacity of equipment was significantly smaller than those of neighbouring countries and there was no nationwide transmission and distribution network. In addition, many of the existing power plants relied on imports of petroleum as fuel, so that the electricity charges were 2 to 7 times higher than those of neighbouring countries. By this project, it was expected that it would become possible to supply inexpensive and reliable electric power from Vietnam through developing interconnection to the transmission lines constructed under the support of other donors² and developing a part of the power network of the Mekong region.

1.2 Project Outline

The objective of this project is to improve the electrical power supply to the area from

¹ The Mekong region (consisting of Cambodia, Laos, Myanmar, Vietnam, Thailand and Yunnan Province, China) refers to the Mekong River Valley that runs longitudinally across the Indochinese peninsula, with an area of approximately 2.3 million km² (approximately 6 times the size of Japan). The population at the time of appraisal was about 250 million (about twice of the population of Japan).

² ADB, the World Bank and the Nordic Development Fund supported the transmission line between Vietnam (Chao Dok) - Takeo - Phnom Penh. The German Reconstruction Finance Corporation (KfW) was supporting the improvement of the transmission line between Kampot and Takeo.

Kampot to Sihanoukville in the Cambodia Growth Corridor, to address electrical demand of Sihanoukville, and to increase rate of electrification, by building 230kV double-circuit transmission lines (about 78km) from Kampot to Sihanoukville, and by newly constructing or strengthening related substations and maintaining an electric distribution system, thereby contributing to the improvement of investment environment and economic development of the region.

Loan Approved Amount/ Disbursed Amount	2,632 million yen/ 2,521million yen
Exchange of Notes Date/ Loan Agreement Signing Date	March 2007/ March 2007
Terms and Conditions	Interest Rate 0.01% Repayment Period 40 years (Grace Period) (10 years) Condition for Procurement General Untied
Borrower / Executing Agency	The Royal Government of Cambodia / Electricité Du Cambodge (EDC)
Project Completion	May 2014
Main Contractors (Over 1 billion yen)	DOOSAN Heavy Industries & Construction Co., Ltd. (South Korea) / DOOSAN Engineering & Construction Co., Ltd. (South Korea) (JV)
Main Consultant (Over 100 million yen)	-
Feasibility Studies, etc.	F/S by the Asian Development Bank (ADB)(December 2005)
Related Projects	<p>【Technical Cooperation】</p> <ul style="list-style-type: none"> • Development Study “Master Plan Study on Rural Electrification by Renewable Energy” (2004 – 2006) • Technical Cooperation Project “Capacity and Institutional Building of the Electric Sector” (2004 – 2007) • Dispatchment of JICA Advisor (Power Sector: dispatched to the Ministry of Industry, Mines and Energy (MIME), 2000 -) <p>【Loan Project】 (Date in brackets is signing date of loan agreement)</p> <ul style="list-style-type: none"> • “Sihanoukville Port Urgent Expansion Project” (November 2004) • “Greater Mekong Telecommunication Backbone Network Project” (March 2005) • “Poverty Reduction and Growth Operation” (October 2007) • “Sihanoukville Port SEZ Development Project” (March,

	<p>2008)</p> <p>【Grant Aid】</p> <ul style="list-style-type: none"> • “The Project for Rehabilitation and Upgrading of Electricity Supply Facilities in Phnom Penh (1/2)” (1993) • “The Project for Rehabilitation and Upgrading of Electricity Supply Facilities in Phnom Penh (2/2)” (1994) • “The Project for Rehabilitation and Upgrading of Electricity Supply Facilities in Phnom Penh-Phase 2 (Detailed Design) (1998) • “The Project for Rehabilitation and Upgrading of Electricity Supply Facilities in Phnom Penh-Phase 2 (1/3)” (1999) • “The Project for Rehabilitation and Upgrading of Electricity Supply Facilities in Phnom Penh-Phase 2 (2/3)”(2000) • “The Project for Rehabilitation and Upgrading of Electricity Supply Facilities in Phnom Penh-Phase 2 (3/3)” (2001) • “The Project for the Upgrading and Extension of Electricity Supply Facilities in Phnom Penh” (November 2004) <p>【World Bank】</p> <ul style="list-style-type: none"> • Emergency Rehabilitation Project (1993) • Phnom Penh Power Rehabilitation Project (1995) • Rural Electrification and Transmission Project (2003) • Poverty Reduction and Growth Operation (PRGO)(2007 – 2009) • Special Rehabilitation Assistance Project (1992) • Power Rehabilitation Project (1994) • Provincial Power Supply Project (2000) • Greater Mekong Subregion Transmission Project (2003)
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2. Outline of the Evaluation Study

2.1 External Evaluator

Masumi Shimamura, Mamiko Yano, Mitsubishi UFJ Research and Consulting Co., Ltd.

2.2 Duration of Evaluation Study

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

Duration of the Study: September 2016 - September 2017

Duration of the Field Study: November 15-26, 2016, Feb 7-10, 2017

2.3 Constraints during the Evaluation Study

In conducting this ex-post evaluation, the following points became constraints.

Firstly, this project took seven years and three months (87 months) as the project period, during which the persons in charge were changed frequently in EDC and ADB. As a result, there were restrictions on the collection of information and data of this project, because personnel directly involved in the project were not already enrolled and the storage location of records was unknown. In particular, it was difficult to grasp the details of the financial information of this

project and the relationship between EDC self-financing part and total project cost. It was also difficult to grasp the details about the cause of the delay of construction works of the electricity distribution network.

Regarding operation and maintenance of this project, the EDC's Transmission Department operates and maintains this project and other power transmission projects conducted by EDC nationwide together without distinguishing each other. As a result, it was impossible to grasp expenses and budget of operation and maintenance, techniques of operation and maintenance, structure, and issues in regards only to this project.

Furthermore in Cambodia, development of economic indicators and statistics, national and regional statistical indicators and statistical data are not well developed, so that it is difficult to grasp especially the impact on revitalization of regional economy and poverty reduction.

For the above reasons, evaluation analysis was conducted based only on the obtained information.

3. Results of the Evaluation (Overall Rating: A³)

3.1 Relevance (Rating: ③⁴)

3.1.1 Consistency with the Development Plan of Cambodia

At the time of appraisal, the purpose of this project was in compliance with the national development strategy (*the Rectangular Strategy Phase I*, 2004) that regarded reconstruction and development of infrastructure as one of the most important policy tasks, and *the Power Sector Development Plan* (January 2005) that regarded enhancement of investment in power generation projects and power transmission projects and increase of electrification rates in rural areas as the basic policy. In addition, this project was based on *the Power Development Plan* (issued in January 2005, a plan for the construction of power plants until 2018) that regarded construction of fire power plants in the Sihanoukville port city and construction of small- and medium-size diesel power plants for base and peak in local cities as the basic policy.

At the time of the ex-post evaluation, the Royal Government of Cambodia established a *National Strategy Development Plan (2014-2018)*, which embodies the national strategy, *the Rectangular Strategy Phase III (2013-2018)*. One of the priority pillars is "infrastructure development: electric power development", and priority is given to expansion of electricity supply, realization of electric power access, and coordination of electric power between regions. In addition, the Royal Government of Cambodia emphasizes rural electrification, expansion of power supply, and promotion of construction, maintenance and expansion of transmission lines along with electricity import from neighbouring countries in *the Energy Sector Development Strategy (2004-2020)* and *the Transmission Line Development Plan (2015-2025)*. Therefore,

³ A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

⁴ ③: High, ②: Fair, ①: Low

even at the time of the ex-post evaluation, the objective of this project is consistent with these policies and plans.

