

英文要約

"Project Formulation Survey" under the
Governmental Commission on the
Projects for ODA Overseas Economic
Cooperation
in FY2013

Summary Report

Kingdom of Thailand and Malaysia

**Feasibility Study on Promotion of the
Fluorescent Lamp Recycling Plant**

March, 2014

**Consortium
Japan Fluorescent Lamp Recycling Co., Ltd. and
Kokusai Kogyo Co., Ltd.**

The content of this report is a summary of the project formulation survey, which was commissioned by the Ministry of Foreign Affairs of Japan in the FY 2013 and is carried out by the consortium (Japan Fluorescent Lamp Recycling Co., Ltd. and Kokusai Kogyo Co., Ltd.). It does not represent the official view of the Ministry of Foreign Affairs.

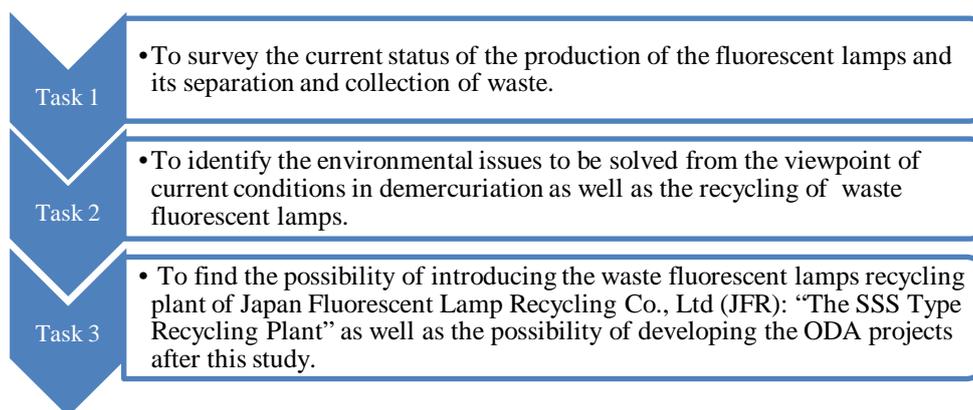
Introduction

The study team has been corresponding the “objectives of the study and summary of the work” described in the explanatory documents of this “Project Formulation Survey’ under the Governmental Commission on the Projects for ODA Overseas Economic Cooperation in FY2013”. The study team has set out three tasks for achieving the above-mentioned objectives:

Task 1: To survey the current status of the production of fluorescent lamps and its separation and collection of waste;

Task 2: To identify the environmental issues to be solved from the viewpoint of current conditions in demercuriation as well as the recycling of waste fluorescent lamps; and

Task 3: To find the possibility of introducing the waste fluorescent lamps recycling plant of Japan Fluorescent Lamp Recycling Co., Ltd (JFR): “The SSS Type Recycling Plant” as well as the possibility of developing the ODA projects after this study.



I. Description of the current situation and development needs of the concerned development issues in the surveyed countries

(1)Thailand

GENCO, which was established by the Ministry of Industry (MOI) with the private sector, has been accepting waste fluorescent lamps. The amount ranges from 8 to 10 tons per month and most of the amounts were from defected lamps, hauled from the fluorescent lamps manufacturing factory. GENCO owns crushing machines exclusively for fluorescent lamps which crushes the materials already solidified by cement and then the materials are disposed at the GENCO’s secured landfill. The method of disposal is said to be appropriate.

According to a survey by Pollution Control Department, Ministry of Natural Resources and Environment (PCD), the amount of waste fluorescent lamps discharged is estimated to be 245,414,000 (40W tubes) in Thailand. Most of the amount, subtracting those which were disposed at the GENCO’s landfill are probably disposed without any intermediate treatment. The study team estimates that 2,450 kg per year of mercury are emitted into the environment by improper treatment of waste fluorescent lamps.

(2)Malaysia

According to the estimation by TEEAM (a business group of electrical and electronic related industries), about 70 million fluorescent lamps (36w tube types) have been discharged per year. Kualiti Alam Bhd. (KA), a major hazardous waste disposal corporation, as well as some of Full Recovery Facilities (FRF) collect waste fluorescent lamps. However, it is considered that only KA legally disposes waste fluorescent lamp. The waste fluorescent lamps brought to KA is quite limited; it is assumed that most of the 70 million tubes per year are not disposed properly. The study team estimates that 551kg per year of mercury are emitted into environment due to such improper disposal.

