Republic of the Philippines

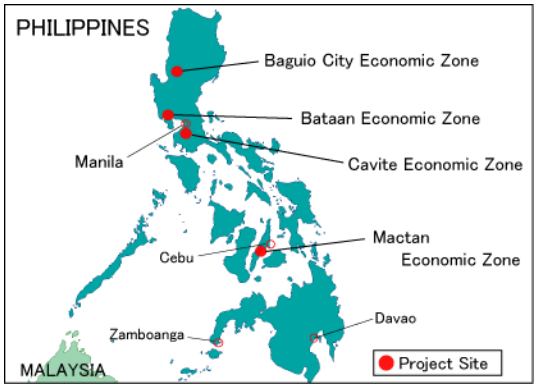
Special Economic Zones Environment Management Project[1]

External Evaluators: Yasuhiro Kawabata and Yuriko Sakairi

Sanshu Engineering Consultant

Field Survey: November 2007 - June 2008

1. Project Profile and Japan's ODA Loan



Location of Project Site

Sewage Treatment Plant in Mactan

1.1 Background

Due to the economic recovery of the Philippines, foreign direct investments in public and private export processing zones sharply increased from 2.7 billion pesos in 1993 to 52.2 billion pesos in 1995. In order to facilitate local and foreign direct investments, the Government of the Philippines enacted the Special Economic Zone Act (Republic Act No. 7916) in 1995, and developmentally restructured the Export Processing Zone Authority (EPZA) to establish the Philippine Economic Zone Authority (PEZA). This piece of legislation and its implementation mechanism was able to establish special economic zones (ECOZONEs) and bring together special industrial zones and export processing zones, and therefore, the planning and management of the zones was unified under the responsibility of PEZA. In the ECOZONEs, preferential treatment for investments, and provision of improved infrastructure and services were offered to attract business enterprises. As a result, there were a significant number of firms trying to locate in the four publicly managed ECOZONEs (i.e., Mactan, Baguio City, Bataan, and Cavite). As investments grew in the ECOZONEs, the amount of wastewater and solid waste was expected to increase, and therefore, the construction and rehabilitation of treatment facilities were urgently needed to prevent pollution in these areas.

[1] The ex-post evaluation for this project was jointly conducted with the Philippine National Economic and Development Authority（NEDA）.

1.2 Objective

The project's objectives are as follows: (a) to establish sewage treatment plants (STP) and treated wastewater reuse facilities in the Special Economic Zones (ECOZONEs) of Mactan, Baguio City, Bataan and Cavite, and (b) to strengthen PEZA's capability in the planning, regulation, enforcement, and environmental monitoring of the ECOZONEs to promote pollution control, to improve public wellbeing in the neighboring areas, and to promote investments in the Philippines.

1.3 Borrower/Executing Agency

Philippine Economic Zone Authority (PEZA) (guaranteed by the Government of the Philippines).

1.4 Outline of Loan Agreement

Loan Amount/Disbursed Amount	2,746 million yen/534 million yen
Exchange of Notes/Loan Agreement	March 1997/March 1997
Terms and Conditions -Interest Rate -Repayment Period (Grace Period) -Procurement	 2.5%; Consultant: 2.1% 30 years (10 years) General untied
Date of (Disbursement) Completion	July 2005
Main Contractors	—
Consultant Services	Pacific Consultants International (Japan) and TCGI Engineers (Philippines) — JV
Feasibility Study	Government of the Philippines (1995)

2. Evaluation Results (Rating: D)

2.1 Relevance (Rating: a)

2.1.1 Relevance at the time of appraisal

To encourage local and foreign direct investments to the country, a law on Special Economic Zones (Republic Act No. 7916)[2] was enacted in 1995, which led to the restructuring and reorganization of the Export Processing Zone Authority (EPZA) into the Philippine Economic Zone Authority (PEZA). PEZA was established to exercise jurisdiction over the ECOZONEs[3], which incorporated not only the export processing zones but also the industrial zones. Increased investments, and hence, activities at the export processing zones were expected to bring about increased sewage and solid waste, and therefore made it important to dispose of this waste adequately. Thus, construction and rehabilitation of these facilities were essential. In addition, it was important to supervise locators through environmental monitoring and adequately review monitoring

[2] The Special Economic Zone Act of 1995.

[3] Investors in the ECOZONEs are given preferential treatment in order to promote foreign and local direct investments in the Philippines.

results, thereby strengthening PEZA's management capability as needed.

Thus, the project was highly relevant.