3.1.2 Consistency with the Development Needs of Cambodia

At the time of appraisal, the increase in demand for electricity in Cambodia as a whole due to economic growth was largely due to the increase in demand in the growth corridor areas (Phnom Penh and Sihanoukville), and this trend was considered to continue. In these areas, the textile industry, which was the driving force of the Cambodian economy, was densely populated, and from the viewpoint of population increase, the demand for electricity was expected to increase.

According to the actual statistical results (Tables 1) based on the response from EDC, in the Sihanoukville area, the maximum power demand at the time of appraisal was 7.40MW, whereas at the time of the ex-post evaluation, it increased by about 6 times to 44MW, which is 9% higher than that in 2015, and it is also increasing currently. Even in the Kampot area, the maximum electric power demand at the time of appraisal was 3MW, whereas at the time of the ex-post evaluation it increased by 6.7 times to 20MW, which is 18% increase compared to that in 2015, and it is also increasing currently. From these facts it can be said that investment demand for electric power supply facilities continues to exist at the time of the ex-post evaluation.

Table 1 Trend of Maximum Power Demand (Unit: MW)

FY	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Sihanoukville Area	5.35	5.70	7.40	8.60	9.50	10.17	13.40	16.40	18.50	24.80	29.50	40.20	44.00
Kampot Area	3	3	3	4.78	6	7.5	8	8.5	9	9.5	13	17	20

Source: Questionnaire Answer by EDC

At the time of appraisal, supply of imported electricity including that from Vietnam was necessary to meet increasing power demand in the future. Especially for Sihanoukville, the demand for electricity from the Sihanoukville Special Economic Zone which was under development was also expected, making it possible to supply inexpensive electricity from Vietnam by the construction of the transmission lines. Accordingly it was expected that investment would be promoted and cause additional power demand. Therefore, it was an urgent task to respond to future power demand in Sihanoukville and build a stable power supply system.

Also, 230kV transmission lines for importing electricity from Vietnam to Phnom Penh was operating from 2009, based on the bilateral power purchase agreement. The power purchase agreement with Thailand was revised in 2007, and electricity import was continuing. In addition,

in accordance with the agreement with Laos, a 22kV transmission line was completed in 2010 and electricity is being transmitted to Cambodia. In 2015, a 115kV transmission line was constructed to connect the substation in Champasak Province in southern Laos with Kampong Sralau of Preah Vihia province in Cambodia. According to the announcement by Electricity Authority of Cambodia (hereinafter, "EAC")⁵, the amount of imported electricity has decreased by 25% compared to the previous year in 2016 and is expected to decrease in the future. However, this is because of increase of the amount of domestic electricity power generation and it does not indicate that the demand for electricity has decreased. From these facts, it can be seen that there is demand for investment in electric power supply facilities throughout Cambodia, including the targeted area by this project at the time of the ex-post evaluation.

3.1.3 Consistency with Japan's ODA Policy

The Country Assistance Program (February 2002) for Cambodia cites "sustainable economic growth and realization of a stable society" as one of the priority areas of ODA, and it was to focus and support "promoting social and economic infrastructure development and the development of the environment for economic promotion." Regarding the power sector in particular, it regards that "the disparity between the capital and the rural areas in terms of the infrastructure of electricity and electric information communication etc. is remarkable, and from a long-term nationwide perspective, it planned to conduct technical and financial cooperation for policy planning and technical personnel training." The purpose of this project is consistent with this plan.

In JICA's *the Medium-Term Strategy for Overseas Economic Cooperation Operations* (April 2005), infrastructure development for vitalizing private economic activities in the growth corridor area is a priority area, and JICA was planning to promote collaboration with the Asian Development Bank (hereinafter, "ADB"), etc. This project implements power infrastructure development in the region with cooperative financing with ADB, so that this project is consistent with this policy.

According to JICA's *Country Assistance Strategy* (November 2004), constructing transmission lines, importing inexpensive electricity from neighbouring countries, and implementing electricity transmission to domestic bases are effective to overcoming the current situation that a high electricity charge is a hindrance to economic growth and poverty reduction. The objective of this project is also consistent with this policy.

3.1.4 Appropriateness of the Project Plan and Approach

As described later (3.2.2.2), various factors have overlapped with each other regarding the delay of this project and one of them was change of the scope of this project (change of the

⁵ Electricity Authority of Cambodia

transmission line route and substation site). After the start of this project, EDC conducted resurvey and it became clear that necessity of construction of a substation in Veal Renh was not urgent, considering the power demand forecast in the Veal Renh area. Also construction of two coal-fired power plants by an independent power producer (hereinafter referred to as "IPP") was decided in Sihanoukville, so that it was expected that the power supply from coal-fired power plants to Sihanoukville would increase through the power transmission system developed by the project. Therefore when EDC conducted a feasibility study in 2010 to confirm the technology, financial and economic feasibility of the 115kV transmission system, it was reported that constructing a 115kV substation in Sihanoukville and transmission lines between the Stung Hav substation and the Sihanoukville substation have high economic efficiency. For this reason, considering power demand, etc., ADB, a co-financing institution of this project, approved EDC's plan of scope change that cancelled construction of the Veal Renh substation and constructed a 115kV substation in Sihanoukville. JICA agreed to add construction of 115kV transmission line from the Stung Hav substation to the Sihanoukville substation. Completion map of this project is as follows (Figure 3).

The scope change of this project occurred for the purpose of further increasing the supply of electricity to the Sihanoukville area. This purpose is consistent with the purpose of this project, "to improve the electrical power supply to the area and to address electrical demand of Sihanoukville." Based on this, the change of plan of this project was consistent with the purpose of this project and the decision was indispensable to develop and increase the project effect. Therefore the decision was considered as appropriate.

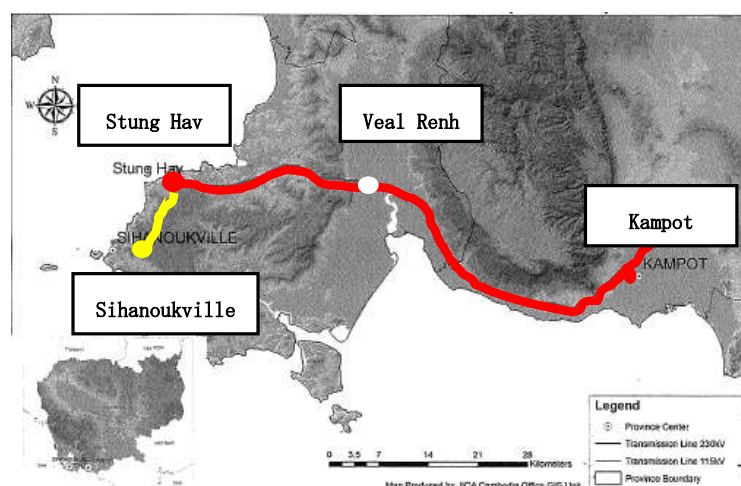


Figure 3 Location Map of this Project

Source: Documents provided by JICA

* Red is transmission lines and substations constructed in line with a plan at the time of appraisal. Yellow is transmission lines and a substation constructed

by additional scope.

