

Socialist Republic of Viet Nam Viet Nam

FY2019 Ex-Post Evaluation of Technical Cooperation Project

“Project on Strengthening the System and Operation on Standards and Conformance
for Energy Efficiency and Labeling”

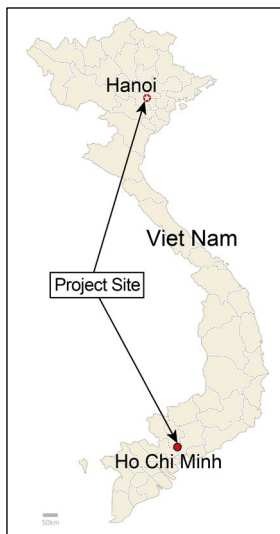
External Evaluator: Mitsue Mishima, OPMAC Corporation

0. Summary

The purpose of this project was to strengthen the operation system of energy efficiency (hereinafter referred to as “EE”) testing laboratories for air conditioners and refrigerators, thereby aiming at disseminating energy efficient products (air conditioners and refrigerators) based on EE policy of the Socialist Republic of Viet Nam (hereinafter referred to as “Viet Nam”). The project is highly relevant since it is consistent with Viet Nam's development plans and policies at the time of the ex-ante evaluation, the needs for setting energy-saving standards and strengthening the test capacity of implementing agencies and related organizations, and is consistent with Japan's development assistance policy at that time. The project improved the capacity of the government agencies that set energy-saving standards and established laws and regulations for home electric appliances in Viet Nam, and of the agencies that certify EE testing laboratories, and also strengthened the test system and staff capacity of the laboratories that conduct EE tests and certify energy efficient labels. As a result, the diffusion of air conditioners and refrigerators with EE labels based on qualified test results was promoted in the Vietnamese domestic market. At the same time, the project benefited the Japanese home electric appliances manufacturers of air conditioners and refrigerators and enhanced awareness of energy saving among consumers, and contributed to climate change countermeasure programs. Therefore, the effectiveness and impacts of the project are high. The efficiency of the project is fair because the project period was within the plan, whereas project cost slightly exceeded the plan. The sustainability of the effects produced by this project is high as the project has no problems in policy/political support, and from an institution/system, technical, and financial aspect.

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

1. Project Description



Project Site



Testing equipment of the air conditioner provided by the project

1.1 Background

In recent years, the Socialist Republic of Viet Nam (hereinafter referred to as “Viet Nam”) has suffered a chronic energy shortage due to an increased energy demand accompanying economic growth, and the Vietnamese Government has put forth various energy saving policies. As one of these policies, the energy saving label system for home appliances, compulsory standardization (the products cannot be sold in the market unless the energy saving label is attached) has been enforced for air conditioners since July 2013 and for refrigerators since January 2014.

Regarding the test standards for certification of energy-saving labels for air conditioners and refrigerators, although some of the international standards proposed by Japan had been adopted, there were many challenging issues in the standard system, such as correlating with the international standard, the appropriate revisions of EE testing standards, the need to revise the energy saving standard, and others. Prior to the beginning of the project, as a testing institute to evaluate the energy-saving performance of household air conditioners and refrigerators, the Testing and Verification Center for Industry (TVCI) was only a registered laboratory under the control of Viet Nam National Coal-Mineral Industries Holding Corporation Limited (VINACOMIN) in the Ministry of Industry and Trade (MOIT) in Viet Nam. TVCI had, however, insufficient testing capacity and reliability.

Meanwhile, JICA had carried out the “Project on Strengthening the System and Operation on Standards and Conformance” from 2009 to 2013. This project targeted the Directorate of Standards, Metrology, and Quality (STAMEQ) under the Ministry of Science and Technology (MOST) and cooperated in strengthening the overall capacity for the standards and operation of

the safe home electric appliances. As a result, STAMEQ's basic conditions on the testing ability of home electric appliances was established. However, it did not have the ability to conduct the energy-saving performance evaluation test of air conditioners and refrigerators. In order to ensure the effectiveness of the energy-saving labeling system, it was urgently necessary to enhance the testing capacity in accordance with the standards and improve the capacity of the testing organizations that contributes to the certification of the standards.

Against the above background, STAMEQ of MOST requested Japan to implement the “Project on Strengthening the System and Operation on Standards and Conformance for Energy Efficiency and Labeling” (hereinafter referred to as “the project”).

