

Ex-post Evaluation of Japanese Technical Cooperation on The Project for Promoting Energy Efficiency Improvement in Sri Lanka

External Evaluator: Mayumi Hamada

Foundation for Advanced Studies on International Development

0. Summary

This project was implemented to strengthen the organization of the Sri Lanka Sustainable Energy Authority (hereafter SLSEA) in order to promote the energy efficiency activities of general households, private companies, and public and governmental organizations in all of the country's urban, agricultural, and estate areas. Relevance is high: energy efficiency and conservation is consistent with the developmental needs of Sri Lanka because it depends on imports for most of its energy resources, and the consistency with its development policy as well as Japanese aid policy is high. Also, effectiveness/impact is at a medium level, because the achievement of the project Purpose and the outputs are at a medium level. Efficiency is fair, since the cost borne by the JICA side exceeded the planned amount, while the quality, quantity, and timeliness of the inputs were adequate for the achievement of the outputs and the project purpose. Sustainability is fair, as there are some concerns regarding the technical aspect, while sustainability in policy, organizational, and financial aspects are high. In light of the above, this project is evaluated to be partially satisfactory.

1. Project Description



(Project Location)



(Provided equipment for energy audit)

1.1 Background

Sri Lanka depends on imported petroleum, which is 62% of the country's total generated energy. The electricity price is high compared with other Asian countries,

which particularly impedes enhancement of the competitiveness of its export industry, which competes with other Asian countries in overseas markets. As there are certain limits in new construction of electric power plants, Sri Lanka's government was concerned that the country might fall into a severe electricity shortage in the future. Under these circumstances, energy efficiency was an urgent task for Sri Lanka to promote. Hence, the Sri Lanka Sustainable Energy Authority Act (hereafter, SLSEA Act) was enforced in October 2007. SLSEA was established as the implementing organization for promoting renewable energy development and energy efficiency policy, and was authorized for related regulations. As for SLSEA's specific responsibility and authority, establishment of energy efficiency benchmarks for private companies and public organizations, introduction of accreditation system of Energy Managers and Energy Auditors and ESCOs, etc. were stipulated in the legislation.¹ Under these political circumstances, the country formally requested cooperation for a technical cooperation project named "Project for Promoting Energy Efficiency Improvement in Sri Lanka," in order to introduce Japan's advanced technology and knowledge on energy efficiency. Hence, the request was accepted and this project was started in May 2008 for a three-year period.

1.2 Project Outline

| | | |
|-----------------|----------|--|
| Overall Goal | | High efficiency in energy consumption is achieved. |
| Project Purpose | | Infrastructure necessary for materializing energy efficiency activities in the country is enhanced. |
| Output(s) | Output 1 | Necessary resources (rules and regulations, human resources, equipment and materials) for implementing the SLSEA Act are prepared. |
| | Output 2 | Incentive/disincentive mechanism for promoting energy efficiency is prepared. |
| | Output 3 | Mass consciousness is created among general public, private, and public sectors on energy efficiency improvement. |
| Inputs | | <p>Japanese Side:</p> <ol style="list-style-type: none"> 1. Experts <ul style="list-style-type: none"> • 11 fields (56.43M/M) 0 M/M for Long Term 56.43 M/M for Short Term 2. 22 trainees received (22 for counterpart training in Japan) 3. 0 trainees for third-country training programs |

¹ Preliminary study report (P9)

| | |
|-----------------------------|--|
| | <p>4. Equipment: \$302 thousand USD and 2.3 million yen</p> <p>5. Local cost: 40 million yen</p> <p>Sri Lanka Side:</p> <p>1. 15 counterparts</p> <p>2. Facilities and equipment (facilities for office work, installation and operation of equipment, seminar and meeting rooms)</p> <p>3. Local cost</p> |
| Total cost | 346 million yen |
| Period of Cooperation | May 2008–April 2011 |
| Implementing Agency | Sri Lanka Sustainable Energy Authority (SLSEA) |
| Cooperation Agency in Japan | J-Power |
| Related Projects | <ul style="list-style-type: none"> • E-FRIEND II² (yen loan) • Sustainable Power Support Project (ADB) (It includes “Implementation of Energy Efficiency Policy Initiatives—Sri Lanka” in its technical assistance component.) • Sustainable Guarantee Facility (USAID) • Promotion of Eco-efficient Productivity (PRP) Project (implemented by Ceylon Chamber of Commerce, supported by Dutch Embassy) |

1.3 Outline of the Terminal Evaluation

1.3.1 Achievement of Project Purpose at the time of the Terminal Evaluation

As for Indicator 4, the “penetration rates of CFLs³ at households” drastically surpassed the target level. Concerning Indicator 5 (the “10-year Plan for EE&C”), it had been approved by SLSEA’s board of directors and was going through the Ministry’s approval process during the project completion period. On the other hand, it was pointed out that the remaining indicators would hardly be achieved by the project completion, due to the delay in legalization and unsuccessfulness of introducing new

² Formal name of E-Friend II is Environmentally Friendly Solutions Fund. Its purpose was to promote private companies’ investment in plant and equipment for environmental measures and improve environment by prevention and mitigation of pollution. Investment for Energy Efficiency was also included as the target of the Fund.

³ CFL stands for Compact Fluorescent Lamp, which is a type of fluorescent lamp in the shape of bulb. It is a fluorescent lamp which can utilize socket of incandescent light bulb, and consists of integrated inverter lighting circuit of the same kind of fluorescent lamp and bent small fluorescent lamp. A CFL consumes less electricity compared with an incandescent lamp with the same brightness.

financial scheme.

1.3.2 Achievement of Overall Goal at the Time of the Terminal Evaluation

With regards to Indicator 1, among the indicators for overall goal; i.e., “Energy consumption efficiency converted into commercial energy (Commercial Energy Intensity⁴) is reduced to 1.8 TOE/Million Rs. By 2017,” it was judged that the prospect of the achievement by 2017 was good, because the commercial energy intensity was certainly improving. As for Indicator 2; i.e., “Electricity load factor is increased annually by 1%,” it was indicated that the figure shows the general tendency of improvement, although the recent rate is slightly less than the annual target figure of 1%. The probability of achieving Indicator 2 was not clearly shown. Besides, contribution to the formulation of the program CDM⁵ in the country, as well as the methodology for raising awareness, which has the potential to be utilized by other technical cooperation projects, was mentioned as other positive impacts.

1.3.3 Recommendations at the time of the Terminal Evaluation

Seven recommendations were made, which were categorized into two; i.e., those which needed to be addressed with urgent actions and those which required continuous efforts. The achievement of each recommendation is shown below.

Table 1: Recommendations at Terminal Evaluation and Achievements

| No | Recommendations | Achievement by the time of Ex-post Evaluation |
|---|--|---|
| (Recommendations that Require Urgent Actions) | | |
| 1 | Early enforcement of regulation by scrutinizing the legal compliance and obtaining cabinet approval as soon as possible (mandatory energy reporting; accreditation of energy managers and energy auditors) | Regulations on all three points were enforced in July 2011 (3 months after the project completion). |
| 2 | Filling the three vacant posts at the | The post of Head, Monitoring and |

⁴ Commercial Energy Intensity is a standard measure of efficient use of commercial energy in a country (Terminal evaluation report P18). While Energy Intensity means energy is energy consumption index for GDP, Commercial Energy Index excludes primary energy. This Indicator was revised as the result of Mid-term Review, because including primary energy such as biomass, etc. into the target was regarded as inappropriate considering the country’s situation.

⁵ CDM stands for Clean Development Mechanism. It is a mechanism in which advanced countries with emission reduction commitment of the greenhouse effect gas which leads to global warming can apply the amount of the gas reduced in emission-reduction projects in developing countries where they provided technical and financial support, to the reduced amount of their own (advanced countries).

| | | |
|---|---|---|
| | management level of the Energy Management Division, SLSEA | Verification is still vacant at the time of ex-post evaluation (for studying abroad). |
| 3 | Sharing the results of the pilot projects (CFL promotion and pump replacement of National Water Supply and Drainage Board) among the stakeholders and reach consensus about the future actions to be taken. | The results were shared but consensus on actions to be taken was not made. |
| 4 | Capacity enhancement of the project management unit, SLSEA, as well as improvement of financial scheme for energy efficiency and conservation (hereafter EE&C) by implementing the following: (1) Facilitating at least 10 showcase projects in 2011 and adding experience in fund management and project implementation in EE&C (2) Proactively adding staff who have experience in loan operations to the project management unit | Financing for EE&C has not been promoted, nor has the financial scheme for EE&C been improved. |
| (Recommendations that Require Continuous Efforts) | | |
| 5 | To implement monitoring and verification of the new schemes to be introduced (labeling system, etc.) | A survey on CFLs with “energy efficient” labels in stores was conducted in November 2013 (94% of CFLs were labeled). |
| 6 | Annual assessment of impact/effect of EE&C promotion | Achievement could not be confirmed as the specific content of the recommendation was not clear. |
| 7 | Reviewing the 10-year EE&C plan periodically and formulating a middle-term financial plan under the supervision of the Ministry of Power and Energy | The 10-year EE&C plan was approved in 2013 (the supervising ministry was changed to the Ministry of Environment and Renewable Energy), and has not been reviewed. |

Source: The Terminal Evaluation Report for the recommendations, Questionnaire and Interview Surveys to SLSEA for the achievement

2. Outline of the Evaluation Study

2.1 External Evaluator

Mayumi Hamada, Foundation for Advanced Studies on International Development

2.2 Duration of the Evaluation Study

This ex-post evaluation survey was conducted as follows.

