Thailand

Department of Alternative Energy Development and Efficiency

Collaboration Program with the Private Sector for Disseminating Japanese Technology for Environment-Friendly Simultaneous Heating and Cooling Heat Pump in Thailand

Final Report

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Japan International Cooperation Agency (JICA)

Mayekawa Mfg. Co., Ltd.

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Map

The site of project implementation was Bangkok, Thailand. The location is as shown below.

Figure 1: Project Implementation Site

Source: Revision of an outline map (with location names) of Thailand in the East Asian portion of a world map

1. Summary

- Background for This Project (Including Development Challenges in the Target Country)

Thailand is experiencing an increase in energy consumption due to rapid economic growth. Along with this, Thailand has confronted with promoting energy efficiency and reducing greenhouse gases ([hereinafter, "GHG"]). In particularly industrial sector, Measures to save energy and reducing GHG are urgent task. The promotion of energy efficiency is a task of utmost priority in major national energy policy (Thailand Energy Efficiency Development Plan 2015-2036 [hereinafter, "EEDP"]). Accordingly, promotion of energy efficiency in the field of food and beverage production, one of Thailand's main industries, is vital in terms of policy as well.

If we are able to disseminate simultaneous heating and cooling heat pumps with food and beverage companies in the industrial sector through this project, we will be able to realize both energy efficiency and GHG reduction at the same time. In this way, we will be able to make a major contribution to Thailand's energy efficiency policy.

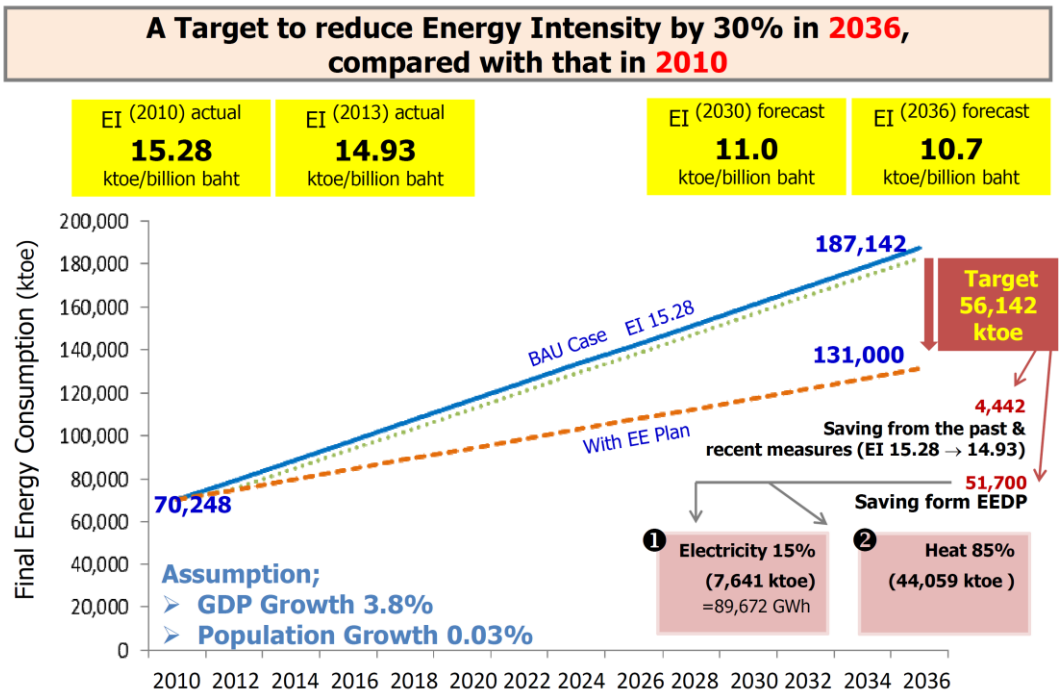

Figure 1-1: Energy Efficiency Goals for the Next 20 Years

Source: Thailand 20-year Energy Efficiency Development Plan (2015-2036)

Table 1-1: Energy Efficiency Goals in Thailand's Industrial Sector

Measure	Residential	Industry	Commercial	Total (GWh)
1. Enforcement of energy conservation standards in designated factory/building	-	10,814	8,834	19,649
2. Building Energy Code (BEC) for the new buildings	-	-	13,686	13,686
3. Energy Labeling (HEPs & MEPs)	8,936	6,226	8,598	23,760
4. Energy Efficiency Resource Standard (EERS) for large energy producers and distributors	1,343	2,367	2,162	5,872
5. Financial Incentives and support for energy performance achievement	-	9,133	5,941	15,074
6. Promoting greater use of LED	3,355	3,303	4,975	11,632
Total (GWh)	13,633	14,516	44,196	89,672

Source: Thailand 20-year Energy Efficiency Development Plan (2015-2036)

- Technology Targeted for Dissemination in This Project

The technology targeted for dissemination in this project is a simultaneous heating and cooling heat pump that uses CO_2 refrigerant, advanced technology of Japan.