1.2 Project Outline

Overall Goal	Energy-efficient products are prevailed in accordance with the energy efficiency policies.	
Project Purpose	Operation of the energy efficiency testing laboratories for air conditioners and refrigerators is strengthened.	
Outputs	Output 1	Capability of revising energy efficiency standards and other energy related standards is improved according to the practical use of air conditioners and refrigerators.
	Output 2	Capability of the energy efficiency testing laboratories for air conditioners and refrigerators is improved.
	Output 3	Capability of accreditation and designation of the energy efficiency testing laboratories for air conditioners and refrigerators is improved.
Total cost (Japanese Side)	464 million yen	
Period of Cooperation	November 2013-November 2016 (3 years)	
Target Area	Hanoi, Ho Chi Minh	
Implementing Agency	Directorate for Standards, Metrology and Quality (STAMEQ) and Bureau of Accreditation (BOA), Ministry of Science and Technology (MOST)	
Other Relevant Agencies / Organizations	<p>Following target agencies for capacity development besides above implementing agency</p> <ul style="list-style-type: none"> • Viet Nam Standards and Quality Institute (VSQI), Quality Assurance and Testing Center 1, 3 (QUATEST 1,3) under MOST STAMEQ • General Directorate of Energy (GDE), Ministry of Industry and Trade (MOIT) * Due to reorganization, Energy Efficiency and Sustainable Development Department (EESDD) at the time of ex-post evaluation • Viet Nam National Coal-Mineral Industries Holding Corporation Limited (VINACOM), Testing and Verification Center for Industry (TVCI) under MOIT 	
Supporting Agency/Organizations in Japan	Ministry of Economy, Trade and Industry (METI), The Japan Electrical Manufacturers' Association (JEMA) Japan Refrigeration and Air Conditioning Industry Association (JRAIA), International Standard Innovation Technology Research Association (IS-INOTEK), Japan Air Conditioning and Refrigeration Testing Laboratory (JATL), and others	

Related Projects	<p>[Technical Cooperation Projects]</p> <ul style="list-style-type: none"> • The Study on Master Plan for Energy Conservation and Effective Use (Technical Cooperation for Development Plan) (2009) • Project on Strengthening the System and Operation on Standards and Conformance (2009 - 2013) • The project for the Establishment of Energy Management Training Center (Stage 1) (2011 - 2012) • The project implementation for the establishment of energy management training Center in Vietnam (Stage 2) (2013 - 2015) <p>[ODA Loan Project]</p> <ul style="list-style-type: none"> • Support Program to Respond to Climate Change (SPRCC) (I)~(VII) (L/A Signing (I) June 2010, (II) November 2011, (III) March 2013, (IV) March 2014 (V) March 2015, (VI) March 2016, (VII) January 2017) <p>[Other Donors]</p> <ul style="list-style-type: none"> • AusAID “Vietnam Energy Efficiency Standards and Labelling Program: Australian Government support project” (2012 - 2015) • UNDP/GEF “Barrier Removal to the cost-effective development and implementation of Energy efficiency Standards and Labeling project (BRESIL)” (2009 - 2013)
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1.3 Outline of the Terminal Evaluation

1.3.1 Achievement Status of Project Purpose at the Terminal Evaluation

The project purpose was expected to be achieved within the project period. In this project, although there are still some monitoring activities to check its progress such as revision of EE test standard for refrigerators, the operational capacity of EE test centers for air conditioners and refrigerators in Viet Nam was strengthened by activities such as installing new laboratory equipment, training in equipment operation, and ensuring the reliability of measurement accuracy, and others. The project has enhanced the capacity to revise test standards and to certify/designate laboratories, which has then strengthened the EE test operation system in Viet Nam. The existing one-laboratory system with only TVCI before the project was changed to a three-laboratory system, adding QUATEST 1 and QUATES 3.

1.3.2 Achievement Status of Overall Goal at the Terminal Evaluation (Including other impacts)

The prospect of achieving the overall goal was evaluated to be a positive, from a result of a visit to a home electronics mass retailers in Ho Chi Minh City where almost all air conditioners and refrigerators in the market were with energy-saving labels were already. Regarding air conditioners, products with high EE performance, including those made in Japan, are expected to occupy the market share owing to the same performance evaluation method between non-inverter and inverter units and the energy saving label system, based on the increase in EE value. In addition, for refrigerators, it was predicted that products with high EE performance will be popular because the testing method will correlate with international standards and the EE standard will be raised.

1.3.3 Recommendations from the Terminal Evaluation

[Recommendation to MOST]

Recommendation	Situation at the time of ex-post evaluation
<p>1. Mutual evaluation testing of air conditioner (QUATEST 3, TVCI) To maintain and improve the accuracy of testing facility for air conditioner installed in QUATEST 3 and TVCI, mutual evaluation testing in Viet Nam should be conducted every two to four years. In addition, QUATEST 3 and TVCI should establish an agreement to collaborate with JATL to conduct mutual evaluation testing every two to four years among the three laboratories.</p>	<p>For mutual evaluation testing, three institutions participated in the international workshop to implement mutual evaluation testing.</p>
<p>2. Appropriate testing fees (QUATEST 1, QUATEST 3, TVCI) In order to maintain the financial sustainability of testing laboratories, the following factors should be taken into consideration in setting testing fees: calibration cost of measuring equipment, cost of mutual evaluation (comparative calibration fee, comparison participation fee between laboratories) maintenance cost by suppliers, depreciation cost of testing facilities and equipment.</p>	<p>Testing fee has not been revised; however, this does not affect the sustainability.</p>
<p>3. PR activities on QUATEST 1 and QUATEST 3 QUATEST 1 and QUATEST 3 should continue PR activities such as promotion seminars and laboratory tours in order to advertise new laboratories to potential clients.</p>	<p>QUATEST 3 is located in Ho Chi Minh where there are many import and export products. They conduct EE testing air conditioners, refrigerators, and other home electric appliances and assign PR expert for PR activities for promoting the use of laboratories.</p>