Duration of the Study: October 2013–October 2014

Duration of the Field Study: January 26, 2014–February 15, 2014

April 30, 2014–May 8, 2014

3. Results of the Evaluation (Overall Rating: C⁶)

3.1 Relevance (Rating: ③⁷)

3.1.1 Relevance to the Development Plan of Sri Lanka

At the time of the preliminary study, the importance of promoting energy efficiency was stressed in the National Energy Policy & Strategy of Sri Lanka, which was enacted on May 11, 2008. During the implementation period until the project completion, a long-term national objective to reduce energy consumption by 8.7% by 2020 was also clarified, with the direction toward promoting the usage of energy-efficient electric light bulbs, “energy efficient” labels on electric appliances, energy-efficient design of buildings, etc., as shown in “Mahinda Chintana—Vision for the Future,” which was revised in 2010. Therefore, it is assessed that promoting energy efficiency had been consistent with the development policy of Sri Lanka since the time of the preliminary study until the project completion.

3.1.2 Relevance to the Development Needs of Sri Lanka

Sri Lanka has been enjoying annual economic growth of greater than 6%. Because demand and supply of oil has been tight, however, it was an urgent task for Sri Lanka to promote energy efficiency and convert its present system into a more energy-efficient social and economic structure. This situation did not change through the project completion. Thus, the consistency between the project direction and the development needs was high.

3.1.3 Relevance to Japan’s ODA Policy

⁶ A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

⁷ ③: High, ② Fair, ① Low

The “Basic Energy Plan,” which was enacted in March 2007 and based on Japan’s Basic Act on Energy Policy, pointed out that international cooperation on energy efficiency will significantly contribute to relief and stability of energy demand and supply, as well as global environment conservation, such as global warming, etc. It also indicated that it was necessary for Japan, which has achieved the world’s highest level of energy efficiency, to positively promote international cooperation on energy efficiency in Asian countries, where huge amounts of energy are consumed and energy efficiency is low. In the Country Assistance Program for Sri Lanka, it was emphasized that an efficient energy policy that brings the national development into perspective was necessary as a part of support for “the improvement of economic infrastructure.” Since promotion of energy efficiency is an important means for energy policy besides improvement of the electricity supply infrastructure, its consistency with the above Country Assistance Program is high. Moreover, this project was positioned in the “Electricity Program” of the JICA Country Program for Sri Lanka. Therefore, the consistency with the Japan’s ODA Policy is also high.

3.1.4 Appropriateness of the Project Plan and the Approach

In this project, some of the indicators of the objectives, such as outputs, project purpose, and overall goal, were not achieved within the predetermined timeframe, although all planned activities were implemented. The major reason for this was inappropriate setting of the target level and timeframe of the indicators. The setting of those indicators were not regarded as realistic enough in view of the time required for legalization in the country and the three-year cooperation period, considering the following were set as the indicators of the outputs of the project: introduction of an Annual Reporting System of Energy Consumption, which presupposes legalization, as well as fostering energy auditors and allocating energy managers at companies, which can be realized by training and accreditation only after the accreditation systems are legalized.

On the other hand, the major reason why the activities of this project were smoothly implemented was the influence of the counterpart training in Japan during the first year, in which senior management staff of the counterpart organization and major related organizations participated. As the result, major senior stakeholders recognized the importance of the problem by sharing the latest information on advanced cases for promoting energy efficiency, hence the project’s direction was clearly shared between both countries’ teams. This led to good communication among the stakeholders and prompt actions by the counterpart organizations.⁸

⁸ SLSEA, ex-Japanese expert hearings

Based on the above, this project has been highly relevant to the country's development plan, development needs, as well as Japan's ODA policy. Although setting the indicators was slightly problematic, the counterpart training in Japan was effectively implemented, because care was taken to enhance its effects. Therefore, its relevance is high.

3.2 Effectiveness and Impact⁹ (Rating: ②)

3.2.1 Effectiveness

3.2.1.1 Project Output

The achievement of the indicators for each output at the time of the project completion is shown in Table 2.

- (1) Output 1: Necessary resources (rules and regulations, human resources, equipment and materials) for implementing the SEA Act are prepared.

Although there are five indicators for Output 1 on the PDM,¹⁰ improvement of the equipment bank and IT infrastructure were also regarded to be in the same position; i.e., indicators of Output 1, in view of the related project documents.¹¹ Hence, the above two are added as the indicators for measuring Output 1 in addition to the indicators shown on the PDM. Concerning the achievement of the seven indicators, three of them were achieved within project duration, three others were not achieved, and one was achieved to the middle level, as shown in Table 1. Indicators 1, 3, 4, and 5 can be achieved only after related systems are legalized; therefore, the fact that they could not be legalized within the project duration became hindrance factors against Output 1. On the other hand, however, all the planned activities were finished by the project completion; and, for some indicators, such as Indicator 1, legalization was completed three months after the project completion, which is not regarded as a serious delay. Also, the organizational infrastructure of SLSEA was established to a certain level, considering the achievement in formulating an annual energy reporting system, drafting an accreditation system and a training methodology for energy auditors and energy managers, improvement of the equipment bank, and establishment of an IT

⁹ Sub-rating for Effectiveness is to be put with consideration of Impact.

¹⁰ PDM stands for Project Design Matrix. It is a matrix to show the overview of a project plan, which clarifies objectives, activities, important assumptions, objectively verifiable indicators, etc., and the logical relationship among them. It is also called as Logical Framework.

¹¹ Preliminary and R/D Report (P21), The project completion Report (P8)

Table 2: Achievement of Outputs by The project completion (April 2011)

| Outputs | Objectively Verifiable Indicators | Achievement | Level of Achievement | |
|---|-----------------------------------|---|--|-----|
| Output 1: Necessary resources (rules and regulations, human resources, equipment, and materials) for implementing the SEA Act are prepared. (△) | ① | A mandatory annual energy consumption reporting scheme is introduced to industrial, commercial and public institutions, of which electricity consumption is larger than 250,000kwh/month. | It was not achieved within the project duration (though it was legalized 3 months after the project completion and was introduced the following year; i.e., in 2012). It was legalized after the minimum amount of energy consumption was changed to 50,000kwh/month in order to cover a larger number of companies and organizations. | × |
| | ② | Report on “energy consumption baseline analysis” is documented and updated every year. | The report was updated every year, after it was produced in the first year. At the times of updating (twice), the reports were not published as printed materials, but were updated in the database. | ○ |
| | ③ | 6 energy auditors are accredited. | There were no accredited energy auditors within the project period, since the accreditation system was not legalized (though it was legalized in 2013 and 6 auditors were accredited for the first time). | × |
| | ④ | Accredited energy managers are appointed in 150 organizations in public and private sectors. | They were not accredited or appointed by the project completion, as the reporting and accreditation systems were not legalized during the project’s duration (though, after the project completion, 142 energy managers were accredited in 2012 and 35 in 2013, while 138 energy managers were appointed in 2012 and 29 in 2013). | × |
| | ⑤ | Mandatory labeling systems are introduced for 3 prioritized appliances (CFLs, ballasts, and fans). | One (CFL) of the three kinds was realized within the project period (although labeling for ceiling fans was legalized in 2013, it has not been prevalent in the markets at the time of ex-post evaluation due to delay in testing). | △ |
| | ⑥ | The extent the equipment bank was expanded (It is positioned as one of the intended indicators based on the related documents, although it is not written in the PDM.) | The equipment bank was strengthened and increasingly utilized every year, although some equipment had some issues. It receives mostly good reviews from the users. | ○ |
| | ⑦ | The extent the IT infrastructure was established (same as above) | The infrastructure of IT software and information dissemination was established through the development of software on energy efficiency, databases on the Web, and an online reporting system for the annual reports. | ○ |
| Output 2: Incentive/dis-incentive mechanism for promoting energy efficiency is prepared. (×) | ① | Number of projects on energy efficiency improvement, approved for finance, increased by 10%. | It was not achieved. The proposal for a new financial scheme was dismissed and was not resubmitted. | × |
| | ② | More than one incentive/disincentive schemes for appliances with “energy efficient” labels are introduced. | It was not achieved. Pilot projects were implemented that could not pave the way for the full-scale implementation of the financial scheme or incentive system that was intended by the project. | × |
| Output 3: Mass consciousness is created among general public, private and public sectors on energy efficiency improvement. (○/△) | ① | Five different types of education materials are prepared and utilized (posters, leaflets, booklets, CDs, and videos). | 19 kinds of educational materials on energy efficiency (10 posters, 5 leaflets, 2 booklets, 2 CDs/videos) were developed and utilized at exhibitions, events and special programs at schools. | ○ |
| | ② | Number of applications for the existing national energy award increased by 10% each year. | The number of applications was 15 in 2008, 51 in 2010, 24 in 2011, and 31 in 2012 (it was not held in 2009 due to the election). This goal was achieved in every year except 2011; the year prior to that, 2010, had the largest number of applications. | ○/△ |
| | ③ | Penetration rate (at least one bulb per household) of CFLs grows to more than 40% in every sub-sector; namely, urban, rural | As this indicator is a duplicate of Indicator 4 in the project purpose, it is assessed at the project purpose level instead of Output 3. | — |

| | | | |
|--|--|-------------|--|
| | | and estate. | |
|--|--|-------------|--|

Source: Produced based on document review, hearing, questionnaire survey results

Remarks: 1. The symbols in the "Level of Achievement" column show the following:

○ Achieved ○/△ Mostly achieved △ Middle level × Not achieved – Not applicable

2. "Finance" above means financial schemes such as E-FRIEND II, Sustainable Guarantee Fund, Sri Lanka Sustainable Energy Fund, etc.