2.1.2 Relevance at the time of evaluation

The Medium-Term Philippines Development Plan 2004-2010 (MTPDP) identifies developing and facilitating environmentally sustainable projects as an important issue, and thus, investments to improve environmental facilities in the ECOZONEs are relevant to the Plan. PEZA's ECOZONEs are strategically located in the centers of economic growth as stipulated in the MTPDP, and hence, the Special Economic Zone Act requires improving its services to locators by developing and improving infrastructure and by providing sustainable clean water to encourage further investments. In line with the MTPDP and the Act, the project aims to facilitate economic growth through improvements of environmental infrastructure, increased investments of international and local companies in good-standing, creation of employment opportunities inside and outside of the ECOZONEs, diversification of export goods, and introduction of advanced technologies including IT. Furthermore, PEZA's advancement of its understanding and management capability on the environment, and its institutional strengthening must continue as a priority issue of high relevance.

The project was, and remains, in line with the MTPDP and the Special Economic Zone Act therefore the project was highly relevant at both the time of the ex-ante and ex-post evaluation.

2.2 Efficiency (Rating: c)

2.2.1 Outputs

Table 1 shows the project plan and outputs. The STPs were constructed and repaired as planned; the STP in Mactan, which demonstrated financial viability, was constructed by an ODA loan, and the facilities in Baguio and Bataan, were constructed by PEZA's own funds.

In the appraisal document, water shortage was identified as an issue in Mactan, Baguio and Cavite, however, excluding Mactan[4], there is no record in the F/S that specifies this problem. Therefore, the wastewater reuse facility was constructed only in the Mactan ECOZONE where there were chronic reports of severe water shortage. No major water shortage issues were revealed in Baguio and Cavite therefore the construction of these facilities was postponed for the future. As the recent assessments confirmed that the

[4] To improve the project's profitability, the F/S recommended packaging the sewage treatment facility and the wastewater reuse facility.

project viability could be improved by packaging the STP and the wastewater reuse facility, PEZA plans to construct the wastewater reuse facility in the coming years.

Procurement of equipment for environmental monitoring was canceled. Since there were few environmental monitoring and testing companies at the time of appraisal, the management capability of PEZA had to be strengthened to ensure environmental soundness in the ECOZONEs. However, many such companies with experience and skills are now in operation and it was believed that outsourcing environmental monitoring to a private third party ensures impartiality and objectivity. Locators contract private specialized companies to conduct regular environmental monitoring and the results are submitted to PEZA for review. No serious problems have been reported.

Consultant services were conducted almost as planned. However, two activities were canceled: detailed design of the solid waste treatment facility and assistance on urgent planning of engineering services of ECOZONEs. The use of incinerators was prohibited under Republic Act No. 8749 (Philippine Clean Air Act of 1999) and therefore the detailed design was called off. Although the bill was discussed in Congress for a while, at the time of appraisal, the details of the bill and if the bill would be enacted were unclear. The urgent planning of engineering services of ECOZONEs was not implemented due to changes in PEZA policies to limit the development of government-managed ECOZONEs to the existing four zones, and as a result, the private sector has developed and managed ECOZONEs.

The project scope was greatly changed or reduced due to policy changes, which were beyond the control of the executing agency. Regarding organizational enhancement, reports on the planning, regulation, supervision, organization enhancement and monitoring were made, and trainings were conducted. Although the engineering department of PEZA implemented environmental management, an “Environmental Safety Group” under the PEZA Policy and Planning Department was established and enhanced, as suggested by the reports. The technical staff totals 16, with four people assigned to each ECOZONE.

Table 1: Planned and Actual Project Output

Item	Planned	Actual
Sewage Treatment Plants	Mactan (New construction)	As planned (ODA loan)
	Baguio City (New construction)	As planned (PEZA own fund)
	Bataan (Rehabilitation)	As planned (PEZA own fund)
Wastewater Reuse Facilities	Mactan (New construction)	As planned (ODA loan)
	Baguio City (New construction)	Postponed
	Cavite (New construction)	Postponed
Environment Management Equipment for the ECOZONEs	Procurement	Cancelled
Consultant Services	International：180M/M Local：399M/M	International : 49.2M/M Local : 603M/M
	1. D/D, construction supervision, and other tasks for STPs（Mactan, Baguio City, Bataan）	1. As planned
	2. D/D, construction supervision and other tasks for wastewater reuse facilities	2. As planned in Mactan (Postponed in Baguio City and Cavite)
	3. D/D, and other tasks for wastewater reuse facilities（Mactan, Baguio City, Bataan, Cavite）	3. Cancelled - RA8749 (Clean Air Act, 1999) prohibits incinerators
	4. Organizational enhancement	4. As planned
	5. Urgent planning of engineering services of ECOZONEs	5. Cancelled