[Recommendation to JICA]

None

2. Outline of the Evaluation Study

2.1 External Evaluator

Mitsue Mishima, OPMAC Corporation

2.2 Duration of Evaluation Study

The ex-post evaluation study was conducted with the following schedule:

Duration of the Study: October 2019 – August 2020

Duration of the Field Study: November 25 – December 6, 2020, March 2 – 3, 2020

3. Results of the Evaluation (Overall Rating: A¹)

3.1 Relevance (Rating: ③²)

3.1.1 Consistency with the Development Plan of Viet Nam

This project is consistent with the development plan from the time of ex-ante evaluation to the completion of the project. In 2006, a ten-year plan for the *National Energy Efficiency Program (VNEEP)* was formulated, and comprehensive energy-saving measures has been promoted. The

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

² ③: High, ②: Fair, ①: Low

Vietnamese government decided to implement the following various policies, laws and regulations, and others on energy saving and energy efficiency measures that were mentioned at the time of project completion, after *the Prime Minister's decision No. 79/2006/QĐ-TTg “Approval of national goals for energy conservation”* (April 14, 2006).

- *Energy Saving Label System Procedure/Procedure: Ministry of Commerce and Industry Notification No. 08/2006/TT-BCN* (November 16, 2006)
- *Energy Conservation Law Enforcement : Detailed Regulations Cabinet Order No. 21: Decree No.21/2011/ND-CP* (March 29, 2011)
- *Energy-saving labeling, list of devices subject to MEPS³, and roadmap for implementation: Prime Minister's Decision No.51/2011/QĐ-TTg* (September 12, 2011)
- *Guidelines for energy-saving labeling Circular No. 07: No.07/2012/TT-BCT* (April 4, 2012)

The purpose of this project, “strengthening the test operation system of the EE laboratories for air conditioners and refrigerators,” is to promote energy saving in conjunction with the national goal of energy saving by establishing EE tests and standards and strengthening test capacity in accordance with the above laws and regulations. It is consistent with the policy of the Vietnamese government to promote energy efficiency.

3.1.2 Consistency with the Development Needs of Viet Nam

This project met the needs of the target group for capacity building, and the companies that manufacture and sell air conditioners and refrigerators that are the final beneficiaries. For companies that import air conditioners and refrigerators in Ho Chi Minh City and sell them in Viet Nam, there was a great need for EE tests in Ho Chi Minh City.

Prior to the start of this project, only TVCI was designated as an EE testing institution for air conditioners and refrigerators, but there was a need to improve test processing capacity and reliability and a demand to improve the test system including QUATEST 1 and QUATEST 3.

Through this EE test and energy-saving label system, this project will provide the correct information on energy saving to suppliers, who deal with air conditioners and refrigerators, and consumers. Thus the project will meet the needs of the final beneficiaries.

3.1.3 Consistency with Japan’s ODA Policy

This project was consistent with Japan's ODA policy at the time of the ex-ante evaluation. In Japan's Country Assistance Policy for Socialist Republic of Viet Nam (December 2012), “Growth and strengthening competitiveness” was emphasized as a priority area for assistance to

³ Minimum Energy Performance Standards (MEPS). If the power consumption of the target home appliances exceeds MEPS, import and production of the products will be prohibited. MEPS regulations was enforced on January 1, 2015 for both air conditioners and refrigerators.

Viet Nam, The promotion of energy efficiency was described as a policy that supported the increasing demand for energy along with economic growth and infrastructure.

The project was sufficiently consistent with the development policies and the development needs of Viet Nam as well as with Japan’s ODA policy. Therefore, the relevance of this project is high.

3.2 Effectiveness and Impact⁴ (Rating: ③)

3.2.1 Effectiveness

3.2.1.1 Achievement of Project Purpose

Outputs 1 to 3 of the project were achieved, thereby achieving the project purpose. As a result of the training and guidance provided in project activities by Japanese experts in the project, the capacity of VSQI and GDE (currently EESDD) were improved to review the standard of the energy-saving test and for air-conditioner and refrigerator standards (Outcome 1). In addition, with the experience and knowledge gained through project activities, new models of air conditioners and refrigerators are continuously tested in compliance with the revised standards, and energy-saving label is affixed to all products. Capacity development through the activities of the project is being utilized (Outcome 2). Furthermore, through the project activity, GDE and BOA are judged to have acquired the capacity to certify according to the revised law (Outcome 3). These outcome results are linked to the achievement of the indicators shown in Table 1 on achievement of project purpose.