Table3: Achievement of Project Purpose by The project completion (April 2011)

| Project Purpose | Objectively Verifiable Indicators | Achievement | Level of Achievement |
|---|---|--|----------------------|
| Infrastructure necessary for materializing energy activities in the country is enhanced. (○/△) | ① Mandatory energy audits, monitoring, and follow-up are conducted annually in at least 150 organizations in the private and public sectors. | Energy audit was not mandated. The data on monitoring and follow-up does not exist. On the other hand, the number of borrowers at the equipment bank increased to 109 in 2010 and 131 in 2011, which indicates an increase in the number of audits and monitoring. | △ |
| | ② Amount of investment in energy efficiency and conservation is increased at least by 10%. | It was not achieved. | × |
| | ③ All the CFLs, ballasts, ¹² and fans in markets have "energy efficient" labels. | One (CFL) out of the three kinds was realized during the project duration. | △ |
| | ④ Penetration rate (at least one bulb per household) of CFLs in household sector grows to more than 40% in every sub-sector, namely urban, rural, and estate. | It was mostly achieved by the project completion because the penetration rate (at least one bulb per household) of CFLs surpassed 40% in general households in both urban and rural areas, and is also increasing in estate areas. | ○/△ |
| | ⑤ 10 year plan for EE&C is authorized by the ministry. | It was not achieved by the end of the project period. The draft plan was formulated and approved by the SLSEA's board of directors during the project duration; approval by the ministry, however, was not completed. | × |

Source: Produced based on document review, hearing, questionnaire survey results

Remarks: The symbols in the "Level of Achievement" column show the following:

○ Achieved ○/△ Mostly achieved △ Middle level × Not achieved – Not applicable

Table 4: Achievement of Overall Goal by The project completion (February 2014)

| Overall Goal | Objectively Verifiable Indicators | Achievement | Level of Achievement |
|---|--|--|----------------------|
| High efficiency in energy consumption is achieved. (△) | ① Commercial energy intensity is reduced to 1.8 TOE/Million Rs. by 2017. | It has not been achieved, according to the latest data available at the time of ex-post evaluation (11.2 TOE/Million Rs. in 2012). On the other hand, as the target amount of the indicator is for 2017, it is difficult to simply apply the actual value to measure achievement. Considering the trend starting from the pre-project period, the amount declined from 2004 to 2009, while it has been slightly increasing since 2010. Thus, it is hard to say that the change has been brought about as a project effect. | × |
| | ② Electricity load factor is increased annually by 1%. | It has been achieved or mostly achieved since the 2 nd year of the project duration, except for the 1 st year of the project period and 2011, although there is some fluctuation. Also, looking at the tendency for the 10-year period, the gap between the increase and decrease has diminished after the project started, compared with the period prior to commencement. | ○/△ |

Source: Produced based on document review, hearing, questionnaire survey results

Remarks: The symbols in the "Level of Achievement" column show the following:

○ Achieved ○/△ Mostly achieved △ Middle level × Not achieved – Not applicable

¹² Stabilizer It is a device for converting voltage and maintaining electric current in order to light a lamp.

infrastructure, except for introduction of a financial system. Therefore, the achievement of Output 1 is fair.

(2) Output 2: Incentive/disincentive mechanism for promoting energy efficiency is prepared.

Output 2 intended to establish financial mechanisms for promoting energy efficiency by setting up a low-interest loan scheme for private companies and a purchase support system of energy-efficient electric appliances for general households. However, both of the indicators for Output 2 were not achieved. In order to achieve the target for Indicator 1, a draft plan of a new loan scheme for supporting energy efficiency was submitted to the Ministry of Finance in 2010 but dismissed due to insufficient capacity of SLSEA to manage the fund as well as some issues on the provisional estimate of the financial scheme. Also, with regard to Indicator 2, two pilot projects, CFL distribution as well as replacing NWSDB water pumps, were implemented. However, neither of them could pave the way for the full-scale implementation of the financial scheme or incentive system that was intended by the project. After the proposed plan was dismissed by the Ministry of Finance, a new proposal was not submitted by SLSEA, since the government changed its direction so that the financial scheme to promote energy efficiency of private companies was regarded as an issue to be covered by banks instead of the government. Thus, Output 2 was not achieved.

(3) Output 3: Mass consciousness is created among general public, private, and public sectors on energy efficiency improvement.

Indicator 3 for Output 3 (penetration rate of CFLs) is the same as Indicator 4 for the project purpose, which is logically inconsistent. Also, diffusion of CFLs is regarded to be achieved as the result of enhanced mass consciousness on energy efficiency. Hence, Indicator 3 for Output 3 is not utilized in the evaluation but is replaced by Indicator 4 for the project purpose in order to avoid duplication. Therefore, there are two indicators for Output 3. Because Indicator 1 was achieved and Indicator 2 was mostly achieved, Output 3 is assessed to be mostly achieved.

3.2.1.2 Achievement of Project Purpose

The achievement of the indicators of the project's purpose by the end of the project cooperation period is shown in Table 3.

- (1) Indicator 1: mandatory¹³ energy audit, monitoring, and follow-up are conducted annually in at least 150 organizations in private and public sectors.

The data on energy audits, monitoring, and follow-ups at private companies and public organizations is neither available at SLSEA nor handled by any organization in the country. Thus, the actual value of Indicator 1 does not exist. On the other hand, the “mandatory energy audit” included in Indicator 1 was not realized by the end of the project. The “mandatory” audit itself is regarded as unnecessary, considering the situation of the country because SLSEA can administratively guide companies whose performance in energy consumption is problematic based on the latest data and improves their performance without a mandatory audit. SLSEA can receive the latest data on energy consumption from major companies and public organizations once the energy reporting system is on track.¹⁴ Indicator 1 includes implementation of an annual energy audit, which is unrealistic because it is not common in Sri Lanka for an energy audit to be conducted every year, even at major companies.

Therefore, this indicator was not achieved. However, the indicator cannot be utilized to assess the achievement of the project purpose because some parts of the indicator are not appropriate.

- (2) Indicator 2: investment in energy efficiency and conservation has increased by at least 10%.

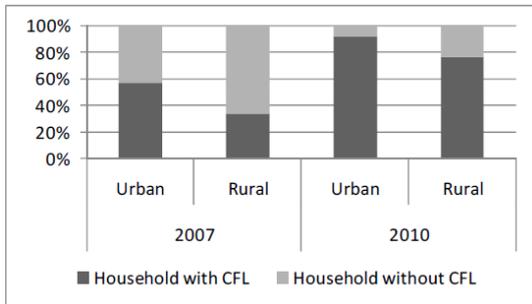
Indicator 2 was not achieved during the project. Output 2 concerned the establishment of new financial schemes to promote investment in energy efficiency, and after E-FRIEND II was completed, no similar scheme existed. For private companies, the interest rate on loans from general banks is high, which results in difficulty promoting investment in energy efficiency.

- (3) Indicator 3: all CFLs, ballasts, and fans in markets have “energy efficient” labels.

Only CFLs were achieved by the end of the project. The rest (ballast and

¹³ Although the word “mandatory” does not appear in the Japanese version of PDM, “mandatory energy audit” is included in the English version of PDM, on which both countries agreed upon. It was confirmed through hearings to the persons concerned also that the project initially intended to realize mandatory energy audit.

¹⁴ SLSEA hearing



Source: Terminal Evaluation Report (data offered by SLSEA)

Figure 1: Penetration rate of CFLs (urban and rural areas)

ceiling fan) were unachieved. Factors promoting “energy efficient” labels on CFLs during the project are like many preceding programs¹⁵ implemented to provide a foundation. Significant changes in terms of legal force toward manufacturers as well as the stance of sellers on purchase and sale were made through activities related to Output 1 of the project.

Some of the preceding programs did not intend to legalize mandatory labeling, but the approach did not result in the diffusion of “energy efficient” labels because it could not accelerate positive participation of manufacturers.¹⁶

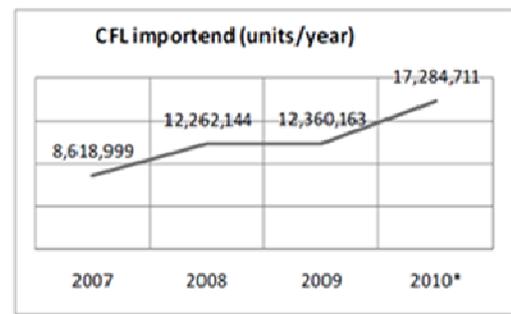
Table 5: Amount of Purchased CFLs in Estate

(Unit : piece)

| CFL sales in 2009 | CFL sales in 2010 |
|-------------------|-------------------|
| 157,882 | 184,550 |

Source: Terminal Evaluation Report (Data provided by SLSEA)

Remarks: Targeted estate area was Bandarawela, Passara, Nuwara Eliya, and Hatton.