Mactan ECOZONE

A technical meeting participated by NEDA staff and the evaluation team at STP in Mactan

2.2.2 Project period

The planned project period at the time of appraisal was from March 1997 to May 2001 (51 months). The actual period was from March 1997 to June 2005 (100 months); at 196% compared with the planned period. While the project period for the consultant services was planned from July 1997 to May 2001 (47 months), the actual period was

from October 1999 to June 2005 (69 months). Table 2 summarizes the project period of the consultant services by activities.

Table 2: Project Plan of Consultant Services

Activities	Planned	Actual
Selection	November 1996 – June 1997	November 1997 – October 1999
D/D・Tender Documents Preparation	July 1997 – January 1998	October 1999 – November 2000
Capacity Building	July 1997 – May 2001	October 1999 – November 2000
Tender Assistance・Construction Supervision	December 1997 – January 2000	November 2000 – June 2005

The main reasons of delay are discussed below:

(1) Since PEZA, established in 1995, was unfamiliar with the JBIC procurement procedures, it took time to prepare TOR and shortlists, negotiate contracts and others.

(2) It was initially planned that all of the construction would be contracted as one package. However, because of the changes in scope (as referred to in the outputs section above), the project activities were divided into several packages and it took significant time to prepare the bidding documents.

(3) Consultant services were adjusted to reflect a reduction in scope, and terms of reference had to be revised accordingly. As a result, it took significant time to select a consultant, resulting in further delays in tender preparation and the start of the construction process.

(4) In Mactan, the unforeseen existence of bedrock led to difficulties in construction, and thus increased the construction cost. This resulted in delays due to revision of the project[5].

2.2.3 Project cost

The total project cost was estimated at 3,103 million yen and the total loan amount at the time of appraisal was 2,746 million yen. The actual total project cost was 1,170 million yen and the total loan amount disbursed was 534 million yen. The total project cost was at 37.7% of the estimates, and the loan spent was at 19% (see Table 3). Table 4 shows the construction cost in each ECOZONE. Insufficient data on cost and its basis for calculation at the time of appraisal made the comparison of estimated and actual costs

[5] In Mactan, the project period was November 2003 to June 2005.

by component impossible. The reason for reduction of project cost was mainly due to changes in project scope as shown in the outputs section.

An ODA loan financed the construction of the STP and Treated Water Reuse Facility in Mactan, while PEZA financed the construction and/or rehabilitation of the STPs in Baguio City and Bataan[6]. PEZA limited the use of the loan due to financial troubles compounded by the substantial debt inherited from EPZA at 3.8 billion pesos. The newly-appointed director aimed at PEZA's financial consolidation by reducing loans and utilizing its own fund, and decided to use loans in Mactan where the project viability was considered higher. This decision was made as PEZA is an autonomous public entity which attaches significance to profitability.

The project output was greatly affected or reduced due to reasons beyond the control of the executing agency, i.e., policy changes and the enactment of new environment-related bills. In addition, financially viable components which contribute to enhancement of environmental protection and improvements of economic development were given highest priority. Thus the changes in output were appropriate. Although a comparison prior to and following the project is virtually impossible, the project period was significantly longer than planned, thus the efficiency of the project is limited.

Table 3: Break-down of Project Cost (million yen)

	ODA Loan	PEZA's own Fund	Total Cost
Construction	354	274.5 million pesos (595.6)	949.6
Consultant	181	18.3 million pesos (39.6)	220.6
Total	**534.7**	**292.8 million pesos (636.2)**	**1,170**

Table 4: Construction Cost in ECOZONEs（1,000 pesos）

	Mactan	Baguio City	Bataan
STP	157,343	94,991	119,554
Water Reuse	46,277	—	—

2.3 Effectiveness (Rating: c)

2.3.1 Sewage treatment plants

The operating rate of the STPs constructed under the project is relatively low as shown in Table 5. The reason for the low operating rate is the limited sewage collection pipe network. In the F/S, the development of the drainage pipe network was not included in

[6] In Bataan, the STP previously constructed through the ODA loan was rehabilitated under the project.

the project scope, and therefore, the project did not include such developments. It is not possible to obtain sufficient data to determine if the drainage network construction was separately planned and why it was excluded from the project. PEZA is currently undertaking the urgently needed pipeline network construction using its own resources. However, the construction has not proceeded as expected because the relatively small contract amount has not attracted many bidders and there is disagreement on the financial terms.