Table 1: Achievement of Project Purpose

Project Purpose	T Indicator	Actual
Operation of the energy efficiency testing laboratories for air-conditioners and refrigerators is strengthened.	1. Improvement of capability by designated energy efficiency testing laboratories*	Achieved. As a result of the training in Japan and the technology transfer through on-the-job training (OJT) of the staff of QUATEST 1 and 3, the new test equipment provided for both laboratories by the project were used properly. Together with these laboratories, TVCI of VINACOMIN participated in the training. The capacity on energy efficiency testing of all three designated EE laboratories was improved.
	2. Increase in the number of accredited and designated energy efficiency testing laboratories	Achieved. The number of accredited and designated institutions has increased by 2 and they are in operation (QUATEST 1, 3)

Source: Terminal evaluation report “Socialist Republic of Viet Nam: Project on Strengthening the System and Operation on Standards and Conformance for Energy Efficiency and Labeling” (June, 2016), and answer to the ex-post questionnaire and interview of stakeholders.

Note: The laboratory will be able to carry out energy-saving tests as an “energy-saving laboratory” if it is designated by GDE (currently EESDD). The Industrial Testing Laboratory (TVCI) is already operating as an energy conservation testing laboratory for air conditioners and refrigerators. This project supported QUATEST 1 and QUATEST 3 to be designated as EE testing laboratories for air-conditioners and refrigerator.

⁴ Sub-rating for Effectiveness is to be put with consideration of Impact.

With respect to the revision of laws and regulations, the air conditioner EE test standard was completed. It was issued as a national standard (national standard number TCVN 7828) during the project implementation period (Prime Minister's Decision 13550/QD-BCT December 2015), and the refrigerator EE test standard was approved. The revised national standard (TCVN 7830) was also issued after the project as the Prime Minister's decision (Prime Minister's Decision 1133/QD-BCT March 2017). According to an interview of Japanese experts once again at the time of the ex-post evaluation, the capacity of the target group (STAMEQ, BOA, VSQI, GDE) in charge of revising the law and regulations and test standard setting improved by the project activities. In self-evaluation of target group upon interviewing them, they assessed that their capacity was also enhanced through project activities in terms of their level of understanding of international standards for energy saving of air conditioners and refrigerators. VSQI officials said they enhanced their awareness, gained knowledge about international standards, and improved their understanding about air conditioner testing methods and energy efficiency calculation methods in accordance with international standards. GDE staff also commented that they learned about EE standards and certification through their participation in project training.

In light of the trend in the number of EE test reports of QUATEST 1, 3, and TVCI (Table 2), which was mentioned in the indicator of Output 2, as the basis for judging the improvement of test implementation capacity for QUATEST 1, 3, TVCI, there have been a certain number of tests reports from 2017 to 2019 after the project was completed at the end of 2016. The number of tests does not necessarily increase every year and fluctuates each year. This is because, while it is necessary to carry out an energy-saving test for each new model, the schedule for developing new models of air conditioners and refrigerators depends on the strategies and circumstances of respective manufacturers. In addition, once certification of the energy saving label is obtained, it is valid for three years. Thus it may not be necessary to obtain certification of the energy saving label every year.

Table 2: Number of EE Test Reports

Laboratory	Category	Year						
		2013	2014	2015	2016	2017	2018	2019 (As of Nov.)
TVCI	Refrigerator	153	164	182	148	152	125	147
	Air conditioner	294	179	248	264	257	261	233
QUATEST 1	Refrigerator				155	67	138	86
QUATEST 3	Refrigerator		20	46	306	240	242	203
	Air conditioner				127	73	61	38

Source: Answers to the questionnaire to each institution

In interviews with Japanese experts, QUATEST 1, 3, TVCI on the Vietnamese side, during the ex-post evaluation, they affirmed that the project improved the laboratories' capacity of conducting more appropriate and accurate energy-saving tests using the measuring equipment. All target group institutions highly valued the guidance of Japanese experts, and stated that the project has enabled more accurate test results. In the opinion of EESDD and BOA, they evaluated that the capacity of these laboratories was improved by the project.

At the time of the ex-post evaluation, in interviews with Japanese experts and BOA and EESDD on the Vietnamese side, as well as at the time of the terminal evaluation, it was found that through project activities such as the joint evaluation conducted with the experts, their capacity in the certification of EE laboratories for air conditioners and refrigerators had improved. In the opinion of the director of BOA, the teaching method of Japanese experts was impressive, it was good to teach theory first followed by practical training that actually showed how to measure and calculate using the equipment. The staff who participated in the training stated that they acquired practical knowledge after participating in the training. The Deputy Director of EESDD pointed out that it was good that they were able to discuss energy conservation policies and standard setting and energy saving incentives with the ministries and agencies during the training period in Japan.