Source: Terminal evaluation report (data offered by SLSEA)

Figure 2: Imported CFLs

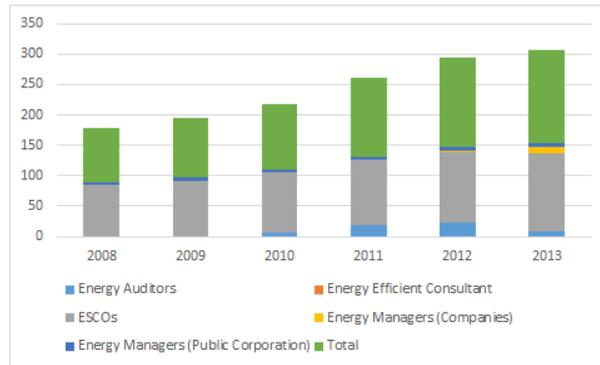
¹⁵ Utility Driven CFL Promotion Program (1995-2003, Ceylon Electricity Board (hereafter, CEB)), which intended to enhance diffusion of CFLs by making CFLs more accessible to consumers with lower price by utilizing loan scheme, and Energy Labeling Program (2000 – 2004), which was aimed at enhancing “energy efficient” labels (without mandatory labelling).

¹⁶ Energy Labeling Program (CEB, Sri Lanka Standard Institute (hereafter, SLSI), National Energy Research and Development Center (hereafter, NERDC)) developed “energy efficient” labels on CFLs, but it did not lead to the incentives of the sellers side because it was not mandatory but voluntary. In order to cope with this situation, CEB put condition for the loan to put energy efficiency labels on CFLs. However, the amount of CFLs with “energy efficient” labels gradually decreased after the loan scheme was completed in 2004 (Sri Lanka Country Report on Energy Efficiency Improvement & Conservation 2009 Wickramasinghe).

- (4) Indicator 4: penetration rate (at least one bulb per household) of CFLs in the household sector is more than 40% in every subsector—namely, urban, rural, and estate.

Indicator 4 was mostly achieved at the project completion. The penetration rate of CFLs significantly surpassed the target level (i.e., 40% in urban and rural areas. The purchased amount of CFLs in the estate area shows a certain level of increase while the import of CFLs increased in 2010 by approximately 40% compared with the previous year after the legalization of “energy efficient” labels on CFLs.

(Unit: persons)



Source: SLSEA Questionnaire Survey

Figure 3: The number of borrowers of Equipment Bank

Among the activities for Output 3 (creation of mass consciousness among general public and private sectors on energy efficiency improvement) were the development of educational materials such as leaflets and posters, distribution of the materials at the events organized by SLSEA, uploading the leaflets to the SLSEA website, development of educational materials for elementary pupils, and distribution to schools (which were utilized at special programs). The information on CFLs is included in these materials. However, the effect of SLSEA’s activities to create awareness of the energy efficiency of general households was low. According to the questionnaire to the residents at the time of the ex-post evaluation, the ratio of residents who had seen the leaflets, posters, and information on the SLSEA website on energy efficiency was 36.1% in urban areas, 2.8% in rural areas, and 0% in estate area.

- (5) Indicator 5: ten-year plan for EE&C is authorized by the ministry.

Indicator 5 was not achieved by the project completion. Although the draft of the ten-year plan for EE&C was formulated during the project period and was approved by the board of directors of SLSEA, it was not approved by the ministry by the project completion as the procedure took much time.

Based on the above points, effectiveness of the project is assessed as fair for the following reasons.

- Achievement of the Output Level

Output 1 was achieved at the medium level, Output 2 was not achieved, and Output 3 was mostly achieved (Table 2). Considering that this project started soon after the establishment of SLSEA and was aimed at institution and capacity building, Output 1 is regarded as most important from the viewpoint of organizational infrastructure. Achievement of Output 1 remained at a medium level mostly due to the delay in legalization of some systems, but the draft for legislation was completed during the project, including the technical aspects. Also, some of the delays (e.g., Indicator 1, which was achieved three months after the project completion) are not regarded as serious. Though a financial scheme of Output 2 was not introduced, organizational infrastructure was established to a certain level—formulating drafts of the legislative bills for the annual reporting system, the accreditation system of energy auditors and energy managers, establishment of training approaches for energy auditors and energy managers, and expansion of the equipment bank and IT Infrastructure. Therefore, the achievement of the output level is assessed to be fair.

- Achievement of the Project Purpose

Among the five indicators for the project purpose, Indicator 2 was not achieved, Indicator 4 was mostly achieved, and the achievement of other 3 indicators the rest was medium (Table 3). Although data for Indicator 1 does not exist, certain improvement is observed except for some elements inappropriate for an indicator. Indicator 3 was partly achieved. Though the formulation of the substantial plan and its approval by SLSEA's board of directors were completed during the project, Indicator 5 was not achieved because of the time required for the procedures for approval in the ministry.

Among the five indicators, Indicator 4 (improvement of the diffusion of CFLs) was regarded as the most important due to the country's energy environment, in which the ratio of electricity consumption of households compared with that of industry is high due to its being an agricultural country. The project prioritized promotion of energy efficiency of electricity consumption in households and covered both households and industry. The share of electricity demand of the country at the time of planning was 38% for the industry and 39% for households, which shows that the ratio of electricity demand for households against that for industry is higher compared with that of other

countries.¹⁷ Furthermore, demand for the suppression of electricity, especially of lighting in households, was recognized as urgent issue because efficiency of utilization of electric power plants decreased based on the concentration of electricity consumption in the evening (around 6:00 p.m. to 8:00 p.m.), due to the high demand for lighting—that is, 42% in households.¹⁸ It was also confirmed through hearings with government officers and ex-Japanese experts who were involved with the project throughout the planning and implementation stages that this project planned to suppress electricity demand, especially in households, to address the above-mentioned issue. Hence, it is appropriate to assess achievement of the project purpose by considering that Indicator 4—which is directly connected with the above-mentioned issue—as mostly achieved. The achievement level of the project purpose is thus assessed as fair.

- Promoting and Hindering Factors

Although some indicators such as the increase in investment in energy efficiency (Output 2) were not achieved, the number of energy audits and monitoring using the equipment bank increased, which contributed to the achievement of the project purpose. The legalization of mandatory “energy efficient” labels of CFLs had the CFLs in the markets labeled during the project. And the penetration rate of CFLs, which would be directly connected to the reduction of electricity consumption in households, with a special emphasis in this project, significantly increased. Furthermore, the planning and implementation of the National Energy Award motivated companies and accelerated their promotion of energy efficiency activities. On the other hand, being unable to establish a financial scheme for companies’ investment in energy efficiency hindered achieving the project purpose while the contribution of IT infrastructure to the project purpose was insufficient. Considering the three-year project cooperation period, the major reasons some the indicators were not achieved were insufficient analysis at the planning stage of the necessary duration for legalization and setting the target level too high.

Based on the above reasons, the achievement of the project purpose is assessed as fair.

3.2.2 Impact

¹⁷For reference, the ratios of electricity consumption of households and industry in the composition of the electricity consumption by sectors(in 2011) in India, 22.0% for households and 44.8% for industry, while in China, 14.6% for households and 68.7% for industry (Japan Electric Power Information Center, Inc. http://www.jepic.or.jp/data/gl_date/gl_date06.html).

¹⁸ Document provided by JICA

3.2.2.1 Achievement of Overall Goal

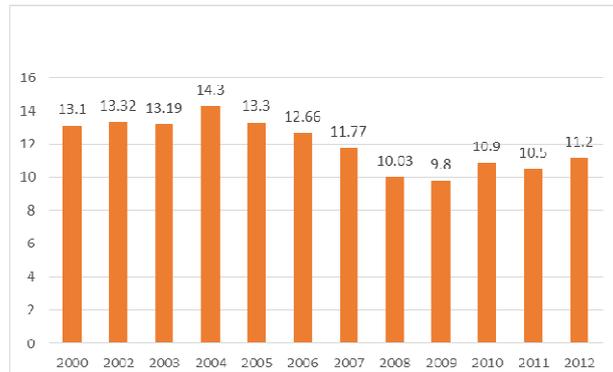
(Unit: TOE/Million Rs.)

The achievement of the overall goal at the time of the ex-post evaluation is shown in Figure 4.

- (1) Indicator 1: commercial energy intensity will decrease to 1.8 TOE/million Rs. by 2017.

As the timeframe of this indicator is 2017, the target figure is not appropriate to be applied at

the time of the ex-post evaluation. However, in 2012, when the latest data was available at the time of ex-post evaluation, the indicator was not achieved (11.2 TOE/Million Rs.), and it was 6.2 times the target figure in 2017, or 1.8 TOE. On the other hand, before the project started, there was an increasing trend long term. After it reached its peak of 14.3 TOE/million Rs. in 2004, it continued to decrease until 2009, the second year of the project.¹⁹ However, it increased slightly after 2010, in the latter half of the project, and has not improved. Thus, this indicator will likely not drastically improve within three years as an effect of the completed project.