* Described with reference to the plot of the Veal Renh station where construction was planned at the time of appraisal (withdrawn later) (white spot).

Based on the above, implementation of this project has been highly relevant to the country'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

Plan of outputs of this project at appraisal and actual project outputs at the ex-post evaluation are as Table 2.

Table 2 Planned and Actual Output of this Project

Plan	Actual
<p>①Construction work</p> <p>(a) Construction of 230kV transmission line (Kampot – Sihanoukville (Stung Hav), about 78km, double-circuit) (JICA portion)</p> <p>(b) Construction of new substations and addition of a substation (construction of new substations in Sihanoukville (Stung Hav) and Veal Renh and addition of a line bay at Kampot substation) (ADB portion)</p> <p>(c) Installment of medium and low voltage distribution system (22kV medium voltage line (about 60km), 400/220V distribution line (about 46km), bay line to surrounding households) (JICA portion)</p>	<p>①Construction work</p> <p>(a) Construction of 230kV transmission line (Kampot – Stung Hav, 82km, double-circuit) (<u>scope change</u>), construction of 115kV transmission line (Sihanoukville city – Stung Hav⁶, 12km, double-circuit)(<u>additional scope</u>) (JICA portion)</p> <p>(b) Construction of new substations and addition of a substation (new construction of the Sihanoukville 115/22kV substation (<u>additional scope</u>), new construction of the Stung Hav 230/22kV substation, addition of 115kV double-circuit line bay at the 230kV Stung Hav substation (<u>additional portion</u>), addition of 230kV double-circuit line bay at the Kampot substation) (ADB portion)</p> <p>*New construction of the Veal Renh substation was cancelled.</p> <p>(c) Installment of medium and low voltage distribution system in the area surrounding transmission line construction (22kV medium voltage line (40km) (230/22kV Stung Hav substation – Sihanoukville area), connection of</p>

⁶ Transmission line connecting a substation located in Stung Hav district, Sihanoukville state, and a substation located in Sihanoukville city.

	existing 22kV networks and 22kV feeder (Stung Hav substation – surrounding community) (additional scope), introduction of transformer (22kV/400V, 220V) (additional scope) (JICA portion), 400/220V distribution line (about 46km). Actual output of bay line to surrounding households is not available (there is a possibility to be conducted by EDC’s own fund)
② Consulting service(detailed design, bidding support, and implementation supervision) (ADB portion)	② Consulting service(detailed design, bidding support, and implementation supervision) (ADB portion)
③ Capacity building for EDC (a) Capacity building of EDC for maintenance of underground distribution networks (JICA portion) (b) Training for the operation and maintenance of high voltage power transmission system (JICA portion) (c) Database system of EDC customers in Phnom Pnem (ADB portion) (d) Training for EDC’s staffs of environmental and social consideration (ADB portion)	③ Capacity building for EDC (a) Not implemented (b) Training for the operation and maintenance of high voltage power transmission system (JICA portion) (c) Improvement of EDC data management system (procurement of hardware and software to establish connected data platform (including reliable backup system and improvement of communication system between headquarters and branches))(ADB portion) (d) Training for EDC’s staffs on social, resettlement, and environmental affairs (dispatchment of 2 EDC staffs specialized in social and environment to master degree course) (ADB portion)

Source: Created based on JICA documents, questionnaire reply by EDC, and onsite interview

The project scope was changed as described in above (3.1.4), and construction of the Veal Renh substation that was scheduled at the time of appraisal was canceled and changed to construction of the Sihanoukville 115kV substation. Hence construction of a 115kV double circuit transmission line which connects the Sihanoukville substation and the Stung Hav substation was added to the scope (Figure 3)⁷. In addition, the construction of a medium- and low-voltage distribution network around the transmission line construction area (a 22kV intermediate-pressure line (40 km) from the Stung Hav substation to the Sihanoukville region) was carried out. Also connection of the existing 22kV network and a 22kV feeder line (the

⁷ By this, substations between Kampot and Stung Hav were connected by 230kV transmission line, and substations between Stung Hav and Sihanoukville were connected by 115kV transmission line.

Stung Hav substation - neighboring communities) and adoption of transformer (22kV/400V, 220V) were added. EDC reports that EDC has connected the residential households living in the transmission line area with the electricity distribution network with its own funds. However, information to confirm whether such distribution network is equivalent to "400/220V distribution line (about 46 km) and the bay line to surrounding households" or not is not available. Relevance of the scope change is aforementioned (3.1.4), and the change of scope was considered as appropriate.

Details of the contents of the training program to EDC staffs were confirmed by the information of ADB which is the co-financing donor and in charge of the portion. According to the information, in addition to participation in training at the EDC training center, training was conducted in both Cambodia and abroad, including dispatching 14 staffs to Thailand and Vietnam. In addition, two EDC staffs obtained a master degree on resettlement and social environment in Thailand.

Improvement of the data management system was implemented as part of customer management and improvement of fee collecting capacity. Regarding the training of the underground distribution network, it was not carried out because construction of the underground distribution network originally planned at EDC was not carried out.



Figure 4 Data management system at EDC headquarters



Figure 5 Data management system at EDC headquarters
(locked state)

Although the construction period of this project was extended, the consulting service period was not extended and ended in 2013 before completion of construction. For the consultant service input (M/M), international consultants of 40M/M and local consultants of 45M/M were assumed. However, the actual implementation increased to 69M/M for the international consultants and 64M/M for the local consultants (Table 3). It was because of an increase in design works and a delay in project implementation. This arises from the aforementioned

scope change of the project, and this change is regarded as appropriate, so that it can be said that an increase in M/M is inevitable.

Table 3 Comparison of the Plan and Actual Results of Consulting Service Input (Unit: M/M)

	Plan	Actual	Balance
International Consultant	40	69	29+
Local Consultant	45	64	19+
Total	85	133	48+

Source: Documents provided by JICA and ADB

3.2.2 Project Inputs

3.2.2.1 Project Cost

The total project cost of this project was 6,179 million yen (of which ODA loan was 2,632 million yen) as planned at the time of appraisal, whereas the actual total project cost was 6,100 million yen (of which ODA loan was 2,521 million yen) that fell within the plan (99% of the plan). Although there were cancellation of construction of the Veal Renh substation⁸, addition of construction of the Sihanoukville 115kV substation and 115kV transmission lines (between Sihanoukville city and Stung Hav)⁹, and increase of land acquisition cost¹⁰, the actual total project cost fell within the plan due to the yen appreciation.

3.2.2.2 Project Period

The project period planned at the time of appraisal was 46 months, from March 2007 (the date of signing the loan agreement) to December 2010 (the start of business operation of transmission and substation facilities and distribution network). However, in fact, the project period was for 87 months from March 2007 (the signing date of the loan agreement) to May 2014 (the start of business operation of transmission and substation facilities and distribution network), which was significantly longer than planned (189% compared with the plan). As the project was delayed, the loan closing date has been extended. Table 4 shows the result of the project period at the time of appraisal and the ex-post evaluation¹¹.

⁸ Decrease of 12.68 million dollars.

⁹ Increase of 14.81 million dollars.

¹⁰ Increase of 3.3 million dollars.