As a result of the project, two laboratories, QUATEST 1 and 3 that were certified as refrigerator EE testing laboratories, as well as TVCI, which received guidance from Japanese experts in the project, have continued the testing work every year since the end of the project. According to an interview with a technical staff member of Panasonic Corporation in Viet Nam, they appreciated that good staff members at QUATEST 1, 3 and TVCI were trained by Japanese experts. The test results were accurate and always presented on time.

In the light of above-mentioned evidence, the project purpose has been achieved.

3.2.2 Impact

3.2.2.1 Achievement of Overall Goal

Although the actual performance indicator of the overall goal was not available⁵, by regulation (MOIT Circular No.36/2016/TT-BCT), products without energy saving labels cannot be sold in the market, as pointed out at the terminal evaluation. At the time of the ex-post evaluation, when home electronics mass retailers (2 locations in Ho Chi Minh, 2 locations in Hanoi) were interviewed, all air conditioning and refrigerator products had energy-saving labels attached. Moreover, as shown in Table 2, the number of energy-saving tests at each

⁵ When requesting EESDD to provide data on the share of EE labeled air conditioners and refrigerators to the total in the market and the number of applications and registrations, it was difficult to obtain the data on application and registration of only air-conditioners and refrigerators because one company usually applied for several products despite records on application and registration number by company.

laboratory has remained at a certain figure every year, thus the number of applications and registrations of energy-saving label products should be increased.

Based on enforcement of the circulation and the results of interviews with home electronics mass retailers, energy-saving products (air conditioners and refrigerators) are disseminated 100% in Viet Nam, and the overall goal is considered to have been achieved.

Table 3: Achievement of the Overall Goal

Overall Goal	Indicator	Actual
Energy efficient products are prevailed in accordance with the energy efficiency policies	1. Increase in the share of energy efficiency labeled products in the Viet Nam Market	Achieved. Due to unavailability, the data for this indicator could not be obtained. There are regulations requiring energy-saving labels to be attached to all products. In the interview with some home electronics mass retailers, all air-conditioners, and refrigerators have EE labels. Accordingly, the share of energy efficient products in the Vietnamese market has been increasing.
	2. The number of application and registration of energy efficiency labeled products by designated energy efficiency testing laboratories	Achieved. The number of applications/registrations of air conditioners and refrigerators has not been compiled and therefore could not be obtained. However, the number of applications and registrations are increasing based on the number of EE test reports at each laboratory.

Source: Terminal evaluation report “Socialist Republic of Viet Nam: Project on Strengthening the System and Operation on Standards and Conformance for Energy Efficiency and Labeling” (June 2016), and answer to the ex-post questionnaire and interview of stakeholders.

Note: Target energy efficient products in this project are air-conditioners and refrigerators.

3.2.2.2 Other Positive and Negative Impacts

The following points were recognized as other impacts of this project.

(1) Benefits to Japanese home appliance manufacturers

Against the background of economic growth in Viet Nam, the income of urban consumers has been increasing and there is a growing demand for home appliances with better performance and quality. Japanese home electric appliances tend to be favored by middle- and high-income consumers in urban areas as a highly reliable brand of equipment, which is the reason for purchasing Japanese products. Although this tendency has been noted, in interviews with a few home electronics mass retailers and Vietnamese counterparts, their comment was that energy-saving labels was a criteria when purchasing air conditioners and refrigerators. With this project, the threshold of energy saving level was reviewed and energy saving labeling based on more accurate measurement became possible, which seems to have been a driving force in the increase of sales for Japanese home electric appliance manufacturers that produce high energy saving equipment.



Figure 1: Energy Saving Label



Photo: Energy saving labeled Daikin Air-conditioners and Panasonic Refrigerators

As examples of Japanese companies that have a relatively high market share of air conditioners and refrigerators in Viet Nam, during the ex-post evaluation survey, an interview of Daikin sales representatives and technical staff and Panasonic technical staff was conducted in order to hear the opinion of the manufacturer. As a result, Daikin's inverter air-conditioners (almost all products have a 5-star energy-saving level) have been increasing in sales for the past five years, and Panasonic's air conditioners and refrigerators are also increasing in sales. Although the high energy efficiency indicated in the energy-saving label is not always the first criteria in consumer selection of air conditioners, Daikin commented that the introduction of the energy-saving label system has contributed to an increase in their product sales and Panasonic technical staff also commented that the introduction of the energy-saving label system could be pointed out as one of the reasons why the company's market share in Viet Nam increased.