Source: SLSEA

Figure 4: Commercial Energy Intensity

One of the possible reasons why energy efficiency has not improved since the latter half of the project and after completion in spite of the improved penetration rate of CFLs: the new financial scheme could not be established, which did not lead to the increase in investment by private companies in energy efficiency. Although diffusion of CFLs was emphasized by the five indicators for the project purpose, the project also sought to increase energy efficiency in private companies by introducing a new financial scheme for investment to promote energy efficiency via Output 2. Unable to establish new financial schemes, the project could not accelerate energy efficiency activities of private companies. Thus, Indicator 1 influenced the overall goal somewhat as the medium and long-term effects decreased compared to expectations. And commercial energy intensity is affected by other things, such as change in industrial structure of the country (the service

¹⁹ It became clear during this survey that the data shown in the Terminal Evaluation Report of the project for the period from year 2006 till 2008 was not commercial energy intensity but commercial energy index. Thus, actual value of the commercial energy intensity was utilized for the ex-post evaluation survey.

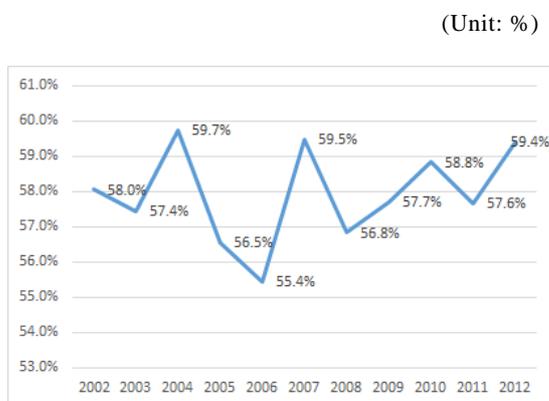
sector has expanded recently, from the conventional structure in which the main industries are agriculture and garments). Thus, the level of the indicator for overall goal was set too high.

(2) Indicator 2: electricity load factor is increased annually by 1%.

Although the figures of Indicator 2 fluctuate year by year, the 1% annual increase is achieved or mostly achieved except for the first year of the project (Figure 5, 6).

Looking at the tendency of the ten-year period, the gap between the increase and decrease narrowed after the project started (Figure 6).

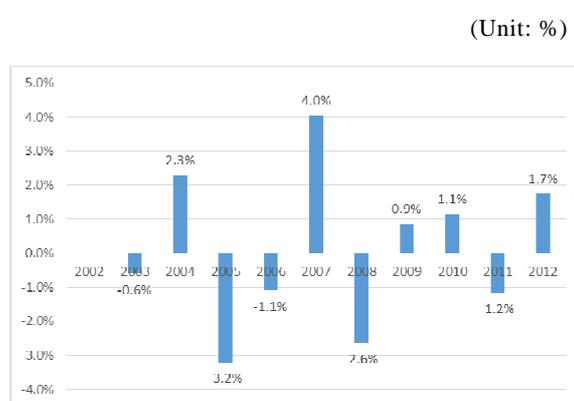
Hence, Indicator 2 is assessed to have been mostly achieved. The improved penetration rate of CFLs and enhanced motivation of private companies on energy efficiency by continuous implementation of the National Energy Award contributed to the achievement of this indicator, together with the other elements. The other elements include prior projects aiming at CFL diffusion, awareness of households and companies influenced by electricity price hike, and the change in pricing by electric companies (raising prices during the evening when electricity consumption is over the daily maximum).



Source: Resource Management Associates (Pvt) Ltd.

Remarks: Revised figures excluding small-scale generation are shown above in order to correctly compare the figure with the past

Figure 5: Electric Load Factor



Source: SLSEA

Remarks: Revised figures excluding small-scale generation are shown above in order to correctly compare the figure with the past

Figure 6: Increase/Decrease rate of Electric Load Factor compared with the previous year

Thus, the achievement of the overall goal is assessed to be fair because Indicator 2 was mostly achieved whereas Indicator 1 was not achieved—financial schemes of investment in energy efficiency was not realized, and the level of Indicator 1 was set too high.

3.2.2.2 Project Effects to Achieve Overall Goal after Completion of the Project

The situation on the project effects for achieving overall Goal after the project completion is shown in Table 4.

(1) Effects Related to Outputs

1) Annual energy consumption reporting scheme

An annual energy consumption reporting scheme became mandatory in July 2011, after the project completion. As of the ex-post evaluation, approximately one hundred companies and organizations regularly submitted reports. As for these companies and organization, SLSEA can comprehend the situation of their energy consumption, and, if necessary, directly provide administrative guidance. In that sense, the organizational infrastructure was already founded on achievement of overall goals. However, as the total number of the companies and organizations that should submit an annual report is approximately seven hundred or eight hundred, an increase in the number of the companies/organizations that submit reports is desired. Of the total, 171 companies assigned energy managers.

(2) Energy managers and energy auditors

At the time of the ex-post evaluation, 181 energy managers and six energy auditors were accredited (Figure 6). Accreditation and assignment of energy managers resulted in energy managers mainly at major private companies acquiring certain knowledge, playing a role in enhancing energy management, and promoting energy efficiency activities at their own companies. Hence, the focal point was clarified for SLSEA as well, and the organizational infrastructure in terms of human resources in the companies/organizations of the annual reporting system was established in terms of achievement of the overall goal. Furthermore, though the number of accredited energy auditors is still limited, the infrastructure for achieving the overall goal has gradually strengthened.

Table 6: The Number of Accredited Energy Auditors and Energy Managers

(Unit: persons)

| | 2011 | 2012 | 2013 |
|---------------------------------|------|------|------|
| Energy Auditors | 0 | 0 | 6 |
| Energy Managers | 0 | 142 | 29 |
| Private Companies | 0 | 131 | 26 |
| Government/Public Organizations | 0 | 11 | 3 |
| Total | 0 | 142 | 35 |

Source: SLSEA Questionnaire Survey

After the project completion, the Asian Development Bank (ADB) implemented a “Sustainable Power Sector Support Project” whose components related to energy efficiency to support the SLSEA’s development of teaching materials and support for implementing training to energy auditors, which complemented positive effects in achieving the overall goal.

3) IT infrastructure development

The online reporting system developed by the project for the annual energy consumption reporting scheme is utilized by about only 5% of the total reports. Most of the reports are submitted through e-mail or by hard copy. So this online reporting system did not have the expected effects.²⁰ According to SLSEA, one of the reasons is that major companies have their own format, which is more complicated, and it takes additional time for them to enter the data in another form. To promote submission of the reports, SLSEA accepts reports using their own forms and extracts necessary data themselves. According to the hearing with private companies with obligations to report, energy managers at the companies did not know about the online reporting system, and some companies send reports by e-mail or hard copy because it is necessary to get signatures from those responsible before submitting reports and/or sending letters.²¹ Thus, the contribution of this output to achieve and sustain the overall goal is small.

²⁰ SLSEA Questionnaire Survey

²¹ Private companies hearing

4) “Energy efficient” labels

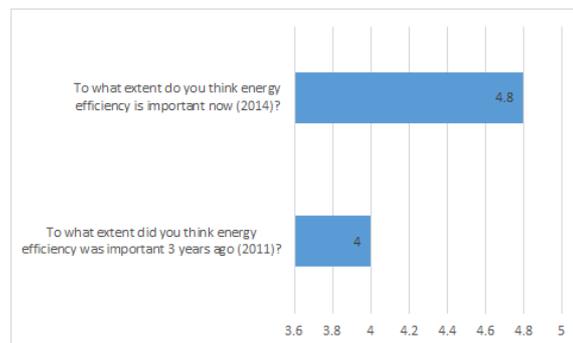
Labeling of the remaining two electric appliances was addressed during the project—the label for ceiling fans was made mandatory in January 2013. But labeling for ceiling fans has not yet been made mandatory at the markets due to delays in technical inspection. Inspection is now suspended because of a technical problem, but it will resume soon. Labeling for ballasts had not been implemented at the time of ex-post evaluation, but it is expected to be legalized between September 2014 and May 2015.²² The formulation of the standard for both appliances was completed within the project period.²³

5) Equipment bank

The equipment bank’s lending equipment increased after the project (Figure 3), and it has been effectively utilized by those involved in promoting energy efficiency at the time of the ex-post evaluation. Furthermore, the support provided by ADB for the equipment bank after the project complemented this. But maintenance is necessary in the future.

6) Mass awareness of energy efficiency

According to the results of the beneficiary survey, awareness of energy efficiency in general households increased compared to the results three years ago. This is not necessarily the result of project activities because the electricity price increase is also a major cause. For major private companies with a legal obligation to report annually their energy consumption, awareness of energy efficiency has been enhanced. Electricity price increase is a major promoting factor as well.