¹¹ As for the commencement of the project period, it was defined as the timing of "land acquisition/resident relocation" by EDC at the time of appraisal. However, actual "land acquisition/resident relocation" occurred in April 2009 after the date of signing the loan agreement. Therefore, in this ex-post evaluation, the date of signing the loan agreement is set as "project commencement".

Table 4 Plan and Actual Project Period

Item	Plan (at Appraisal)	Actual (at Ex-Post Evaluation)
1. Consulting Service	Feb.2007 – Dec.2010 (47 months)	Dec.2008 – Dec.2013 (61 months)
2. Capacity Building	May 2007 – Aug.2008 (16 months)	Dec.2008 – Dec.2009 (13 months)
3. Land Acquisition and Relocation	Nov.2006 – May 2010 (43 months)	April 2009 – beginning of 2014
4. Bid and Contract	Sep.2007 – Nov.2008 (15 months)	Dec.2009 – May 2012 ¹² (31 months)
5. Transmission Line Construction	Dec.2008 – Dec.2010 (25 months)	March 2011 – April 2014 (38 months)
6. Distribution System Construction	June 2009 to Dec.2010 (19 months)	March 2011 – April 2014 (38 months)

Source: Documents provided by JICA and a questionnaire reply from EDC

The delay of this project is a combination of various factors. Firstly, the selection of consultants was delayed, and contract with consultants was concluded in December 2008, which was a delay of 21 months. Procurement of the construction contractor¹³ was also delayed because it took time for administrative procedures.

In addition, due to the scope change, construction of the Veal Renh substation was cancelled and construction of the Sihanoukville 115kV substation was added, so that the start of the procurement process of contractor was delayed, which became the main factor of the delay of the project. Additional work on the 115kV transmission line delayed the completion of the transmission line construction. In the construction of the Sihanoukville 115kV substation, it was found that the soil quality of the originally planned site was bad and it was necessary to change the location, so that selection of construction site was delayed and start of construction delayed for nine months.

In addition, land acquisition was delayed because negotiations with some residents prolonged about the amount of land acquisition compensation. It could not be confirmed about the reason for the delay in the construction of the electricity distribution network in Sihanoukville.

¹² ADB portion

¹³ The construction work of this project (Table 2①) was implemented by turnkey contract (all orders from design to construction are accepted and the subject matters are delivered in a state where it can deliver in a fully operational state).

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

At the time of the ex-post evaluation, the financial internal rate of return (FIRR) and the economic internal rate of return (EIRR) were recalculated, FIRR increased to 22.2% versus 13.6% at appraisal. Table 5 shows cost, benefits, and project life premise of the FIRR. The main factor that increased FIRR from the time of appraisal is that after the project was completed, the cost of electricity import decreased due to the increase in domestic electricity supply. Although recalculation of EIRR was attempted, recalculation was not possible because it was difficult to estimate detailed costs and benefits due to lack of accurate data.

Table 5 Premise of FIRR

Item	Appraisal	Ex-post evaluation
Cost	Project cost, operation and maintenance cost	Project cost, operation and maintenance cost
Benefit	Revenue from electricity sales	Revenue from electricity sales
Project life	30 years	30 years

From the above, although the project cost was within the plan, the project period significantly exceeded the plan. Therefore, efficiency of the project is fair.

3.3 Effectiveness (Rating: ③)

3.3.1 Quantitative Effects (Operation and Effect Indicators)

Table 6 shows the targets and results of the operation and effect indicators of this project. Availability Factor on 2014, 2015, and 2016 could not be obtained. Regarding the electrification rate in Kampot, the target value of both 75% in town area and 35% in rural area were exceeded, over the period from completion of the project to 2016, two years after the completion of the project. In Sihanoukville also, over the past 3 years both town and rural areas exceeded the target value of 75% in town areas and 35% in rural areas. Regarding rate of distribution loss, Kampot achieved the target value of less than 12% in the past three years. Sihanoukville also achieved the target value of less than 12% until 2016, two years after the completion of the project. In general, the operation and effect indicators were achieved except for availability factor.

In order to measure the effect of this project in the target area of this project, the trends in the maximum power demand, the receiving end electricity amount, and the amount of electricity sold in Sihanoukville and Kampot region before and after completion of this project were collected as reference indices. Maximum power demand in 2016 is 44MW for Sihanoukville and 20MW for Kampot as shown in Table 1 above, which are higher than before. The amount of

receiving end electricity¹⁴ is 240,303,979kWh in 2016 in Sihanoukville, though it is difficult to compare because information on other years could not be obtained. For Kampot no answer was obtained. The amount of electricity sold in 2016 was 19,356,087kWh /month for Sihanoukville, 8,849,973kWh/month for Kampot, though information on other years was not obtained. However the total amount of electricity sold in EDC as a whole became six times larger from 2006 to 2014, so that an increase in electricity supply was observed. The collection rate for electricity fee is maintained at 100% in any region.

Table 6 Operation and Effect Indicators¹⁵

	Baseline	Target	Actual		
	2004	2012	2014	2015	2016
	Baseline year	2 years after completion	Year of completion	1 year after completion	2 years after completion
Availability Factor (%)	-	Less than 100%	-	-	-
Electrification Ratio (%) (Kampot)	Town area: 50% Rural area: 8%	Town area: 75% Rural area: 35%	Town area: 85% Town area: 50%	Town area: 95% Rural area: 65%	Town area 100% Rural area 80%
Electrification Ratio (%) (Sihanoukville)	Town area: 60% Rural area: 13%	Town area: 75% Rural area: 35%	Town area: 80% Rural area: 62%	Town area: 87% Rural area: 74%	Town area 95% Rural area 86%
Distribution Loss (%)	Kampot 35% Sihanoukville 13%	Kampot 12% Sihanoukville 12%	Kampot 6.24% Sihanoukville 3.72%	Kampot 4.07% Sihanoukville 4.04%	Kampot 4.72% Sihanoukville 3.34%

Source: Documents provided by JICA and EDC

3.3.2 Qualitative Effects (Other Effects)

At the time of appraisal, as the qualitative effect of this project, stable supply of electricity to the Sihanoukville area and along the main transmission line was expected to be realized.

According to the EDC Sihanoukville branch and the Kampot branch, after completion of this project, electricity supply amount increased in the Sihanoukville area and demand was satisfied. Blackouts which lasted from a half day to whole day before completion of this project now lasts for a short period of about 13 minutes per one time. In the Kampot area, prior to completion of this project, it relied on imported electricity from Vietnam, whereas after completion of this project, the electricity supply improved and the construction of distribution line advanced. There

¹⁴ The amount of electric power received by the target transformer during a year.

¹⁵ Availability Factor: maximum load (MW) / {equipment rated capacity (MVA) × power factor}

Electrification ratio: number of electrified households × 100 / Number of households

Distribution loss: distribution loss (kWh) × 100 / Electricity transmitted (kWh) (Applied to supply work)

were frequent blackouts before, but now the power supply is stable 24 hours. As described above, by completion of this project, it was recognized that the increase in power supply available for 24 hours, and the reduction of blackouts are achieved in each target area, and the stability of power supply in these areas has improved significantly.