In Mactan, PEZA has issued a third tender and successfully invited competitive bids to improve the drainage pipe system, with completion expected within the year. In Baguio, a portion of the drainage pipeline system was also not completed, and thus, the amount of collected sewage was low. However, with the completion of the drainage collection pipes in 2007, the amount of sewage doubled due to direct connections of many locator firms although the total volume collected remains low (Table 5). In Bataan, construction of the sewage collection pipe network is also needed. The detailed design was completed in 2006 and construction bids have already been received. The construction is expected to be completed next year. Thus, the treated volume at the facilities and the operating rate are expected to improve shortly.

Table 5: Treatment Capacity of Sewage Treatment Plant (m^3/day)

	Mactan	Baguio City	Bataan
Installed Capacity	4,700	1,500	15,500
Treated Volume in 2006 (Percentage)	880 (18.7%)	274 (18.2%)	342 (2.2%)
Treated Volume in 2007 (Percentage)	993 (21.1%)	560 (37.3%)	1,000 (6.5%)

2.3.2 Quality of treated water

Table 6 shows the average water quality and the standards at the time of appraisal, and Table 7 summarizes the actual values along with the standards in 2007. At the time of appraisal, the BOD and some COD and SS[7] values were higher than the set standards in all ECOZONEs implying that water which did not comply with the standards was discharged as locators were allowed to remove deposits in a septic tank in Baguio and Mactan. The existing plant in Bataan was not fully operational due to partial damage resulting in the release of treated sewage water below the effluent standard. Although COD data was not obtained in Baguio City and Bataan, the effluent is treated to meet the national standard level at the STPs constructed under the project. Therefore, it can be concluded that the project has made social contributions from the perspective of public

[7] BOD (Biochemical Oxygen Demand), COD (Chemical Oxygen Demand), SS (Suspended Solids).

health. The effluent standard has been revised since the project appraisal and Class C, which is clean enough to be utilized for agriculture and irrigation[8], is now adopted. In each ECOZONE, a private operating company conducts[9] a weekly test of BOD, COD, and SS levels, and any problems are reported. Firms that produce harmful wastewater containing heavy metal and others are obligated to establish a disposal facility to treat the wastewater so that it meets the water quality standards. They contract a private firm to conduct environmental monitoring and the results are required to be submitted to PEZA. A comprehensive supervisory system has been established in the ECOZONEs where PEZA, a supervisory agency, verifies the monitoring results and DENR conducts onsite inspection. No problems have been reported yet.

Table 6: Water Quality at Appraisal (Mg/l)

	Mactan	Baguio City	Bataan
Actual			
BOD	47-130	100-120	140
COD	125	48-900	8
SS	26- 83	2-120	100
Standard			
BOD	30	50	100
COD	60	100	200
SS	50	70	150

Table 7: Water Quality (Mg/l)

	Mactan	Baguio City	Bataan
Actual			
BOD	6-21	14.12	34.0
COD	15-54	N.A.*	N.A.*
SS	12-86	13.75	12.0
Standard	Class C	Class C	Class C
BOD	50	50	50
COD	100	100	100
SS	70	70	70

*No data in Baguio and Bataan

2.3.3 Treated water reuse

Water quality at Class C is clean enough for agricultural use. In Mactan, the water is further treated for reuse in the ECOZONE[10]. Water quality data could not be obtained, and therefore, the following argument cannot be validated. However, the project may eliminate SS and BOD from the wastewater which had undergone treatment using an established filter and remove additional deposits which settle in the bottom of the reservoirs. It is also believed that wastewater treated by the system meets the 10 mg of BOD consistency as indicated in Table 8 if the wastewater coming from the STP is not polluted. Neither soil contamination nor bad odors from the reused water were reported.

In Mactan, wastewater is used for cleaning toilets, watering plants, cleaning drainage canals and pipes, and for extinguishing fires. No environmental problems were reported. The reuse facility was constructed in 2006 and 83% of the planned volume of recycled water was already used in the following year (Table 9). As an area plagued by water

[8] Water Quality and General Effluent Standards of 1990.
[9] In Bataan, PEZA hires and oversees private engineers. Trained PEZA staff conduct environmental monitoring. Outsourcing to private agencies is planned after 2008 and preparation is underway (as of February 2008).
[10] Water quality for the industrial use is Class D according to the Water Quality and General Effluent Standards.

shortage problems, this project has contributed greatly to an improved quality of daily life and more effective extermination of fires. The volume of reused water in Mactan exceeds that of the treated water which is 993m^3 (2007) as shown in Table 5. This may be due to rainwater which enters the reuse facility via the STP resulting in increased water volume for reuse.