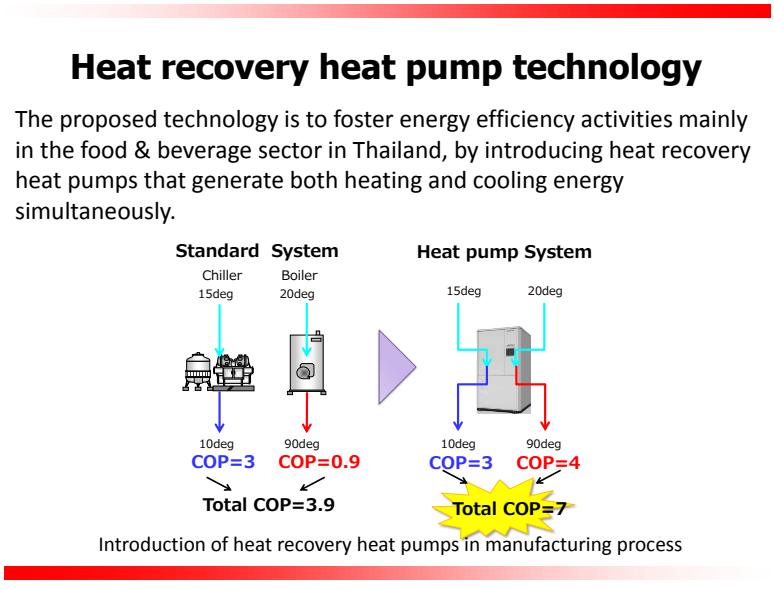

Figure 1-2: Energy Efficiency Comparison for Simultaneous Heating and Cooling Heat Pump

Source: Mayekawa Manufacturing

- Objective/Goal of This Project

This project had the objective of mitigating the barriers to the dissemination of simultaneous heating and cooling heat pumps in Thailand by: (a) improving low level of recognition, and (b) improving initial investments.

- Activities Carried Out in This Project

In this project, we targeted the below-mentioned counterparts for activities in Thailand. As for counterparts, we promoted an understanding of simultaneous heating and cooling heat pumps in industrial sector through activities conducted in Japan and seminars in Thailand.

Table 1-2: List of Counterparts in Thailand

Abbreviation	Official Name
DEDE	Department of Alternative Energy Development and Efficiency
PEA	Provincial Electricity Authority
PEA ENCOM	PEA ENCOM International Co., Ltd.
KMUTT	King Mongkut's University of Technology Thonburi

(a) Improving Low Level of Recognition

The targets for this project were food and beverage companies in Thailand (hereinafter, "customers"). Currently, simultaneous heating and cooling heat pumps are rarely introduced in Thailand. The level of recognition regarding simultaneous heating and cooling heat pumps used for industrial purposes is extremely low. For this reason, there had been little progression in the promotion of understanding, and dissemination had not advanced.With this project, aiming to improve this low level of recognition, we provided training to the above-mentioned counterparts in Thailand including the provision of information and observation of the actual simultaneous heating and cooling heat pumps, and explained to them the basics of simultaneous heating and cooling heat pumps and examples of the promotion in Japan.

In addition, we collected information on trends energy saving policy in Thailand and investigated solutions simultaneous heating and cooling heat pumps for applying Thailand energy performance standards (MEPS and HEPS)

Figure 1-3: Venue of Seminar in Thailand

Figure 1-4: Presenters at Seminar

(b) Improvement of Costly Initial Investments

In general, companies tend to avoid costly initial investments. As one solution for this, we considered utilizing ESCO,[1] which does not require initial investments. In terms of an ESCO, we judged that PEA ENCOM, a subsidiary of PEA for which we can expect abundant cash flow and utilization of PEA's list of customers, was the optimal choice. Thus, we selected PEA ENCOM and carried out considerations.