In addition, according to an interview with Daikin, the new model air conditioners were imported from a factory in Thailand; and it was the first pilot case to sign a memorandum of understanding with MOIT in August 2019, which approves the overseas energy saving test results. QUATEST 3 in Viet Nam was about to check the results of the energy saving test in Thailand (refer to “3.4 Sustainability” for details). In addition, for some of the conventional models, a factory for air conditioners was built in the suburbs of Hanoi and production has begun with the aim of further increasing sales.

The increase in the number of laboratories also had the impact of reducing costs for manufacturers. According to interviews with EESDD, QUATEST 3 and Daikin, the fact that this project enabled an energy-saving test for air conditioners in QUATEST 3 in Ho Chi Minh had a significant impact on cost and time saving for companies importing air-conditioners via Ho Chi Minh, since they used to transport their products to the laboratory in Hanoi for EE tests before the project.

(2) Increase in consumer interest in energy-saving products

As a result of the increased number of laboratories and improved testing capacity of laboratories through this project and having promoted the dissemination of energy-saving labels on air conditioners and refrigerators, more consumers saw the energy-saving labels at the shops, thereby contributing to enhanced consumer awareness of energy conservation. In an interview with QUATEST 1, an opinion was expressed that not only air conditioners, but also refrigerators tended to be favored in the market as high energy-saving products. In interviews with consumer electronics retailers, it was found that although energy saving levels were not always the first criteria because brands and prices tended to be considered first when purchasing air conditioners and refrigerators, the level of energy saving was one of the reasons consumers purchased a product.

Viet Nam began VNEEP in 2006 before the implementation of this project, and it has been conducting awareness raising activities for consumers to enhance their awareness about energy conservation. The program has been continuously implemented even at the time of the ex-post evaluation, making the effort to raise consumer interest in energy-saving products. Simultaneously with this policy, consumers are becoming increasingly aware of energy conservation labels.

(3) Contribution to climate change programs

In the terminal evaluation report of this project, revisions of the EE test standard for refrigerators and air-conditioners in this project were incorporated into the policy action plan of SP-RCC under the cooperation of the Japanese ODA loan “Support Program to Respond to Climate Change (SP-RCC).” The reports mentioned that this inclusion led to a strong commitment by the Vietnamese government and had derived a great effect. This project directly contributes to the reduction of CO₂ that contributes to climate change by reducing the energy consumption volume with the diffusion of products with high energy-saving levels. It can be said that this fact became a concrete measure for the mitigation of climate change, the Green House Gas (GHG) emission regulations targeted by SP-RCC.

Through project implementation, the project purpose of “strengthening the test operation system of the EE laboratory for air conditioners and refrigerators” was achieved by improving the capacity and increasing the number of laboratories. “Dissemination of products (air conditioners and refrigerators)” was confirmed, and there were impacts on the benefits of Japanese home electric appliances manufacturers, enhanced consumer awareness of energy conservation, and contributions to Viet Nam's climate change countermeasures. As seen in the above, its effectiveness and impact are high.

3.3 Efficiency (Rating: ②)

3.3.1 Inputs

Table 4 below shows the actual results at the time of project completion against the plans at the time of the detailed plan formulation study of the project. Regarding the dispatch of experts, in addition to the chief advisor, other than the scheduled expert dispatch, the experts were dispatched timely according to the project progress and the situation of counterpart organizations. In the interviews during the ex-post evaluation, Japanese experts were generally evaluated to be highly satisfactory by Vietnamese counterpart personnel.

Table 4: Inputs for the Project

Inputs	Plan	Actual
(1) Experts	Long-term and Short-term experts Total: Approximately 150 MM (Chief Advisors, Energy Efficiency Performance Test of Air Conditioners, Energy Efficiency Performance Test of Refrigerator, Project coordinator and human resource planning, other)	Total 15experts Total Approximately 146.12MM 4 Long term experts (Chief Advisor, Energy Efficiency Performance Test of Air Conditioners, Energy Efficiency Performance Test of Refrigerator, Project coordinator) 11 Short-term experts (Revision on the Air Conditioners EE standard, Accreditation on Laboratories of EE test of Refrigerator, Accreditation on Laboratories of EE test of Air-Conditioners, and other)
(2) Trainees received	Counterpart Training in Japan and in the Third Country	35 persons (Training in Japan, 5 times)
(3) Equipment	Refrigerator EE testing equipment (planned to be installed at QUATEST 1), Air-conditioner EE testing equipment (planned to be installed at QUATEST 3), office equipment, etc.	Air-conditioner EE testing equipment, Refrigerator EE testing equipment, office equipment, vehicle, etc. (total Approximately 230 million Yen)
(4) Project activity cost (Local Cost)	Local cost for seminars, workshops, OJT	Approximately 26.6 million yen (Employment of part-time worker, domestic travel expense, telecommunication fee, etc.)
Japanese Side Total Project Cost	454 million JPY	464 million JPY
Vietnamese Side Total Project Cost	Cost for supply or replacement of equipment, machinery, instrument, tools, spare parts, installation fee for equipment, utilities, etc.	2,968 million VND (Approx. 452 thousand yen)* office interior, tools, utilities, etc.