Table 8: Reused Water Standard

	At Appraisal	
	Target Value	Standard
Water Reuse Facility	<10mg/l BOD	University of California: Irrigation water quality<10mg/l BOD

Table 9: Volume of Reused Water in Mactan（m^3/day, in 2007）

Planned	1,400
Actual	1,161 (compared with planned : 83%)

2.3.4 Solid waste treatment status

As mandated by the Philippine Clean Air Act (Republic Act No. 8749), the use of incinerators is prohibited. Accordingly, planned D/D was cancelled and no activities related to the solid waste treatment were carried out under the project. Solid waste is treated by segregation, recycling, and disposal to waste disposal sites approved by DENR by the authorized contractors in all ECOZONEs. No problems have been reported.

Table 10: Volume of Solid Waste (ton/day, in 2006)

	Mactan	Baguio City	Bataan
Disposed amount in the disposal sites	—	1.95	24

2.3.5 Internal rate of return

The Financial Internal Rate of Return (FIRR) at the time of appraisal was calculated with the costs as the project investment cost, additional operation and maintenance expenses that will increase due to the implementation of this project, benefits as charges for sewage treatment, and utility fee for reused water, for the project life of 25 years. FIRR was estimated at 6.5% for STPs and wastewater reuse facilities. Re-calculation of FIRR was not performed due to large changes in the project scope which makes it difficult to compare with that of the appraisal.

2.4 Impact

2.4.1 Number of and investments from locators

Sewage Treatment Plant in Bataan

As shown in Table 11, the number of locators has been increasing, in general, in all ECOZONEs. In Bataan, there was a slight fluctuation as some export-related companies transferred to ECOZONEs with better geographic conditions, as Bataan is located away from the Port. As the economy has grown steadily in recent years, investments in ECOZONEs have also increased. In the four ECOZONEs, total investments increased by more than 40% in 2006 compared with investments prior to this project (Refer to Table 12). Investments in Mactan have increased the most, but investments per locator are the highest in Baguio City.

Table 11: Number of Locators

	96	**97**	**98**	**99**	**00**	**01**	**02**	**03**	**04**	**05**	**06**
Mactan	87	99	105	107	110	112	108	119	127	118	125
Baguio City	11	12	11	11	12	13	14	14	17	17	16
Bataan	47	52	58	61	62	55	58	63	61	57	58
Cavite*(not includ. in project)	200	212	217	239	254	269	276	297	313	303	322
Total	**345**	**375**	**391**	**418**	**438**	**449**	**456**	**493**	**518**	**495**	**521**

Table 12: Annual Investments from Locators (million pesos)

	96	**97**	**98**	**99**	**00**	**01**	**02**	**03**	**04**	**05**	**06**
Mactan	0.36	0.66	0.64	1.10	3.74	0.84	0.12	2.38	1.90	2.34	3.26
Baguio City	0.12	0.00	0.02	0.02	1.44	3.25	0.35	0.00	1.14	3.17	2.34
Bataan	1.29	0.98	0.71	1.25	0.00	0.33	0.42	0.12	0.45	0.10	0.65
Cavite*(not includ. in project)	3.37	0.80	1.03	1.57	2.31	1.62	1.79	1.16	1.30	2.90	1.00
Total	**5.16**	**2.45**	**2.40**	**3.94**	**7.49**	**6.04**	**2.68**	**3.66**	**4.79**	**8.51**	**7.25**

2.4.2 Employment opportunities

Increased employment opportunities were observed during the project. In Mactan, 384 local people were employed at the peak of construction. Increased income in the local area during the project was also reported. The use of local accommodation by workers, supply of materials, sub-contractual work, rental equipments and supply of food contributed to the increased income. As shown in Table 13, employment has increased in the ECOZONEs every year since 2002, except for Bataan. In addition, it was also reported that employment opportunities in the area around the ECOZONEs had improved. The project also created employment during construction of the facilities and increased

employment opportunities to personnel involved in the administration and management of the environmental facility. Therefore, the project has brought about high economic benefits.