According to an interview to a coal-fired power station, the Cambodian Energy Limited (hereinafter, "CEL") in Sihanoukville which is a beneficiary of this project, the Sihanoukville Special Economic Zone (hereinafter referred to as "SEZ"), the Sihanoukville Port SEZ, and local electric utilities in the Prey Nob region¹⁶ (hereinafter, "REE"¹⁷), two coal-fired power plants were constructed in Sihanoukville and the capacity of power supply has increased drastically. This project enabled the power supply to Sihanoukville, Kampot and Phnom Penh, contributing to stable power supply in each region. CEL operates a coal-fired power plant since December 2013, and it says that it is impossible to operate the power plant without construction of a 115kV substation by this project. CEL has a capacity of 100MW (50MW × 2 units) as of 2016, and expects a sharp rise in electricity demand in the Sihanoukville region in the future. Therefore it plans to expand the capacity per unit from 100 to 150MW in the future. The other coal-fired power plant by the Cambodia International Investment Development Group (CIIDG) supplies electric power with an installation capacity of 270MW (135MW × 2 units). Likewise, completion of this project enabled sufficient power supply to Sihanoukville.

According to the Sihanoukville SEZ¹⁸, it previously used diesel private power generation. However, after completion of this project it is receiving direct supply from EDC. Although blackout was also frequent and long, now it became rare and shorter, so that it states that the increase in electricity supply and stable use became possible. According to REE, in the Prey Nob region, diesel power generation was used before completion of this project. Power usage was limited at 8 hours per day and power outages occurred frequently. Used by 1,200 households, electricity consumption per household was 10kWh. After completion of this project, it became possible to use electricity for 24 hours, there was little power interruption, and the supply became stable. Electricity came to be used by 3000 households and the consumption per household increased to 50kWh.

In light of the comprehensive consideration of this project, it can be said that the power supply has increased and the stable use has been drastically increased for commercial businesses and households in the Sihanoukville and Kampot regions, as a result of completion of this project.

¹⁶ Located between Sihanoukville and Kampot.

¹⁷ Rural Electricity Enterprises

¹⁸ 105 companies invested as of November 2016.

3.4 Impacts

3.4.1 Quantitative Impacts

As an impact of this project, it was supposed that the activation of the regional economy was promoted by the stable supply of electrification and electric power, contributing to the increase in the number of offices and employees. Therefore, it was attempted to obtain statistical data (data on economic activity such as number of registered offices, employees, frequency of outage at each office, etc.) in the Sihanoukville area and the area along transmission lines of this project. However, available data is limited to the 2011 Economic Census and the 2014 mid-year economic survey, and it was difficult to objectively evaluate the promotion of regional economic vitalization. With regard to the number of economically active population and the unemployed, only the data of the 2008 census was obtained, so that it was impossible to evaluate the trend.

3.4.2 Qualitative Impacts

Through on-site interviews, the projects contribution to vitalizing economic activities such as industry and agricultural development, to improving living standards and to job creation in the Sihanoukville region and the area along the transmission line of this project was analysed and reviewed. Particularly in the Sihanoukville SEZ, which was invested by Chinese companies, the production cost was reduced, and the productivity, the number of tenant enterprises, and employment increased. Hence this project seems to contribute to the SEZ to a certain extent. Also in Kampot area, along with the increase in electricity supply, productivity of various plants improved, employment increased, and use of electric appliances by small and medium enterprises became possible and their productivity improved. In addition, regarding this project as a prerequisite, CEL is engaged in a coal-fired thermal power generation project, and employment of CEL is increasing along with the implementation of their project. In the Prey Nob region, REE reported that improvement of electric power supply by this project, enabled use of machinery for production and processing, which brought about various benefit to agriculture, small and medium-sized enterprises, livestock rearing, etc. Also it reports that use of televisions, air conditioners, and cooking appliances, etc. by residents has increased and the living conditions have also improved. It can be said that this project is contributing to the improvement of living standard.

From the above, it is evaluated that this project contributes to vitalization of economic activities such as industry and agricultural development in the target area, improvement of standard of living, and creation of employment.

3.4.3 Other Positive and Negative Impacts

3.4.3.1 Impacts on the Natural Environment

Land to be used for this project was selected in consideration of the environment, neither the center of the Bokor National Park which has a significant impact on the environment, nor residential area was selected, and used the peripheral area¹⁹ in the Bokor National Park where short forest grows and where the land is close to the railroad. This project tried to minimize impact on natural environment such as ecology of wild animals.

Regarding environmental impacts, mitigation measures were presented at the Initial Environmental Survey (IEE²⁰) implemented in 2006, and the Design and Construction Contractor (DCC) was selected as the implementing entity. Also, in 2009 the Detailed Environment Management Plan was prepared for this project, and as a negative potential impact that can occur in the land and the surrounding environment, tree loss, crops and environmental destruction, impact on wild animals, atmospheric quality, soil erosion, water quality and soil contamination, noise, health and safety, were confirmed, and mitigation measures against them were presented. During construction, environmental monitoring was conducted by the Korea Electric Power Corporation (KEPCO), a project implementation consultant. Reporting was made to ADB and JICA once every three months. According to EDC and ADB, these mitigation measures were fully implemented. After the commencement of operation, EDC hires external NGOs and conducts monitoring.

As a result of environmental monitoring, no particular problem has been reported. Even by the site visit, evidence of negative influence was not observed.

3.4.3.2 Land Acquisition and Resettlement

Ultimately the number of affected people is 445 households. 12 households became subjects of resettlement and they resettled upon received the payment of compensation (arrangement was done by the residents themselves). There is no change with the plan at the time of appraisal. 887,000 square meters of land were acquired and the affected building was reported to be 1,658 square meters. Relocation of residents and land acquisition have been all completed.

Certain laws concerning land acquisition for the government's public works are not enacted in Cambodia, and the government's Inter-ministerial Resettlement Committee is responsible for rights protection, price valuation, and determination of compensation amount. Real estate acquisition is decided ad hoc for each project by government decision.

In implementing this project, in compliance with *the ADB's Policy on Involuntary Resettlement* (hereinafter "ADB Policy") in 1995, EDC created a 2006 re-settlement framework and conducted land acquisition and resettlement in accordance with the framework. The framework provides guarantee for due process of procedures concerning land acquisition and resettlement, and has heavily protected the households affected.

¹⁹ Even within the national park premises, the peripheral part can be used by the country and residents.

²⁰ Initial Environment Examination

There were no problems found in appropriateness of procedures of land acquisition and resettlement, such as composition of the land acquisition committee, holding a public hearing, negotiation with residents, calculation of compensation amount. According to EDC Environmental Society Resettlement Department, prior explanation and consultation on the land acquisition were done adequately at public hearing. Although it took time to negotiate with the 4 households about the compensation amount, EDC persuaded the residents with sufficient consultation, and finally agreed with them. From the above, no particular problem was found in the land acquisition and resettlement procedure of this project. In addition, regarding complaints from residents, it can be evaluated that appropriate response was taken by attempting setting up of a focal point and quick response.

Compensation provided to the residents who were subject to land acquisition exceeded reacquisition cost, so that it is considered that the compensation satisfied right value.

According to an interview to EDC, regarding gender consideration, public hearing was arranged for both sexes to participate and they heard opinion equally. Female head households, disabled persons, senior households over the age of 60 were provided compensation with 150 dollars more. As mentioned above, in this project women and men were treated equally in land acquisition and resettlement, single mothers, senior or disable households were given more compensation, employment opportunities were given gender equally, etc., so that this project considered gender and socially vulnerable groups as expected. People who were relocated have moved to another region, such as foreign country or Phnom Penh, so that direct interviews to local residents were impossible.