In addition, we collected information of Thailand's energy saving subsidies and investigated solutions for reducing initial investments by using energy saving subsidies and the like.

- Results/Outcomes of This Project

Upon carrying out all of the above-mentioned tasks in an effort to (a) improve low level of recognition and (b) improve costly initial investments, thereby addressing the barriers to the dissemination of simultaneous heating and cooling heat pumps in Thailand, we earned the below results.

[Results on the Development Side]

(1) Enlightenment on the role and awareness of simultaneous heating and cooling heat pumps, which can be expected to contribute industrial sector

We had the Thailand counterparts recognize the role and importance of simultaneous heating and cooling heat pumps, which can make great contributions to energy effiency and CO_2 reduction in Thailand's industrial sector. We also had DEDE and KMUTT consider a performance certification method for once-through heat pumps. If this performance

[1] Energy Service Company

certification method is established, it can be expected to make a great contribution to the dissemination of simultaneous heating and cooling heat pumps in the future.

[Results on the Business Side]

(1) Improvement in the awareness of simultaneous heating and cooling heat pumps and establishment of the implementing structure of disseminating simultaneous heating and cooling heat pumps in Thailand for this product

We carried out seminars in Thailand and invited the counterparts to Japan and gave them training, aiming to improve the level of awareness regarding simultaneous heating and cooling heat pumps. In addition, we were able to establish a method by which PEA would promote and propose simultaneous heating and cooling heat pumps. We were also able to establish the implementing structure of disseminating simultaneous heating and cooling heat pumps in Thailand.

(2) Improvement of Initial Investments

We reached an agreement regarding continued considerations aimed at realizing the utilization of Thailand's energy saving subsidy scheme. In order to utilize Thailand's energy saving subsidies (hereinafter, "Direct Subsidies"), we will need performance test certificates for simultaneous heating and cooling heat pumps, issued by third-party organizations, for applying Direct Subsidies. If in the future, we are able to reach a consensus with the counterparts in Thailand and performance test certificates are completed, it will be possible to utilize Direct Subsidies, and we will be able to anticipate initial cost reductions.

- Business Development Prospects at This Stage (Business Development Decisions, Considerations, Inability)

Through this project, an agreement was reached between the three parties of Mayekawa, PEA, and PEA ENCOM regarding a method of working toward the dissemination of simultaneous heating and cooling heat pumps in Thailand.

For the immediate future, we will implement proposal activities focusing on customers participating in the seminar which was conducted by PEA and PEA ENCOM in this project.

Figure 1-5: Scene of Discussion

- Basis for Judgment of Business Development Prospects

It is clear that there is a high likelihood of installation for customers who have received a satisfactory result for the energy audits carried out through this method. The prospects for the success or failure of business development will depend on how efficiently potential customers in a roughly three-year payback period following investment can be found. The fact that PEA, which possesses the customer information, will be the main body making proposals is the biggest strength in this business. Thus, we have judged that there are prospects for business development.

- Remaining Challenges for Business Development and the Corresponding Handling Strategy and Policy

Before business development is reached, it is important for PEA and PEA ENCOM to personally conduct proactive proposals to customers. In order for that to happen, it is necessary for them to possess the proposal skills and knowledge needed to carry out walk-through energy audits, as well as detailed energy audits (including analyses and proposals). However, these organizations currently have a shortage of personnel with said proposal skills and knowledge. Accordingly, we believe that in the future, it will be vital to place emphasis on personnel development as well.

In the initial stage, Mayekawa Manufacturing will support the proposal activities of PEA and PEA ENCOM and aim to build their capacity.

Further, when PEA ENCOM carries out detailed energy audits, the expenses to be shouldered by the customer may become an issue depending on the audit results. For this reason, we believe that in the period until dissemination takes hold, it will be necessary to provide a boost through activities such as having a policy wherein energy audits fees are supported, for instance. If this activity can be realized, we believe that it will contribute to faster dissemination.

- Plans for Future Business Development

In terms of business development, we will perform the scheme for this project for customers within PEA's customers who have participated in the seminar and have potential for simultaneous heating and cooling heat pump installation. Initially, we are planning to form a success story within this year. It is important to have a plan in which, through this success story, this project is promoted through wide-reaching introductions and proposals at PEA's branches officies and to food and beverage companies within PEA's customers.