Table 13: Employment in ECOZONEs (1,000 persons)

	96	97	98	99	00	01	02	03	04	05	06
Mactan	32.1	34.9	36.6	38.1	41.3	40.5	38.0	39.9	43.4	45.3	47.9
Baguio City	3.7	3.9	4.1	4.4	4.8	4.1	3.7	3.7	4.1	4.7	5.5
Bataan	22.1	24.4	23.1	21.9	20.1	19.6	18.0	18.3	18.5	18.5	15.5
Cavite*(not includ. in project)	47.2	51.6	55.1	58.4	67.0	65.0	67.3	72.8	74.2	79.5	88.5
Total	**105**	**115**	**119**	**122**	**133**	**129**	**127**	**134**	**140**	**148**	**157**

2.4.3 Beneficiary assessment

A beneficiary survey was conducted in Mactan, Bataan and Baguio City (December 2007 to January 2008). Questionnaires were sent to tenant firms through PEZA requesting their response. Researcher follow-up and interviews were also performed. The surveys revealed that in all ECOZONEs, the project achieved effective environmental protection and the environmental management capability of PEZA improved. The following details the results:

In Mactan, the questionnaire was sent to all locators (110 firms) and valid responses were received from 33 firms[11]. Most companies answered that the improved sewage treatment services and wastewater reuse facility are effective measures in environmental protection and water resources conservation. 21% of the respondents said that the project has reduced production cost. The stable supply of industrial water, not having to establish a sewage treatment facility of its own, and reduction in the transport cost of bringing industrial water due to the availability of recycled water in the ECOZONE were reasons for the cost reduction. Twelve companies said that water supply became stable after the project, while eight companies said otherwise. The remaining 10 companies said they did not know if the project led to stable water supply. Those companies which responded negatively said that facilities had not yet started their full operations and that service charges had yet to be set. They indicated they would need to check data to confirm this issue. 70% of the respondents answered that PEZA's management ability had improved.

In Bataan, the questionnaire was sent to all 23 firms using the STP (23 of 58 firms).

[11] All firms who responded had already started their operation before the project (7 to 28 years). The profile on the number of employees is as follows: less than 20 persons = 2 companies; less than 20-100 persons = 5 companies; 100-500 persons = 15 companies; 500-2,000 persons = 6 companies; more than 2,000 persons = 5 companies. There are 29 companies with annual sales of more than 10 million pesos (88%).

All 23 firms returned the questionnaire and were followed-up by interviews[12]. Most companies said that the improved STPs are effective measures in environmental protection. Eight companies said that the project improved their productivity and increased their employment. It was indicated that an increase in employment ranged from 15 to 100 employees. 30% of the respondents indicated that the project also reduced production cost. 84% of the respondents answered that PEZA's management ability had improved.

In Baguio, the questionnaire was sent to eight companies using the STP (8 of 16 firms). Eight firms returned the questionnaire[13]. Most companies said that the improved sewage treatment services are effective measures in environmental protection. One company said that the project reduced production cost. 88% of the respondents answered that PEZA's management ability had improved.

2.4.4 Environmental and social impact

Construction was implemented under ECC's conditions which had been obtained prior to the start of the project. In all of the ECOZONEs, environmental monitoring, management and maintenance in the STP and wastewater reuse facility were outsourced to private agencies[14], which are required to submit the monitoring results to DENR and PEZA.

PEZA has focused on environmental protection and accordingly, has required each locator firm to implement a regular environmental audit by a specialist including air and water pollution, hazard waste management, solid waste disposal, and others, and to submit a report. PEZA directly oversees the situation on the management of wastewater and solid waste of locators[15].

The project completed the STPs in all of the ECOZONEs under PEZA and promoted environmental management, which has demonstrated that the facilities are good examples

[12] The firms have been operating in the ECOZONE from 1 to 31 years with 11 firms indicating that they have been operating for more than 10 years. The profile on the number of employees is as follows: less than 20 persons = 4 companies; less than 20-100 persons = 5 companies; 100-500 persons = 5 companies; 500-2,000 persons = 6 companies; and more than 2,000 persons = 1 company. There are 5 companies with annual sales of more than 10 million pesos, while 17 companies did not indicate their annual sales.

[13] The firms have been operating in the ECOZONE from 3 to 35 years with 6 firms indicating that they have been operating for more than 10 years. The profile on the number of employees is as follows: less than 20 persons = 1 company; less than 20-100 persons = 1 company; 100-500 persons = 2 companies; 500-2,000 persons = 3 companies; and more than 2,000 persons = 1 company. There are three companies with annual sales of more than 10 million pesos, while 5 companies did not indicate their annual sales.