3.4.3.3 Other Positive and Negative Impact

(1) Decline of electricity tariff

In EDC, the method of setting electricity tariff is different between the area connected to the National Grid (115kV or more transmission line) and the independent system area. In the latter, the electricity tariff is set based on the generation cost of the small scale power plant in the independent system and it becomes higher than the former. It can be thought that as this project made the Sihanoukville and Kampot regions connected to the National Grid, electricity tariff have declined.

Through interviewing to the large consumers etc. in Kampot and Sihanoukville, it was confirmed that after the completion of this project, the electricity tariff became lower in this area. For example, the Sihanoukville SEZ paid \$0.1675/kWh as electricity charge to EDC before completion of this project, whereas it decreased to \$0.142/kWh as of 2016²¹. The electricity charge of the Prey Nob REE was 2500 riel/kWh²² before completion of this project, whereas it

²¹ The consistency with Table 11 cannot be confirmed.

²² About 0.618 dollar/kWh (as of April 2017)

decreased to 800 riel/kWh²³ as of 2016.

(2) Poverty Reduction

The area where the distribution network is to be constructed by this project includes rural areas and poor areas, and improvement of the living environment of the local residents by electrification was expected. As mentioned above, this project brought about employment creation, wage increase and improvement of living environment in the target area, whereas, no direct data showing quantitative effect on poverty reduction in this project area was obtained so that it was impossible to evaluate the degree of contribution of this project to poverty reduction.

(3) Benefit to Phnom Penh

This project was aimed at bringing benefits directly to Sihanoukville and Kampot regions. Since the construction of the coal-fired power plants (two plants) in Sihanoukville by IPP was decided unexpectedly after the project began, the EDC implemented a feasibility study and changed the scope of this project. Hence, as a result of this project and the completion of two coal-fired power plants, the power supply to Sihanoukville increased, and in addition to that, 100MW could be supplied to Phnom Penh through the power system between Sihanoukville, Kampot and Phnom Penh. Electricity imports declined by 20% and, according to EDC, it is possible to supply 400MW to Phnom Penh in 2017. In this way, indirectly through the completion of this project Phnom Penh has received large benefits, and the impact beyond the expectation of this project occurred.

Therefore, this project has achieved its objectives. Therefore effectiveness and impact of the project are high.

3.5 Sustainability (Rating: ③)

3.5.1 Institutional Aspects of Operation and Maintenance

Regarding the personnel composition of EDC officials, highly educated engineers and technical workers are increasing year by year, and human resources of an appropriate level are secured for the operation and maintenance of this project. The transmission department is in charge of the operation and maintenance of this project. The number of power transmission lines handled by EDC is increasing year by year, and whenever a new transmission line is established, the transmission department newly hires and increases the number of staffs²⁴. As shown in Table

²³ About 0.197 dollar/kWh (as of April 2017)

²⁴ The EDC's Transmission Department is responsible for EDC's operation and management of transmission lines across whole Cambodia, and staffs of the Transmission Department are assigned throughout Cambodia. For this reason, the staffs in charge of operation and maintenance of the transmission lines in Sihanoukville and Kampot belong to the Transmission Department of EDC headquarters. On the other hand, the EDC Sihanoukville branch is in charge of operation and maintenance of distribution lines of this project.

7, the number of personnel at each substation was supplemented after completion of this project, and the total number of staffs of the transmission department as of February 2017 was 517, which is said to be enough to carry out appropriate maintenance and management of this project.

Table 7 The Number of Employees of Transmission Department Allocated at Each Substation

	2014 (new staffs)	2015 (new staffs)	2016 (new staffs)	Staffs total (as of Feb.2017)
Sihanoukville Substation	6	-	4	15
Stung Hav Substation	9	-	3	14
Kampot Substation	8	-	2	24

Source: EDC document

Through JICA technical cooperation "Project for Improvement of Transmission System Operation Maintenance" (2013-2015), *the Maintenances Rule for National Transmission Line* was created²⁵ and applied to maintenance and operation of transmission lines from 2014. The EDC is supposed to make annual patrol plan, and it is said that the monthly patrol plan should also be made based on the plan. The rule also describes the flow of communication between the EDC headquarter and the local workers, and troubles are dealt with in accordance with the flow written in the rule. It is said that the transmission department swiftly copes with the contact from the site through a hot line or a call center and it seems that there is no problem in the process up to the decision making. Therefore, there seems no problem in implementation of monitoring.

The EDC Sihanoukville branch, which is responsible for the operation and maintenance of distribution lines, has 129 staff in 2016 and is responsible for two substations (the Sihanoukville substation and the Stung Hav substation) and five sections (power generation, distribution, control, administration, projects). The personnel on operation and maintenance of distribution lines was sufficient and no particular problem was seen. The number of staffs of the Kampot branch of EDC was 96 in 2016. Although information on the composition was not available, personnel for operation and maintenance was fully sufficient and no problem was seen about the number of staffs.

From the above, there are no major concerns about the institutional aspects of operation and maintenance.

²⁵ The project also created the rule of operation and maintenance for substations.

3.5.2 Technical Aspects of Operation and Maintenance

During project implementation, training on EDC officials was conducted in Thailand and Vietnam for maintenance of 230kV transmission line, and 14 staff members of the transmission department participated and learned an appropriate maintenance method, a repair method of tower insulator, and how to maintain weekly and monthly maintenance schedule. The trainees are still working at the transmission department, and it is considered to be effective for operation and maintenance of this project. In addition, the above-mentioned *the Maintenances Rule for National Transmission Line* exhaustively prescribes maintenance plan, type of patrol, inspection plan, implementation process, check items, recording method, repair plan, work process, recording method, evaluation, safety measures for operation and maintenance. The EDC's transmission department is implementing operation and maintenance based on this rule, so that the rule contributes to the improvement of the operation and maintenance capacity of EDC staffs. A subsequent project of the technical cooperation project is scheduled in the future, and further guidance for maintenance of 230kV is planned. These are expected to contribute to further strengthening capacity of EDC staffs on operation and maintenance of 230 kV.

EDC has a training center at the EDC headquarters for in-house training, and lectures on general transmission lines and accidents are held there (however, there is no guidance specialized for operation and maintenance of 230kV). New employees of the transmission department and staffs of the same department are occasionally trained when necessary. EDC also offers training through OJT, which also contributes to operation and maintenance of 230 kV.

The EDC Sihanoukville branch is working on training on indices such as SAIFI²⁶ and SAIDI²⁷ by a NGO to improve the maintenance capacity for distribution lines. The average annual power outage per customer in 2017 is 0.05 and the average power outage was 20.4 hours. Other technical problems in terms of technology have not been reported.

Despite the fact that no information was obtained on the technology of operation and maintenance at substations, EDC established the above-mentioned training center for all officials, and substation staffs are also able to attend. Therefore, it can be said that the basic training system is established. Also, staffs of the EDC transmission department assigned at substations are also responsible for operation and maintenance of the substations, so that there are no particular concerns regarding their technology. From the above, there seem no particular problems with the technology of operation and maintenance of this project.