Source: Record of Discussion of the Project (September 2013), "Terminal Evaluation report, Socialist Republic of Viet Nam: Project on Strengthening the System and Operation on Standards and Conformance for Energy Efficiency and Labeling" (June 2016), "Project Final Report on Strengthening the System and Operation on Standards and Conformance for Energy Efficiency and Labeling, Socialist Republic of Viet Nam" (November 2016)

Note: * Total amount at the time of Terminal Evaluation, April. 2016. Based on JICA exchange rate 1 VDN=0.005027 Yen as of May 2016

3.3.2 Elements of Inputs

3.3.2.1 Project Cost

The amount of cooperation for this project slightly exceeded the original plan (102% of the plan). The reason for slightly exceeding the plan seems to be due to the difference in the number of training received and the actual price of the equipment procured. These changes are evaluated to be appropriate as they are the result of a response to what was required.

3.3.2.2 Project Period

At the time of planning, the project period was from October 2013 to September 2016 (three years), however, the actual cooperation period was three years from November 2013 to November 2016, which was within the planned three years.

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

3.4 Sustainability (Rating: ③)

3.4.1 Related Policy and Political Commitment Aspects for the Sustainability of Project Effects

Regulations related to energy-saving labels have been promulgated even after the project was completed as follows, and the obligations of energy-saving labels have become even more consolidated. Moreover, the national program related to energy efficiency are ongoing. Therefore, the sustainability of policy and political involvement is high.

[Regulations concerning energy-saving labels issued after the project]

- *Circular No.36/2016/TT-BCT* (December 2016) promulgated immediately after the completion of the project describes the type of energy saving label testing and certification, which standard of what organizations should be adopted. According to this circular, the EE test results of overseas laboratories in addition to the target laboratories of the project can be admitted in Viet Nam if they meets international standards. As a result of the survey conducted in this ex-post evaluation however, each manufacturer of air conditioners and refrigerators basically obtain the energy efficiency figures and energy saving labels certified by QUATEST 1, 3 or TVCI in Viet Nam. In August 2019, the application of certification based on the test results of the Daikin air conditioner in Thailand began as the first time pilot case.
- According to *the Prime Minister's decision No. 04/2017/QĐ-TTg* (March 2017), a list of the equipment that require energy-saving labels was published including air conditioners and refrigerators.

- According to *the Prime Minister's decision No. 24/2018/QĐ-TTg* (May 2018), products that do not meet the national minimum energy efficiency standard (MEPS) of air conditioners and refrigerators are prohibited from being imported, manufactured or traded in Viet Nam.

[National programs related to energy conservation]

MOIT formulated the *National Energy Efficiency Program 2019-2030 (VNEEP 2019-2030)* in March 2019 as an extension of the national energy efficiency program that has been implemented since 2006, promoting further energy conservation policies. In addition, the government formulated a policy on “Cleaner Production and Sustainable Consumption” as a goal to be achieved by 2030, and if this policy is approved, the energy-saving products certified by the energy-saving label will be further promoted.

3.4.2 Organizational Aspects for the Sustainability of Project Effects

From the following points, it was evaluated that there were no problems affecting the sustainability at the time of the ex-post evaluation in the organizational structure and staff assignment of the target group of the project.

- As a result of interviews with QUATEST 1 and QUATEST 3, each organization has an independent accounting system. However, there was an opinion that the number of staff in charge of EE testing was not particularly in shortage given the number of products to be tested. It was confirmed that the staff who participated in the training session of the project and received guidance from the Japanese experts continued to be in charge of the same work at each institution. Thus there was no problem in that regard.
- In an interview with VSQI under STAMEQ, which is in charge of setting national standards, drafting and promulgating legislation, it was also stated that there were no institutional issues.
- The department in charge of energy conservation of GDE of MOIT became EESDD due to reorganization after the project was completed. At the time of GDE, there were eight full-time staff; however, the newly organized EESDD has a total of 20 staff. There was no particular problem with the system.

3.4.3 Technology required to sustain the effects

It has been evaluated that there are no problems with the technical aspects of the test capabilities of QUATEST 1, 3 and TVCI based on the following points.

- Regarding air conditioner EE tests, Japanese experts said that once every three years, it was necessary to carry out a mutual evaluation test of the same products with other test laboratories and compare them to confirm test capability. In recent years, an international

workshop⁶ has been held every year to do a round robin test (a method of collaborative work to measure the same product in order to verify the reliability of the measuring method and measuring equipment including the skill of the measurer by multiple test laboratories). QUATEST 3 and TVCI participated in this workshop and they did the mutual evaluation. According to the mutual evaluation results of air conditioners in November 2019, the workshop organizer did not point out that the test results of both QUATEST 1 and TVCI institutions showed any problems with the test method.