Source: Beneficiary survey to residents

Remarks: Average amount of the replies to 5-level evaluation (5: I think so very much 4: I think so to some extent 3: Medium 2: I do not think so much 1: I do not think so)

Figure 7: Change in Consciousness on Energy Efficiency

²² SLSEA Questionnaire Survey and hearing

²³ The project completion report

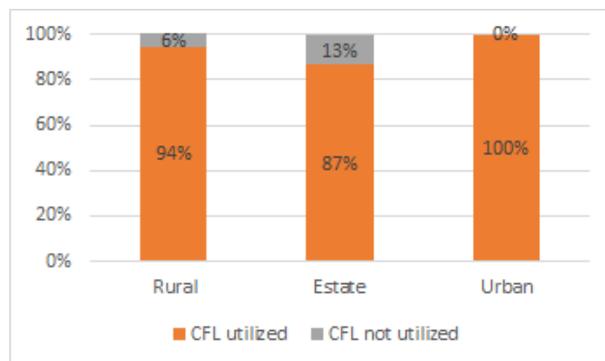
(2) Effects Related to Project Purpose

1) “Energy efficient” labels in the market

According to a survey²⁴ conducted by SLSEA in November 2013, 94.43% of CFLs in the market have “energy efficient” labels. When the evaluators actually visited a mass retailer shop in Colombo City for visual observation (February 2014), all the CFLs in the shop had SLSEA “energy efficient” labels, and it is assumed that most of them are labeled in the markets at the time of the ex-post evaluation. The quality of the CFLs is maintained because poor CFLs were expelled, which led to an improved penetration rate of CFLs (to be explained later).

2) Penetration rate of CFLs

The result of the beneficiary survey of the residents at the ex-post evaluation (sample size was 109 households in total, with the breakdown of 36 in urban, 36 in rural, and 37 in estate areas) shows that the penetration rate is high in all urban, rural, and estate areas, which more than doubled of the target utilization rate of 40%. On the other hand, their knowledge of energy efficiency is insufficient, and it is difficult to attribute the improvement of the penetration rate of CFLs to improved knowledge of consumers on energy efficiency. Legalization of mandatory “energy efficient” labels on CFLs resulted in a change of attitude of manufacturers and retailers, which led to an almost 100% share of CFLs with “energy efficient” labels in the market.



Source: Beneficiary survey

Remarks: Ratio of households that use more than 1 CFL

Figure 8: Penetration rate of CFLs
(general households)

3.2.2.3 Other Impacts

(1) Other Indirect Impacts

Significant indirect impacts were not observed at the time of the ex-post

²⁴ CFL Energy Labeling Market Penetration Survey, SLSEA

evaluation.

(2) Negative Impacts

No negative impacts were observed.

Therefore, as for the impacts, the achievement of the overall goal is medium because Indicator 2 is mostly achieved, whereas Indicator 1 is not. The reasons why Indicator 1 is not achieved are that the achievement of the project purpose remained at the medium level and the overall goal was set too high. Also, a positive impact is observed, while no negative impact is seen.

Effectiveness is assessed to be medium, as already mentioned. The positive reasons are the achievement of the project purpose is medium, the expansion of the equipment bank, the legalization of mandatory “energy efficient” labels on CFLs, and the continuous implementation of the National Energy Award, which contributed to the attainment of the project purpose. On the other hand, the negative reasons are that the financial schemes for the investment of energy efficiency were not established. Further, the IT infrastructure development did not contribute to the achievement of the project purpose.

With the reasons above, effectiveness (and impact) is fair.

3.3 Efficiency (Rating: ②)

3.3.1 Inputs

| Inputs | Plan | Actual |
|-------------------------------------|--|---|
| (1) Experts | 4 for long term (4 fields; 144 M/M, if 4 people were supposed to be dispatched for 4 years) ● 3 fields for short term, if necessary | ● 56.43 M/M in 11 fields ● all for short term |
| (2) Trainees received | 9 trainees (about 3 people per year for training in Japan, mainly for core counterparts) | 22 trainees (1 st : 5 seniors, 2 nd : 10 practitioners, 3 rd : 7 seniors and practitioners, 22 in total) Field(s) of training: energy efficiency policy |
| (3) Third-country training programs | N/A | N/A |

| | | |
|--------------------|---|--|
| (4) Equipment | Main equipment (no description of the budget): equipment for energy auditing, facilities for industrial motor testing, OA equipment, equipment for energy efficiency, etc. | Main equipment (\$302 thousand USD and 2.3 million yen): measuring equipment for energy auditing, testing equipment, OA equipment, etc. |
| Total project cost | 285 million yen | 346 million yen |
| Total local cost | (no description) | 256.9 million Rs. |

3.3.1.1 Elements of Inputs

(1) Japanese Inputs

1) Japanese Experts

SLSEA recognizes that the quality and quantity of Japanese experts was medium and the timeliness was good. Thus, it is assessed that there was no problem. Also, the M/M of Japanese experts significantly decreased in comparison to the plan. However, the reason for the significant decrease is not clear.

2) Trainees received

SLSEA's recognition of the contribution of training in Japan is high (i.e., four out of five levels).²⁵ Also, during training in Japan in the first year for the senior level, many senior staff at related organizations participated, in addition to those of SLSEA. The training was highly satisfactory for the participants, as the curriculum was appropriate. It was effective for quick decision-making and action during the project duration,²⁶ as it helped the participants to recognize the importance of energy efficiency²⁷ and fostered the establishment of a clear vision shared among the senior staff of the stakeholders for the project direction²⁸.

3) Equipment Provision

SLSEA highly evaluates the quality, quantity, and timeliness of the equipment provision. However, some of the equipment provided for the equipment bank was insufficient, in terms of quantity. In addition, the level of nonconformity was not serious as a whole.

²⁵ SLSEA Questionnaire Survey

²⁶ Ex-Japanese expert hearing

²⁷ SLSEA hearing

²⁸ The completion report on "the Sri Lanka Energy Efficiency Policy (Advanced Course) 2008" (P13)

4) Local Cost

As for the amount of local cost borne and the timeliness of disbursement, no particular problem was observed.

(2) Sri Lankan Inputs

1) Allocation of Counterparts

As shown in Table 7, the number of counterparts during the project duration gradually increased after the first year. No staff members left the SLSEA, and only one staff member was on a leave of absence in order to study abroad and attain a higher degree.²⁹ There were three vacant posts in the Energy Management Division. Some perceive that this vacancy became a constraint for the activities' progress, while others recognize that it did not seriously influence activities in a practical sense.³⁰ Since all of the planned activities were completed within the project period, it is regarded that it was not a very serious problem although the manpower was insufficient.

Table 7 : The Number of Assigned Counterparts
(During and After the Project Period)

| | '08 | 09 | 10 | 11 (-4) | 11 (5-) | 12 | 13 |
|----------------------------|-----------|-----------|-----------|------------|------------|-----------|-----------|
| A. Management Staff | 3 | 4 | 4 | 4 | 4 | 4 | 4 |
| Director (Energy Mgmt) | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Head (EE System) | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Head (EE Service) | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| Head (Outreach Program) | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Head (M & V) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| B. Technical Staff | 7 | 7 | 8 | 10 | 13 | 13 | 12 |
| Engineering Specialist | 1 | 1 | 0 | 0 | 3 | 3 | 3 |
| Professional Engineering | 5 | 5 | 6 | 6 | 8 | 8 | 8 |
| Engineering Assistant | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Technical Assistant | 0 | 0 | 1 | 3 | 1 | 1 | 0 |
| TOTAL | 10 | 11 | 12 | 14 | 17 | 17 | 16 |

Source : SLSEA Questionnaire Survey

Remarks: Year 2011 is divided into two; that is, until April, when the project was completed, and since May, after the project was over.

²⁹ SLSEA Questionnaire survey

³⁰ SLSEA and former Japanese experts hearing

2) Provision of Facilities

The necessary facilities were provided as planned, and there was no problem in terms of quality, quantity, and timelines.

3) Local Cost Bearing

There was no problem, in the sense of the amount and timeliness of the local cost bearing. SLSEA secures its own financial sources by obtaining sponsors for the exhibitions for promoting energy efficiency and through the equipment bank rental fee.

(3) Implementation Process

With the following reasons, the project activities were conducted smoothly and all of the planned activities were completed. The causes for not achieving some outputs were something besides the manner in which the activities were conducted (See Effectiveness and Impact).

1) Communication within the Team

It is recognized by SLSEA that the communication between the Japanese expert team and the Sri Lankan counterpart team was “very good” (a five out of five levels of evaluation).³¹ As for the reason, it was pointed out that there was no gap on the project because the Japanese expert team almost always explained things with practical examples.

2) Sharing the direction and the smooth progress of activities

It is recognized by the Japanese expert side that it was easy for them to proceed with the activities because the counterparts were eagerly involved. Further, the activities and the recognition of the direction in which the project should be heading were shared with them.³²

3.3.1.2 Project Cost

As shown in Table 8, the project cost was higher than planned (121%). One of the reasons why the project cost exceeded the planned amount was that the number of the trainees received in Japan doubled in comparison to the plan. On the other hand, the participation of the senior staff, including those at related organizations, in addition to the organization that served as a counterpart to the training in Japan in the

³¹ SLSEA Questionnaire Survey

³² Japanese experts hearing

first year, enabled them to strongly recognize the importance of energy efficiency. Such an understanding led to smooth decision-making and actions within the project.

Table 8 : Project Cost and Period of Cooperation

| | Planned | Actual | Ratio Against the Plan (%) |
|-----------------------|----------------------------------|-----------------------------|----------------------------|
| Project Cost | 2.85 hundred million yen | 3.46 hundred million yen | 121 |
| Period of Cooperation | May 2008–April 2011 (3 years) | - ditto - | 100 |

3.3.1.3 Period of Cooperation

As shown in Table 8, the period of cooperation was as planned.