²⁶ SAIFI (System Average Interruption Frequency Index) = the number of blackout of customers/the number of customers.

²⁷ SAIDI (System Average Interruption Duration Index) = total hours of blackout in a year/ the number of customers

3.5.3 Financial Aspects of Operation and Maintenance

In terms of the electricity charge collection system, a data management system has been introduced as a capacity building of this project and it promoted power data backup saving, improvement of mailing system for electricity charge collection and customer service. These allow for more efficient implementation of electricity charge collection.

According to EDC's income statement (Table 8), balance of income and expenditure is surplus every year. Especially in 2015, after the completion of this project, the operating profit increased by about 86 million riel, and no problem was seen in the balance of income situation.

Table 8 EDC Income Statement (Unit: 1000 riel)

	2013	2014	2015
Electricity sales	2,624,680,302	2,958,274,445	3,763,629,241
Connection service fees	35,025,778	39,544,709	34,298,112
Other income	13,809,934	15,392,163	15,722,090
Total Revenue	2,673,516,014	3,013,211,317	3,813,649,443
Purchased power	1,952,554,348	2,243,866,492	2,820,985,078
Fuel costs	38,791,976	29,471,785	6,927,267
Import duty	45,632,751	33,963,181	29,065,630
Salaries and other benefits	101,371,233	125,726,983	153,172,713
Other operating expenses	65,578,646	77,844,015	214,287,293
Depreciation	68,947,387	72,081,334	82,468,483
Amortisation	75,593	157,261	195,512
Operating profit	400,564,080	430,100,266	506,547,467
Net finance costs	13,439,986	49,513,604	39,682,849
Profit before income tax	387,124,094	380,586,662	466,864,618
Income tax expense	83,800,621	78,915,691	98,108,272
Net profit for the year	303,323,473	301,670,971	368,756,346

Source: EDC document

The EDC's balance sheet is as follows (Table 9). The capital adequacy ratio is 40.8% in 2013, 44.6% in 2014, 43.3% in 2015. Each year exceeds 40% and is in favourable condition. With respect to the current ratio, it is 182% in 2013, 303% in 2014, 233% in 2015. Each year exceeds 100% and there seems no problem in payment reserve.

Table 9 EDC Statement of Financial Position (Unit: 1000 riel)

	2013	2014	2015
Assets	3,663,318,285	4,035,797,345	5,079,911,859
Non-current assets	2,170,475,034	2,408,775,320	3,253,874,460
Current assets	1,492,843,251	1,627,022,025	1,826,037,399
Liabilities and equity	3,663,318,285	4,035,797,345	5,079,911,859
Equity	1,495,525,491	1,801,029,804	2,199,916,150
Non-current liabilities	1,348,485,403	1,697,826,071	2,098,802,105
Current liabilities	819,307,391	536,941,470	781,193,604

Source: EDC document

Regarding the trends in maintenance-related budgets and actual allocation since the completion of this project and the start of the operation, as EDC conducts maintenance and management in a centralized manner without distinguishing between this project and other projects, data specific to this project are not available. However, as for the EDC Sihanoukville branch, the budget tends to increase, the annual spending performance is within the budget range, and problems such as insufficient funds cannot be seen in maintenance management. Therefore it seems that the budget necessary for maintenance of transmission lines of EDC including this project is accumulated (Table 10). The budget and performance of the Kampot branch cannot be confirmed.

Table 10 Budget and Actual Allocation for Maintenance and Operation of EDC (Unit: million riel)

	2014		2015		2016	
	Budget	Actual	Budget	Actual	Budget	Actual
Sihanoukville branch	100,316	97,072	143,958	121,594	156,989	140,528

Source: EDC document

According to the future forecast of the Cambodian electricity tariff system obtained through the field survey (Table 11), the electricity tariff for industrial and commercial customers and resident customers are expected to decline from 2015 to 2020. However, according to EDC, as large amount of electricity charges collected from all Cambodia, there is no direct impact on the allocation of the maintenance cost for this project.

Therefore, although some matters could not be reviewed, no particular problem was found in regard to the financial affairs of operation and maintenance.

Table 11 Trend of Electricity Tariff and Subsidies

1. For Industrial and Commercial Customers									
Type	Unit	2005	2010	2015	2016	2017	2018	2019	2020
Purchase directly from feeder MV in GS ²⁸	USD/kWh	-	0.1225	0.129	0.126				
Purchase from Phnom Penh and Kandal system	USD/kWh	0.149 -0.165	0.179 -0.229	0.177	0.172	0.1675	0.165	0.163	0.162
Purchase from provincial grid and EDC's subtransmission	USD/kWh	0.135 -0.185	0.170 -0.200	0.1725	0.1675	0.165	0.164		

²⁸ Grid Substation

2. For Residential Customers									
Coverage Area	Unit	2005	2010	2015	2016	2017	2018	2019	2020
Coverage area by EDC	Riel/kWh	720 -1220	820 -1220	820 -920	780	770	750	740	730
Coverage area by licensees (REE)	Riel/kWh	1800 -3000	2400 -3700	1000 -1100	800	790	770	760	750
3. Subsidy Tariff for Poor People and Agriculture Purpose									
Type	Unit	2005	2010	2015	2016	2017	2018	2019	2020
For households use below 50 kWh/month in Phnom Penh and Kandal System	Riel/kWh	-	-	610	610	610	610	610	610
For households use below 10 kWh/month in the provinces which connect to the National Grid	Riel/kWh	-	-	-	480	474	462	456	450
For pumping in agriculture sector use from 21:00 -7:00	Riel/kWh	-	-	-	480	474	462	456	450
For household use below 50 kWh/month in the provinces which connect to the National Grid	Riel/kWh	-	-	-	-	610	610	610	610

Source: EDC document

*Answers were not available on from which year the estimated figures are.

3.5.4 Current Status of Operation and Maintenance

As a result of inspection on the site of this project, the transmission lines, substations, distribution networks and various facilities and equipment were adequately managed and no particular problem was found. Operation and maintenance are carried out at an appropriate frequency in accordance with the above-mentioned *the Maintenances Rule for National Transmission Line*. Check items and work processes are also being implemented in accordance with the new rule, and the system to cope with troubles when they occur is also in place. As a result of on-site inspection, the system is properly installed, kept in a tightly locked, antimicrobial closed room (Figures 4 and 5), and operation and maintenance are properly conducted.

As a problem of operation and maintenance, there is damage to power supply caused by such as poor soil in the rainy season and fear of lightning. In the dry season EDC is taking countermeasures

such as cutting trees, paving roads, and attaching overhead ground wires. In addition, occasional problems such as a car colliding to a steel tower due to an accident, a kite played by a child being entangled with transmission lines occur. However each time technical staffs have resolved within 10 to 15 minutes from occurrence of problems, and the rate of occurrence of troubles was 1 to 1.5% in 2016.²⁹ According to the IT staff of the Sihanoukville substation, there was a rare issue of the power outage in whole Cambodia as a result of power failure due to the EDC headquarters control system in Phnom Penh. However, now the Stung Hav substation is in place, so that it became possible to supply electric power independently from coal-fired power plants and the problem of such blackouts in the Sihanoukville area was solved by 95%.

KEPCO conducted a survey and banned the use of land within 50m from steel towers by a contract. However, it was reported that the soil around steel towers within 50m is of good quality and sometimes residents excavate and remove soil for use of road construction etc. without permission. When EDC patrol discovered such case, it reports to landowners and local governments (villages or provinces) and asks for guidance to cope with the case.