(3) Summarized Issues

The results above are summarized as follows. These are said to be common issues.

- 1) There are some cases that waste fluorescent lamps are crushed by some machine, the crushed residues are solidified by cement, and they are finally disposed at the secure landfills. However, such cases are quite limited.
- 2) Most of waste fluorescent lamps are mixed with non-hazardous waste, treated and disposed. This leads to emit mercury into the environment. It is a requirement to show effective solutions for treating waste fluorescent lamps.
- 3) There is no plant equivalent to JFR's proposed level in both countries.

II. Possible applicability of the SME's products and technologies, and prospects for future business development

The SSS Type Recycling Plant to be proposed in this study enables crushing the used fluorescent lamps as well as mercury lamps, and thereafter, separates them into glass cullet, metals and fluorescent powder, removes mercury from them; its processing capacity is about 1,500kg per hour. (2,000 tubes 40W type lamps) and 1,500 tons per year during the operation of 10 hours a day and 25 days a month. It also does not discharge drainage during the process of treatment as it is a dry processing; the equipment and running costs can be suppressed because there is no need to set a drainage treatment facility. Furthermore, each machine is not easily broken as its structure is simple and its maintenance is easy. Therefore, JFR judged that the SSS Type Recycling Plant will be applied to overseas countries effectively, and it decided to seriously expand business to overseas countries.

The main target buyer of the proposed plant will be private waste disposal companies, while at the same time it is assumed to be the central or local government agencies. The sales activities will be promoted, after ensuring some distributors to sell the plant in the target country, and some contract manufacturers will be secured in order to reduce the cost for manufacturing the plant. If such cost can be reduced, the selling to small and medium waste disposal companies will be possible.

III. Verification of adaptability of the SME's products and technologies to the surveyed countries (Demonstration and pilot survey)

Both the Thai and Malaysia sides showed interests in the SSS's Type Recycling Plant and its technology. The study team conducted the recycling market survey in addition of the plant introduction to the related agencies. Through this survey, the study team concluded that the mercury removal machine which was originally part of the SSS's Type Recycling Plant will be displaced due to the confirmation of the reduction of market price of rare earth contained in fluorescent powder, the decrease of its buyers, no company accepting mercury for recycling use, the reduction of using mercury as a global practice, etc.. This last issue is being promoted in an expedited manner in accordance with the Minamata Convention adopted in October, 2013.

According to the results above, the study team decided to introduce as the proposed plant the following three machines: i. Multi crusher, ii. Powder separating machine (Separator), and iii. Dust collector. Moreover, based on the study verified through the interviews with the related stakeholders, the study team confirmed the need to reduce the price of the proposed plant.

IV. Expected development impact and effect on business development of the proposing SME(s) in the surveyed countries through proposed ODA projects

- (1) Relevance between the Development Issues and Proposed Plant and technology

There are prospects of economic and population growths in both cities: Bangkok Metropolitan Area (BMA) in Thailand and Kuala Lumpur Metropolitan Area in Malaysia. Both areas are similar to each other in terms of "economic growth", "population growth" and "urbanization".

PCD in Thailand estimates that the amount of waste fluorescent lamps discharged will gradually increase in 2 to 3 percent. Especially, Bangkok is remarkable in terms of “urbanization”. It is estimated that Bangkok will experience a higher rate of discharging than the national average. This trend can be considered the same in Malaysia’s metropolitan area, and the increase of discharging will be observed in both areas.

Under such situation where the amount of waste fluorescent lamps is continuing to increase, an effective solution for disposing waste fluorescent lamps is needed in both countries. JFR’s proposed plant and machines will be able to solve such issues. As mentioned above, the proposed plant can reduce its running cost and its machines are easy to maintain and are not easily broken. It makes sense to introduce the JFR’s proposed plant.