[14] Refer to footnote 8.

[15] Following the enactment of the Special Economic Zone Act, the responsibility of the environmental impact assessment and the environmental monitoring of the locators was delegated to PEZA from DENR. PEZA is required to report to DENR when any problems arise.

of improvement and development of the economic zones. As a result, STPs are now required to be provided in private economic zones.

No relocation or land acquisition were conducted under the project.

Due to a reduction in the project scope and the low operating rate of the facilities, the benefit of the project is limited as opposed to the estimates at the time of appraisal. Therefore the effectiveness of the project is evaluated as low.

2.5 Sustainability (Rating: a)

2.5.1 Executing agency (Philippine Economic Zone Authority: PEZA)

PEZA was the executing agency for this project and the Policy and Planning Department managed the project implementation from its head office. After completing the projects, each ECOZONE is responsible for the management of operation and maintenance. At the start of the project, a Project Management Unit (PMU) was established in PEZA to conduct daily operations and monitoring of the project.

2.5.1.1 Operation and Maintenance system

The operation and management of facilities (STPs and water reuse facility) provided under the project is outsourced to a private agency which is to regularly monitor sewage under DENR standards and submit the monitoring results to PEZA and DENR. PEZA personnel trained on the operation and maintenance under the project oversee the private agency. PEZA requires locators to submit an environmental audit on air/water pollution, waste management, and etc., and monitors the audit results[16].

2.5.1.2 Technical capacity

Three personnel were selected from each ECOZONE to receive training on the operation and maintenance of facilities conducted by the contractors that constructed the STP and the wastewater reuse facility. In Bataan, at the time of ex-post evaluation personnel trained on the operation and maintenance, and private agencies in the other ECOZONEs were overseeing the operation and maintenance of the facilities based on the operation and maintenance manual. However, in Bataan, outsourcing to private agencies is planned after 2008. Neither problems regarding operation and maintenance nor breakdown of facilities have been reported.

Staff participated in trainings jointly conducted by contractors and consultants in order to secure safety and health, and to obtain skills in operation and maintenance management under the project.

[16] Refer to footnote 14.

"In-house" trainings, mainly on Clean Water Act, DAO 34 & 35 (Water Quality Standard and Laboratory Procedure) and Pollution Control, are regularly conducted by engineers in PEZA and DENR.

2.5.1.3 Financial status

As shown in Table 14, PEZA reported an income of about 20 billion yen in 2006 and profits of around 2 billion yen, thus its financial condition is excellent. PEZA's expenses are almost exclusively related to operation and maintenance in the ECOZONEs as indicated in Tables 14 and 15.

PEZA does not aim to profit on the management of STPs, and instead focuses on environmental protection to improve its service to the locator firms. And because STP management is being supported by PEZA's own funds, there are generally no particular problems regarding sustainability. According to the FS and study conducted in 2003, since the construction of a water reuse facility improves profitability, PEZA is planning to construct this type of facility using its own funds.

Table 16 shows the operation and maintenance expenses of the STPs[17]. In Bataan, as PEZA staff and a few private engineers assume responsibility for the operation and maintenance of the STP, the O&M expenses are lower than those in other ECOZONEs. PEZA is planning to contract a management company in 2008, and has budgeted 2.594 million pesos accordingly. The operation and maintenance cost of STPs in the four ECOZONEs accounts for 0.09% of the total operation and maintenance cost.

Table 14: Financial Condition of PEZA (1,000 pesos)

	2004	2005	2006
Income	4,987,961	6,601,103	7,586,844
Expenses	4,447,587	5,797,920	6,483,232
Profit	540,374	803,183	1,103,612
Other Income	－31,086	336,704	134,636
Taxes	150,263	361,932	425,620
Profit after Tax	**359,026**	**777,955**	**812,627**

Table 15: Breakdown of Expenses (1,000 pesos)

	2004	2005	2006
Personnel	237,846	482,124	276,609
O&M Expenses	4,209,741	5,315,796	6,206,623
Total	4,447,587	5,797,920	6,483,232

[17] O&M cost of the water reuse facility is included for Mactan.