Regarding the purchase of spare parts, the EDC Transmission Department sets up a spare parts procurement plan for one year from September to August not only for this project but also for all projects by EDC. In the case of parts that cannot be procured domestically, it is necessary to import from other countries. However, in other countries the model used by EDC is often not sold anymore. In that case EDC needs to order production of the spare parts, and it may take time from 4 months to 1 year before acquisition

Regarding distribution lines, although the EDC Sihanoukville branch had been in charge of operation and maintenance of distribution lines up to 22kV, from 2016 it is in charge of operation and maintenance of distribution lines up to 35kV. There are problems such as collision of cars to utility poles, removing of soil around utility poles, cutting and taking out electric wires, etc. Until 2016, when problems occurred, staffs of the EDC Sihanoukville branch headed for repair far from Sihanoukville city, so that it took three hours (2 hours for round trip from the city and 1 hour for repair) to settle the issue. However, automatic detection system was introduced and when problems such as cable disconnection occur, staffs who live in Sihanoukville city can receive alert directly from the system, so that it becomes possible to solve the problem by handset operation within 5 to 15 minutes. It was said that time was saved and it did not become a big problem.

As a result, concerning the operation and maintenance status, although there are some concerns about procurement of spare parts, no particular problem was found.

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

²⁹ Calculated by the time spent for solving problems per year.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project constructed and upgraded 230kV double-circuit power transmission lines and related facilities in the aims to strengthen the electricity supply capacity of the southern Cambodia, Kampot-Sihanoukville region, to respond to the demand for electricity of Sihanoukville and to improve the electrification rate along the area surrounding the transmission lines. This project was in line with development policy including Cambodia's energy/electricity policy, development needs, Japan's ODA policy, in terms of increasing investment in power generation and transmission business and improving electrification rate in rural areas. As such, the relevance of the project is high although the project cost fell within the plan, the project period greatly exceeded the plan, so that the efficiency is fair. For operation and effect indicators set at the time of appraisal, both electrification rate and distribution loss rate achieved the targets. By this project, it is evaluated that electric power supply has increased significantly in the target area and stable power supply has been realized. Through interviews with large consumers, increase in employment and the number of factories and offices and improvement of productivity, income and living environment are confirmed. Based on the above, the project has achieved its objectives, so that the effectiveness and impact of the project are high. Regarding the operation and maintenance of this project, there are no particular problems with respect to systematic and technical aspects. Regarding the financial aspect, according to the financial data of EDC, the operation and maintenance cost of the transmission lines and substations is properly supplied. Transmission lines and substations are well operated and maintained, and even when problems arise, they are being handled appropriately and quickly. Therefore, the sustainability of the effect expressed by 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

Promotion of Project Effect through Collaboration between Soft Component of Financial Cooperation and Technical Cooperation

In this project, in addition to cooperation on the hard side as construction of transmission

lines and substations, cooperation on the soft side as capacity building has been comprehensively implemented, and it can be said that the effect of this project has been enhanced in total. Acquisition of Master's degree by EDC staffs at the Asian Institute of Technology (Thailand) strengthened EDC's capacity on social and environmental consideration.

In addition, the operation and maintenance of this project follows *the Maintenances Rule for National Transmission Line* set by JICA's technical cooperation project as mentioned above. This covers comprehensively the procedures, methods, systems, check items, etc. concerning the operation and maintenance of the transmission lines and substations. The stringent compliance with this regulation by EDC contributed to the situation in which no particular problems occurred in the operation and maintenance of this project. Thus, during the term of project formulation and implementation, it is desirable for an executing agency and JICA to conduct supports on the sides of both hard and soft under loan cooperation in collaborating with a technical cooperation project, when appropriate, to increase effects of both projects.

End

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs	<p>① Construction work</p> <p>(a) Construction of 230kV transmission line (Kampot – Sihanoukville (Stung Hav), about 78km, double-circuit) (JICA portion)</p> <p>(b) Construction of new substations and addition of a substation (construction of new substations in Sihanoukville (Stung Hav) and Veal Renh and addition of a line bay at Kampot substation) (ADB portion)</p> <p>(c) Installment of medium and low voltage distribution system (22kV medium voltage line (about 60km), 400/220V distribution line (about 46km), bay line to surrounding households) (JICA portion)</p>	<p>① Construction work</p> <p>(a) Construction of 230kV transmission line (Kampot – Stung Hav, 82km, double-circuit) (<u>scope change</u>), construction of 115kV transmission line (Sihanoukville city – Stung Hav, 12km, double-circuit)(<u>additional scope</u>) (JICA portion)</p> <p>(b) Construction of new substations and addition of a substation (new construction of Sihanoukville 115/22kV substation (<u>additional scope</u>), new construction of Stung Hav 230/22kV, addition of 115kV double-circuit line bay at 230kV Stung Hav substation (<u>additional portion</u>), addition of 230kV double-circuit line bay at Kampot substation) (ADB portion) *New construction of Veal Renh substation was cancelled.</p> <p>(c) Installment of medium and low voltage distribution system in the area surrounding transmission line construction (22kV medium voltage line (40km) (230/22kV Stung Hav substation – Sihanoukville area), connection of existing 22kV networks and 22kV feeder (Stung Hav substation – surrounding community) (<u>additional scope</u>), introduction of transformer (22kV/400V, 220V) (<u>additional scope</u>)) (JICA portion), 400/220V distribution line (about 46km). Actual output of bay line to surrounding households is not available (there is a possibility to be conducted by EDC's own fund)</p>
	<p>② Consulting service (detailed design, bidding support, and implementation supervision) (ADB portion)</p>	<p>② Consulting service (detailed design, bidding support, and implementation supervision) (ADB portion)</p>
	<p>③ Capacity building for EDC</p> <p>(a) Capacity building of EDC for maintenance of underground distribution networks (JICA portion)</p>	<p>③ Capacity building for EDC</p> <p>(a) not implemented</p>

	<p>(b) Training for the operation and maintenance of high voltage power transmission system (JICA portion)</p> <p>(c) Database system of EDC customers in Phnom Phen (ADB portion)</p> <p>(d) Training for EDC's staffs of environment and social consideration (ADB portion)</p>	<p>(b) Training for the operation and maintenance of high voltage power transmission system (JICA portion)</p> <p>(c) Improvement of EDC data management system (procurement of hardware and software to establish connected data platform (including reliable backup system and improvement of communication system between a headquarter and branches))(ADB portion)</p> <p>(d) Training for EDC's staffs on social, resettlement, and environmental affairs (dispatchment of 2 EDC staffs specialized in social and environment to master degree course) (ADB portion)</p>
2. Project Period	March 2007 – December 2010 (46 months)	March 2007 – May 2014 (87 months)
3. Project Cost		
Amount Paid in Foreign Currency	N/A	N/A
Amount Paid in Local Currency	N/A	N/A
Total	6,179 million yen	6,100 million yen
ODA Loan Portion	2,632 million yen	2,521 million yen
Exchange Rate	1 US dollar = 118 yen 1 riel = 0.029 yen (As of April 2006)	1 US dollar = 95.70 yen (Average between 2007 and 2014)
4. Final Disbursement	December 2014	