Table 1-3: Predicted Changes in the Number of Contracts

	2018	2020	2022	2024
Number of Contracts	1	5	10	50

- Possibility of Linkage with ODA Projects

To this point, Japan has performed activities with one or multiple other countries including technical support for energy efficiency labeling systems and testing laboratories for individual air conditioning units, which are an object of particular interest in ASEAN countries. In terms of the possibility for future cooperation, we anticipate ODA project in which Japan and Thailand can cooperate to form criteria and design a system and are able to create performance testing criteria for simultaneous heating and cooling heat pumps that conform to Thailand's standards.

In addition, since there is a shortage of personnel with the above-mentioned energy audits skills and knowledge, we can also anticipate an ODA project aimed at training energy audits technicians.

2. Schematic Diagram for Project

The schematic diagram for this project is as shown below.

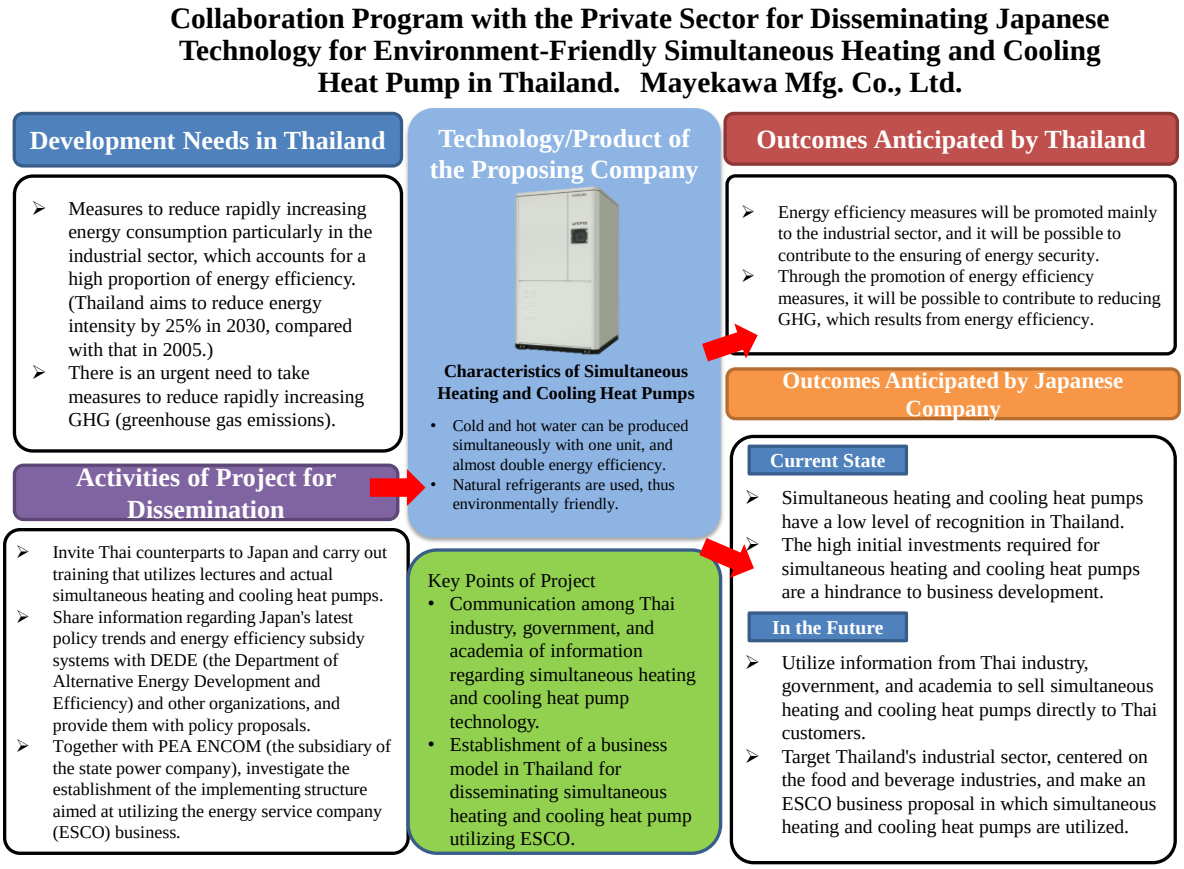

Figure 2-1: Schematic Diagram for Project