Table 16: Operation and Maintenance Cost of STP (1,000 pesos)

ECOZONEs	2006	2007
Mactan	527	2,096
Baguio City	2,030	1,860
Bataan	737	890
Cavite* (not includ. in project)	2,230	2,650
Total	5,524	7,496

Baguio and Bataan have set sewage treatment charges at 4.8 pesos/m^3. Mactan has not yet set the charge, and thus, it does not collect any fees at the moment. However, PEZA has already discussed this issue in their board meeting, and the collection of charges is expected to start shortly. In 2006, income from sewage services was 0.37% of the total income (Refer to Table 17).

In Mactan, the setting and collection of charges for treated water reuse has not been implemented to promote the use of treated water. However, discussions are taking place on the service price issue at PEZA's Board, and it is believed that collection of charges will be implemented in the near future.

Table 17：Revenue from Sewage Treatment Services（1,000 pesos）

ECOZONEs	2006	2007
Mactan	--	--
Baguio City	--	2,020
Bataan	660	1,320
Cavite* (not includ. in project)	27,200	28,090
Total	27,860	31,430

2.5.2 Operation and maintenance status

The operation and maintenance of the facilities is entrusted to a private agency. The agency duly follows the operation and maintenance manual[18] to daily check and record problems on cleaning, lubrication, repair of the belt's backlash and propeller, and each aerator's performance. Spare parts are obtained and managed by the entrusted agency. For example, containers and tanks for chlorine gas are changed regularly. Pumps for sewage, spare pipes and manhole covers are obtained and changed as required. Bleach, etc. are ordered regularly and stocks are secured for a few months. Operation and maintenance of the facilities is good and any problems are reported.

The STPs and the wastewater reuse facility have introduced the Building Management System and computer programs for improved operation and maintenance, which control

[18] Check-ups are performed regularly according to the manual: for example, daily for aerator, every 3 months or every 2,500 working hours for lubrication, and every three years for sludge disposal.

the equipment such as in operation planning, running time, warning detectors and automatic on-off switch.

There are no problems with the capability and organization of operation and maintenance, therefore the project sustainability is considered high.

3. Feedback

3.1 Conclusion

The project relevance and sustainability are evaluated highly, however, the project efficiency is low and the benefits from the project were not fully realized. Thus the project is rated low.

3.2 Lessons learned

There are issues concerning data in the FS which are different from that of the appraisal report, therefore it is impossible to verify the base data and target index at the planning stage. It is desired that modified information as a result of the review during appraisal be recorded in the appraisal documents.

For agencies that are unfamiliar with ODA loans, the lending agency should assist the borrower on the procedures including procurement to avoid project delays.

As the timing of implementation for project components which are necessary for the project effect has a big impact on effectiveness, the executing agencies should always formulate a realistic plan. (One of reasons for the limited project benefits which affected effectiveness was that the construction of the sewage pipeline network was not included in the project scope.) In addition, JICA should also scrutinize the schedule and project scope.

3.3 Recommendations

N.A.

Comparison of the Main Issues at Planned/Actual

Item	Planned	Actual
(1) Output		
STPs	Mactan (New construction)	As planned (ODA loan)
	Baguio City (New construction)	As planned (PEZA own fund)
	Bataan (Rehabilitation)	As planned (PEZA own fund)
Wastewater Reuse Facilities	Mactan (New construction)	As planned (ODA loan)
	Baguio City (New construction)	Postponed
	Cavite (New construction)	Postponed
Environment Management Equipment for the ECOZONEs	Procurement	Cancelled
Consultant Services	International : 180M/M Local : 399M/M 1. D/D, construction supervision, and other tasks for STPs（Mactan, Baguio City, Bataan） 2. D/D, construction supervision and other tasks for wastewater reuse facilities 3. D/D, and other tasks for wastewater reuse facilities（Mactan, Baguio City, Bataan, Cavite） 4. Capacity building 5. Urgent planning of engineering services of ECOZONEs	International : 49.2M/M Local : 603M/M 3. As planned 4. As planned in Mactan（Postponed in Baguio City and Cavite） 3. Cancelled - RA8749(Clean Air Act, 1999) prohibits incinerators. 4. As planned 5. Cancelled
(2) Project Period	March 1997 – February 2001 (4 years)	March 1997 – July 2005 (8 years and 5 months)
(3) Project Cost		
Foreign Currency	2,746 million yen	534 million yen
Local Currency	357 million yen (89 million pesos)	636 million yen (292.8 million pesos)
Total	3,103 million yen	1,170 million yen
ODA Loan Portion	2,746 million yen	534 million yen
Exchange Rate	1 peso＝4 yen (in 1997)	1 peso＝2.17 yen (average of 1997-2005)