- Regarding the refrigerator EE test, according to QUATEST 1, they sometimes confirmed the results by comparing it with the test results of QUATEST 3 or TVCI.

3.4.4 Finance required to sustain the effects

At the time of the ex-post evaluation, no financial problems were found to sustain the effects of this project. According to the results of interviews with QUATEST 1 and 3, TVCI, it was found that there was no financial problem because each organization covered necessary expenses such as personnel expenses and O&M expenses for equipment with the income from the test fee.

3.4.5 Operation and maintenance status of equipment provided

When a field survey was conducted to confirm the set of test equipment such as air conditioners and refrigerators provided to QUATEST 1 and 3 by this project, it was confirmed that they were operated and maintained properly without any problems such as breakdowns.

As in the above, no major problems have been observed in the policy background and the institutional/organizational, technical, financial aspects. Therefore, sustainability of the project effects is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The purpose of this project was to strengthen the test operation system of the EE laboratories for air conditioners and refrigerators, thereby aiming to spread energy-saving products (air conditioners and refrigerators) based on Viet Nam's EE policy. The project is highly relevant since it is consistent with Viet Nam's development plans and policies at the time of the ex-ante evaluation, the needs for setting energy-saving standards and strengthening the test capacity of implementing agencies and related organizations, and is consistent with Japan's development assistance policy at that time. The project improved the capacity of the government agencies that

⁶ Collaborative Labelling and Appliance Standards Program (CLASP), a private organization for strengthening energy efficiency regulations and consistency, hosted this workshop. Policy makers, regulators, and technical staff of laboratories from 8 ASEAN countries such as Viet Nam, Thailand, Laos, Cambodia, Myanmar, the Philippines, Indonesia, Malaysia, participated in the workshop held in Ho Chi Minh City on November 2019.

set energy-saving standards and established laws and regulations for home electric appliances in Viet Nam, and of the agencies that certify EE testing laboratories, and also strengthened the test system and staff capacity of the laboratories that conduct EE tests and certify energy efficient labels. As a result, the diffusion of air conditioners and refrigerators with EE labels based on qualified test results was promoted in the Vietnamese domestic market. At the same time, the project benefited the Japanese home electric appliances manufacturers of air conditioners and refrigerators and enhanced awareness of energy saving among consumers, and contributed to climate change countermeasure programs. Therefore, the effectiveness and impacts of the project are high. The efficiency of the project is fair because the project period was within the plan, whereas project cost slightly exceeded the plan. The sustainability of the effects produced by this project is high as the project has no problems in policy/political support, and from an institution/system, technical, and financial aspect.

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

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

None.

4.2.2 Recommendations to JICA

None.

4.3 Lessons Learned

Conditions for penetrating the energy-saving label system and disseminating energy-saving equipment in the target country

Under the energy efficiency policy at the national level with a high commitment by the Vietnamese government since 2006, the project was implemented to support the revisions of the national energy efficiency standards for air conditioners and refrigerators in Viet Nam and to improve the capacity of test methods at laboratories. On the consumer side, it coincided with a rising urban consumer income due to the recent economic growth of Viet Nam; and consumers were able to afford energy efficient equipment and had a better understanding about the benefits of energy efficiency.

One of the reasons why capacity improvement was achieved in Viet Nam is because Vietnamese engineers had the basic foundation to learn the test methods taught by Japanese experts, and they were highly motivated to learn. Moreover, since 2008, JICA started technical cooperation in Viet Nam to prepare an energy efficiency master plan, and through support to establish an energy efficiency training center, JICA became familiar with the situation and needs of the counterpart country, and also worked with counterpart organizations such as MOIT. In addition, when

implementing the project focused on the labeling of energy-saving equipment such as air conditioners and refrigerators and strengthening the operational system, the accuracy in grasping the energy-saving needs of home appliances was enhanced, which was one of the underlying reasons that increased the effectiveness of the project.

To save energy as a countermeasure against the climate change was described in the “Intended Nationally Determined Contribution: INDC” as a Viet Nam’s policy for continuous efforts. Under this international commitment, in order to ensure the spread of energy-saving equipment through the establishment of an energy-saving label system, it is necessary to confirm the environmental conditions under which the energy-saving equipment will be used during the project preparation survey. In other words, the following points are critical: analyzing the policy/legal system of the counterpart country; the economic/social situation and the capacity of the stakeholders; whether there is a high level of commitment from the counterpart organizations; whether counterpart staff have a basis for understanding the content of the guidance; whether there is a political power that permeates the system from the top down; whether electricity cost reductions affect households or companies' finances and whether consumers understand it, and also whether purchasing power has reached a certain level. It can be said that an analysis of the abovementioned issues was the key to enhancing effectiveness and impact. In this project, the aforementioned conditions existed and became the factors that led to the success.

End