(2) Development Effect by Application and Use of the Proposed Plant and technology as well as Dissemination of the Plant in the Targeted Country

1) Protection from Environment Pollution by Inappropriate Disposal of Waste Fluorescent Lamps

The proposed plant enables to treat waste fluorescent lamps properly which contain mercury and prevent environmental contamination due to increasing amount of improper treatment of fluorescent lamps. It is assumed that the amounts of mercury, 2,450kg per year in Thailand and 551kg per year in Malaysia, were emitted into environment in 2012 as a result of improper treatment of waste fluorescent lamps. If the JFR’s plant is introduced through ODA projects, it will contribute to reducing environmental load and it will prevent environmental pollution that causes health damage.

2) Signing the “Minamata Convention on Mercury”

The Diplomatic Conference on “Minamata Convention on Mercury” was held in October, 2013 in Kumamoto and Minamata cities, to adopt and sign the Convention. Both Thailand and Malaysia had attended the conference. However, both countries have not signed the Convention. Through the implementation of the ODA projects regarding the fluorescent lamp recycling, it is expected that the importance of proper treatment of mercury-containing waste will be understood and disseminated among the government officials of both countries. It will be a great impact if the ODA projects encourage the signing and adopting the convention in both countries.

(3) Effect of the JFR’s business development by ODA projects

If the plant can be installed either in the countries surveyed the place of installation will function as a hub of business promotion for the buyers who have interest in the plant in the neighboring countries of the targeted country: either in Thailand or Malaysia. This will enable inviting such buyers to the place where the plant is installed in the targeted country and make them decide the purchase of the plant on site.

V. Proposals for formulating ODA projects

(1) Outline of Pilot Survey for Disseminating Small and Medium Enterprises Technologies (“Pilot Survey”) and other applicable ODA Scheme

1) Pilot Survey

To solve the issues found through this study, the study team proposes to introduce the proposed plant (The SSS Type Recycling Plant) either in Thailand or Malaysia through the Pilot Survey and verify its workability. Then, the activity to disseminate proper method of disposal of waste fluorescent lamps can be done in the future. JFR expects that its technology will contribute to building society, and protecting health damage by pollution caused by mercury substance disposed to environment

without proper treatment.

a. Candidate C/P Agency from the Thai side

Among the candidate C/P agencies that expressed their willingness to accept the Pilot Survey, even if they pay operation and maintenance costs of the plant by their own expenses, the study team selected Department of Environment, BMA (BMA-DOE) and MOI-DIW as candidate C/P agencies for the Pilot Survey.

b. Candidate C/P Agency from the Malaysia side

Department of Environment (DOE) of Ministry of Natural Resources and Environment advised to setup the proposed plant in the premises of existing FRF for the Pilot Survey. FRFs are the private hazardous waste treatment facilities licensed by DOE. The reasons are as follows: the cost and time of constructing the space for the plant can be saved if the plant is installed in a part of FRF and it could initiate the Pilot Survey smoothly as no EIA is required since FRF has already been approved; as the owner of the proposed plant is DOE, DOE will function as the main C/P agency to monitor closely the activities of FRF. From the above reasons, DOE recommended to utilize the existing FEF to conduct the Pilot Survey. Taking this advice, the study team has been considering the formation of the Pilot Survey in which DOE is the main C/P and the project site (location of the proposed plant's installation) has some FRF, having the capability of operation and maintenance of the plant.

c. Selection of C/P Agency

As shown in above section, the study team concluded that BMA-DOE and MOI-DIW from Thailand and DOE from Malaysia would be selected as C/P agency for the Pilot Survey. There are three options. However, the study team considered that it was difficult to select only one from those 3 options. The final selection will be made later when JFR applies the Pilot Survey. Then, which option should be taken will be studied again.

2) Training

Both Thailand and Malaysia had attended the Minamata Convention held in October 2013. However, both countries had not signed the Convention. Followed by the Pilot Survey, the study team proposes to conduct training programs as well as other ODA schemes and to conduct awareness-raising activity on mercury-containing waste issues, to share the Japanese counter-measures against mercury and to strengthen the capability of mercury-contaminated waste management, for related government officials. This awareness-raising activity will disseminate the importance of proper mercury-containing waste management.