The quality, quantity and timeliness of the Inputs were generally appropriate for the produced Outputs and achievement of Project Purpose, which were confirmed earlier as a part of Effectiveness. Also, as for the implementation process, good communication between the Japanese expert team and its Sri Lankan counterpart, as well as the conformity of the direction in which the project was heading, resulted in smooth implementation while completing the planned activities within the project period. On the other hand, the period of cooperation was 100%, in comparison to the plan, whereas the project cost was 121% in comparison to the planned figure.

Thus, although the project duration was concluded occurred as planned, the project cost exceeded the plan. Therefore, the efficiency of the project is fair.

3.4 Sustainability (Rating: ②)

3.4.1 Related Policy toward the Project

Due to the following reasons, sustainability, in terms of related policy and institution, is high.

There is no change in the “SLSEA Act” (2007), which stipulated the function and power of SLSEA; “National Energy Policy and Strategy of Sri Lanka” (2008), which stressed the importance of promoting energy efficiency; and “Revised Mahinda Chintana” (2010), which includes the objective “to reduce energy consumption by

8.7% by 2020.” Moreover, the “Unstoppable Sri Lanka 2020: Public Investment Strategy 2014–2016” maintains the above-mentioned objective shown in the “Revised Mahinda Chintana,” and stipulated that the promotion of energy efficiency is one of the major components of the energy policy.

Both of the related ministries, the Ministry of Power and Energy and the Ministry of Environment and Renewable Energy, share the same view that the promotion of energy efficiency is important. Also, the managing officers of SLSEA emphasized the promotion of energy efficiency and recognizes the commercial energy intensity and electricity load factor as important parameters after the project completion as well.³³

As the country anticipates that its energy consumption will be doubled by 2020, it has constructed some coal-fired power plants and attempted to promote renewable energy as well. It is important to imagine that the direction of the government policy emphasized energy efficiency, since energy efficiency will be required to cope with the increasing needs for energy, in addition to those actions mentioned above.

3.4.2 Institutional Aspects of the Implementing Agency

Considering the reasons below, sustainability, in terms of the institutional aspects of the implementing agency, is high.

The number of SLSEA staff has been increasing after the the project completion (Table 7). In 2013, the number of allocated staff decreased by 1, but the total staff number is still larger by two staff members than at the time of the project completion, (i.e., fourteen staff). It was the number of technical staff (professional engineering) that increased in comparison to the project period. The decrease from 2012 to 2013 represented the departure of a technical assistant. The number of vacant posts that were pointed out in the past decreased in comparison to the project duration. It is regarded that the probability of increasing the number of staff is high,³⁴ because the country has set a goal to reduce energy consumption by 8.7% by 2020. SLSEA is the only government organization that specializes in energy efficiency, the number of staff has been increasing, and it has already started to negotiate with the Ministry of Finance to secure additional budget for increasing the number of staff.

³³ SLSEA Questionnaire Survey

³⁴ Ministry of Environment and Renewable Energy hearing

As for the supervising ministry, SLSEA was under the guidance of the Ministry of Power and Energy during the project period, whereas it came under the Ministry of Environment and Renewable Energy in February 2013 after the project cooperation was completed. There is no significant change in terms of SLSEA's mission and function at the time of ex-post evaluation. Furthermore, the future role of SLSEA in further promoting energy efficiency is regarded as being unchanged because both the Ministry of Environment and Renewable Energy and SLSEA put an equal emphasis on energy efficiency and renewable energy.³⁵

Concerning the strengthening of the annual energy reporting scheme, SLSEA proposed CEA, which is responsible for EPL,³⁶ to include additional checkpoints related to energy efficiency for the screening of companies for acquiring EPL in order to increase the number of major companies to submit an annual report. More specifically, they are now considering the possibility of adding checkpoints, such as whether or not the applicant submitted an annual energy consumption report and whether or not the company already allocated an energy manager. With this, a company which does not submit an annual energy consumption report will not be able to acquire or update EPL until it addresses it, and the ratio of companies which submit an annual energy consumption report is expected to increase. The number of companies that are required to acquire and update EPL, as well as submit this reporting scheme, appears to be about 500.³⁷ It seems that the addition of those checkpoints is not difficult because SLSEA, along with CEA, which is responsible for EPL, is now under the Ministry of Environment and Renewable Energy and the ministry's standpoint is to accept the addition. Based on these circumstances and considering that there is no specific hindering factor, the possibility is high that the checkpoints for screening EPL will be changed.

With regard to the promotion of "energy efficient" labels in the future, the National Engineering Research and Development Center (hereafter, NERDC) has started the preparation of testing refrigerators, which was not included in this project, while utilizing a laboratory and equipment provided by ADB. SLSEA is also going to

³⁵ Ministry of Environment and Renewable Energy and SLSEA hearing

³⁶ EPL stands for Environmental Protection License, which is a strategy stipulated in the National Environment Act for avoiding negative influence to environment by companies' activities such as air pollution, water pollution, soil pollution, etc. Companies are divided into 3 categories from A to C, according to the potential risk of environmental pollution. Each company have obligation to acquire a license and update it regularly. It is necessary to pass screenings in order to acquire and update it.

³⁷ SLSEA

commission Moratuwa University to conduct the testing of air conditioners by the end of 2014. Thus, it is expected that mandatory “energy efficient” labels will be promoted by SLSEA in collaboration with the related organizations.

3.4.3 Technical Aspects of the Implementing Agency

There is some concern regarding the technical aspects of the implementing agency, due to the following reasons.

(1) Stakeholders’ recognition of the technical capacity of SLSEA

The evaluation by the government and the individuals within governmental organizations on the technical capacity of SLSEA is not very high. There were several comments that their technical capacity is lower in comparison to CEB. However, there are also some comments that even so, there is no problem because there are energy auditors and energy efficiency consultants, as well as some external organizations, such as universities and NERDC, etc., with which SLSEA can collaborate.³⁸ On the other hand, the result of the interview survey on the technical capacity of SLSEA at the time of ex-post evaluation with twenty-one companies/organizations, which include the Energy Service Company (hereafter, ESCO) and energy efficiency consultants who provide the service of energy auditing and consulting (7), as well as major energy consumers among private companies and public organizations (14), is shown in Table 9. It is a five-scale rating and the average of the former group is 3.7, while that of latter group is 3.3, which shows that it is recognized as medium.

Table 9: Does SLSEA Have Sufficient Technical Capacity for Promoting EE&C

(5: Sufficient, 4: Sufficient to some extent, 3:Medium, 2: Not so sufficient, 1: Not at all sufficient)

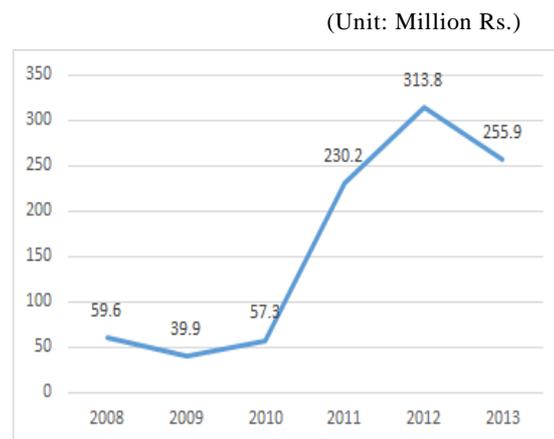
| Group of Respondents | Average |
|--|---------|
| ESCO、 Energy Auditors, Energy Efficiency Consultants | 3.7 |
| Private and public organization (major energy consumers with an obligation to provide annual reporting | 3.3 |

Source: Beneficiary Survey

³⁸ Government and governmental organizations hearing

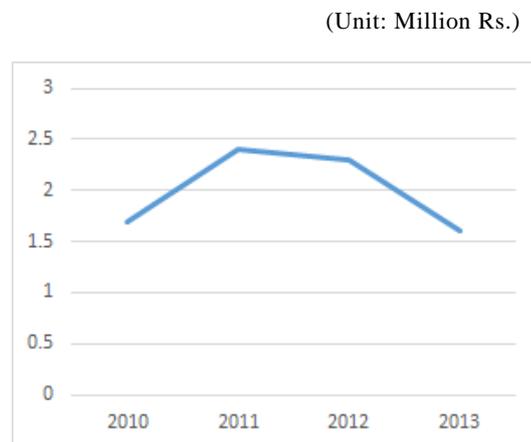
(2) Technical capacity of SLSEA in the future

In the process of conducting the interview survey above, there were some common comments from many of the organizations, such as “The technical capacity of some senior staff who is the core members is high, while that of the middle and junior staff is insufficient.” If this comment is correct, then there is concern over the future sustainability in the technical aspect. On the other hand, the salary standard of SLSEA is lower than that of CEB, resulting in the low possibility for SLSEA to hire new staff with high technical capacity.³⁹ SLSEA received instruction from the Board of Directors on the necessity to foster internal human resources. Thus, SLSEA will take new actions, such as by giving responsibilities to junior staff and requesting some donors to secure budget for the cost of human resources development. It is necessary, however, to pay attention to the progress and effects of the above point.