(2) Development Effectiveness

1) Functionalization as Information Center

The pilot site, where the plant is installed through the Pilot Survey, will likely function as information center on the recycling activity on fluorescent lamps. The collected data/information at the information center will be very useful to provide a proper method of disposal as well as recycling of waste fluorescent lamps. Moreover, whichever country the Pilot Survey is conducted in, the pilot site would also function as the hub to disseminate the technology of appropriate method for disposal of waste fluorescent lamps to those who are involved in waste management in the neighboring Southeast Asian countries. This would lead to building a sound recycling society for the neighboring Southeast Asian countries.

2) Expectations to Building/Strengthening of Collection System for Waste Fluorescent Lamps

If some government agency in the targeted country for the Pilot Survey owns the plant, it is expected that collection system for waste fluorescent lamps would be built or strengthened. The plant would contribute to building collection system for waste fluorescent lamps which would be addressed as the issue by both countries through the Pilot Survey.

3) Creation of Glass Recycling Business

As surveyed through this study, there is no business which recycles the glass cullets from waste fluorescent lamps in both countries. With the JFR's plant operation as a starting point, there is a possibility that the glass recycling business from fluorescent lamps would be created. If some recyclables from waste fluorescent lamps are recycled via combining them, the study team will consider the method of disposal more highly. If the plant is introduced somewhere in the targeted country, the method of disposal in which some recyclables from waste fluorescent lamps are recycled can be realized. The plant would contribute to building a better recycling society for the targeted country.

(3) Other related Information: Result of Discussion with the C/P Candidate Agencies for the Pilot Survey

1) BMA-DOE, Thailand

Head of BMA-DOE said that it would become a C/P candidate if the Pilot Survey would be conducted in BMA. The timing for official expression as C/P candidate would be after further discussion within BMA-DOE, followed by approval from the Governor.

2) MOI-DIW, Thailand

Head of the Waste Management Department in MOI-DIW said if GENCO was interested in conducting the Pilot Survey, MOI-DIW would have willingness to become a main C/P agency. Later, the study team confirmed that GENCO did show its interest. In case MOI-DIW would be a main C/P, an official discussion on the topic that MOI-DIW becomes an official C/P agency between the Japanese side and the MOI-DIW would be needed.

3) DOE, Malaysia

A joint meeting with the personnel from the agencies that would be related to the Pilot Survey was held at the DOE. The main objective of the meeting was to share the results of this study by the study team. Division Head of DOE chaired this meeting. In the meeting DOE said that DOE would support JFR, if JFR selected Malaysia for the Pilot Survey, and then it would win the bidding for the Pilot Survey.

**Project Formulation Survey
Kingdom of Thailand and Malaysia, Feasibility Study on Promotion of the Fluorescent Lamp
Recycling Plant**

SMEs and Counterpart Organization

- Name of SME : Japan Fluorescent Lamp Recycling Co., Ltd. (JFR)
- Location of SME : Tokyo, JAPAN
- Survey Site : Counterpart Organization : 1) Department of Environment, Bangkok Metropolitan Administration or Department of Industrial Works, Ministry of Industry in Thailand, or 2) Hazardous Substances Division, Department of Environment, Ministry of Natural Resources & Environment in Malaysia

Concerned Development Issues

- It is concerned that almost all waste fluorescent lamps which contain mercury substance as hazardous waste are not treated properly at the moment.
- “Economic growth”, “Population growth” and “Urbanization” will continue and amount of waste fluorescent lamp would be increased.
- It is also expected amount of mercury substance emitted to environment by improper way of disposal would be increased.
- Both countries have not signed the Minamata convention yet.

Products and Technologies of SMEs

- It enables to drastically reduce volume of mercury-containing materials by removing recyclables from waste fluorescent lamps and lower the cost of final disposal.
- It's maintenance method is simple as it is simple structure and it is not easily broken.
- It enables to lower the equipment and operation costs.

Proposed ODA Projects and Expected Impact

- Two ODA projects are proposed: i) Pilot Study on Promotion of the Fluorescent Lamp Recycling Plant, and ii) Training for the related government officials to strengthen the capacity on proper way for disposal of mercury-containing waste
- Expected impacts would be 1) Functionalization as Information Center, 2) Expectations to Building/ Strengthening of Collection System for Waste Fluorescent Lamps, and 3) Creation of Glass Recycling Business

Future Business Development of SMEs

- 9 plants will be sold by 2020, at the same time, the business will be developed to surrounding countries.