Source: SLSEA

Figure 9: The Budget of SLSEA



Source: SLSEA Questionnaire Survey

Figure 10: The Rental Fee of the Equipment Bank

(3) Technical capacity on the maintenance of equipment

The maintenance of equipment, mainly of the equipment bank is mostly well done, while only some of the equipment was not repaired in a timely manner. It mainly resulted from the shortage of technical staff members who are in charge of maintenance.⁴⁰ Also, as the staff in charge of maintenance has a double assignment, it is not functioning well when some of the team members are on a business trip. On the other hand, some of the equipment cannot be repaired by the suppliers in the country,

³⁹ SLSEA hearing

⁴⁰ SLSEA Questionnaire Survey and hearing

though it is not SLSEA's problem. In that case, the equipment had to be sent overseas. Sometimes SLSEA had to give up on fixing them, as the cost for shipping was high (six cases occurred during the project period until the time of ex-post evaluation. All of the cases pertained to Data Logger).⁴¹

The problem of unconformity between the provided equipment and the local pipes to be connected was already solved by the time of ex-post evaluation, as ADB provided the measuring equipment which can be used with any size of pipe. Also, due to users' enhanced consciousness of the accuracy of the equipment bank, SLSEA recognized the necessity of calibration,⁴² which did not exist in the country. It started to consider the establishment of a new periodical calibration system that included identifying criteria for each respective type of equipment.⁴³

3.4.4 Financial Aspects of the Implementing Agency

From a financial aspect, sustainability is high for the following reasons, although there is some concern over the maintenance cost of the equipment bank.

(1) Financial status of SLSEA

Although the annual budget of SLSEA, from the time of the project completion until ex-post evaluation, fluctuates depending on the year, the amount significantly increased in 2011—the last year of the project's duration. It maintained a high level without decreasing to the level of the project period.

(2) Maintenance cost for the equipment bank

The rental fee amount, which has been utilized for the maintenance of the equipment bank, has decreased since 2012. However, it increased during the project period, while the unit cost of the rental fee for each type of equipment was not lowered. SLSEA assumes that the reason is because of the ratio of the users who borrowed the equipment at a lower unit price was high.⁴⁴ However, the ratio of the maintenance cost of the equipment bank to all of SLSEA's budget is small.

(3) Financial scheme of investment for energy efficiency by private companies

A new financial scheme of investment for energy efficiency with the initiative of the Sri Lankan government has not been introduced at the time of ex-post evaluation.

⁴¹ SLSEA hearing

⁴² Calibration in Japanese means "kosei"(correction) or "chousei"(adjustment). It means to measure deviation of an equipment with measurement standard, and to adjust it so that it can measure correct amount, in order for the measurement equipment to give the right amount according to the standard.

⁴³ SLSEA hearing

⁴⁴ SLSEA hearing

On the other hand, the European Investment Bank (hereafter, EIB) started a loan scheme with the DFCC,⁴⁵ the Commercial Bank of Ceylon, and the Regional Development Bank as the intermediary banks. The name of the financial scheme is “SME⁴⁶ and Green Energy GL,” and it is divided into two components: 1) green energy and 2) SME. The first component includes investment for energy efficiency for the target. Neither of the components accepts the loan for more than 50% of the total cost. As for Green Energy, its target is energy efficiency and renewable energy; the minimum amount of the loan is Euro500,000 and maximum Euro900,000. The interest rate is 8%, and the redemption period depends on the borrower. All of the preparatory procedures were completed in April 2014, and the application started to be accepted. The DFCC already conducted a screening of fifteen application forms and sent them to EIB. The commencement of a new financial scheme is a positive factor for the future, although there is a constraint that the applicants can borrow up to 50% of the total cost. Further, monitoring the progress is necessary because the scheme was newly introduced.

Based on the above information, some problems have been observed, in terms of the technical aspects of the implementing agency, whereas the sustainability from policy, institutional, and financial aspects is high. Therefore, the sustainability of the project effects is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project was implemented to strengthen the organization of the Sri Lanka Sustainable Energy Authority (hereafter SLSEA) in order to promote the energy efficiency activities of general households, private companies, and public and governmental organizations in all of the country’s urban, agricultural, and estate areas. Relevance is high: energy efficiency and conservation is consistent with the developmental needs of Sri Lanka because it depends on imports for most of its energy resources, and the consistency with its development policy as well as Japanese aid policy is high. Also, effectiveness/impact is at a medium level, because the achievement of the project Purpose and the outputs are at a medium level. Efficiency is fair, since the cost borne by the JICA side exceeded the planned amount, while the quality, quantity, and

⁴⁵ DFCC stands for the Development Finance Corporation of Ceylon.

⁴⁶ SME stands for small and medium-sized enterprises.

timeliness of the inputs were adequate for the achievement of the outputs and the project purpose. Sustainability is fair, as there are some concerns regarding the technical aspect, while sustainability in policy, organizational, and financial aspects are high. In light of the above, this project is evaluated to be partially satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the implementing agency

It is desired that SLSEA strengthen the development of its internal staff at the middle and junior levels, in parallel with increasing the number of staff member allocations. SLSEA was given instruction by the Board of Directors to enhance the capacity development of its internal staff, and it has already decided to give this development in on the job training, with more responsibility to junior staff, and request donors to provide financial support for human resources development. In addition, it is important for SLSEA to formulate a medium- and long-term plan for human resources development, mainly for the middle- and junior-class staff with focus on technical skill-up, and to start preparation for implementation for the sake of further strengthening its organizational development in the future.

4.2.2 Recommendations to JICA

None.

4.3 Lessons Learned

- The duration of a project for which legalization or activities by organizations other than the counterpart organization is a prerequisite.

In this project, most of the activities were completed during the project duration, but it was a prerequisite to legalize the system or to conduct technical testing, not at the counterpart organization but at other related organizations, which requires many procedures. Even after the activities were implemented and the project was over, it took a considerably long time to achieve some outputs, resulting in the delay in achieving the project purpose as well. It is necessary to make sure that a sufficient project period is secured, in case the legalization of a new system or related organizations is involved. With the exception of the counterpart organization, the others need to take specific responsibility for some activities that are indispensable to achieve outputs or project purpose.

- Institution-building of receiving reports using the online system

With respect to one of the outputs, i.e., the “development of IT Infrastructure,” it was intended that the project would develop an online system for receiving an energy

consumption report from major companies so that it would be more convenient for both the companies and SLSEA. Although the development of the online reporting system itself was completed within the project period and the expected output was achieved, the ratio of the companies which utilize the system is very low—that is, less than 5%—while most of the companies submit the annual report by e-mail or hard copy. The major reasons why the online system is underutilized are regarded to be due to the fact that most of the major companies utilize their own forms. They need to enter the data again if they have to use the online system. Other reasons are that the implementing agency did not continuously disseminate the existence of the online system and promote its usage, and that the preparatory survey was not necessarily sufficient in the country where the signature of the bosses and/or the management is a prerequisite for sending out a letter from major organizations. Insufficient analysis on the current situation, the constraints, and the needs of the companies who were the targeted users, as well as sharing the views among stakeholders, were the major hindering factors. Therefore, in case a project receives a large number of reports from external organizations with the online system, it is important to decide to introduce the system only after conducting a sufficient survey on the latest situation and the needs of the users (private companies, etc., in this case) including the special elements of the country. The result of the survey should be well reflected in the project design before finalizing the introduction of the system.

- Setting practical indicators based on the timeframe and long-term direction of a project

Some of the indicators for outputs, project purpose, and the overall goal are skeptical, in terms of the feasibility of achievement, considering that the project period is three years. For example, the accreditation of energy auditors and the appointment of energy managers can only be realized after the legalization of new schemes is complete through human resources development, such as training, etc. In this project, however, all of the formulation of new schemes and the legalization of human resources development by training are positioned as the indicators at output level, which should have been the indicators for a higher level. Similar examples are also observed and, as a result, the achievement of the indicators declined, as did the evaluation on effectiveness and efficiency, despite the fact that the organizational infrastructure has already been achieved to some extent. The major reason why the indicator levels were set too high are as follows: 1) Each objective at each level was unclear (especially the project purpose and overall goal); 2) there is a possibility that the important rules of the PDM, such as the project purpose needs to be achieved by the end of the cooperation, were not shared among stakeholders. The overall goal, which also had to be attained within three years after the project completion, etc., was not fully shared and recognized by the people concerned; 3) as a comprehensive approach is required for an energy efficiency project,

the project scope was set broadly, thus including some indicators that were set too high to achieve within the three-year project period; 4) being a project for strengthening organizational capacity, the image and change of the target group that the project intended to bring about were not clear. It is important to set realistic indicators (and objectives) after reflecting the results of the analysis of the beneficiaries and needs (i.e., companies, related organizations, and residents in rural, estate, and urban areas) on the status quo. It is also vital to pay sufficient attention to the boundary of counterpart organizations' authority.

- Sharing the project direction with the senior management staff of counterparts during the initial stage

This project was successful, in terms of sharing the same direction to which the project should be heading, among the counterparts. It also successfully communicated with the counterpart teams and the Japanese expert team by sharing advanced cases and the latest information in the sector at the training in the Japan program during the first year of the project. This training included the participation of the senior management staff of counterpart, as well as related, organizations. This approach resulted in project management without a recognition gap between the two teams, good communication, and prompt action by the counterpart organization, all of which led to smooth implementation of the activities. Effective utilization of the training in Japan during the initial stage of a project, clarifying the direction that the project should take among counterparts, as well as between the counterpart team and Japanese expert team, and fully sharing it among them results in the smooth implementation of activities.