Summary of the Results of Evaluation Study

1 Outline of the Project	
Country: Socialist Republic of Vietnam	Project Title：Project on Strengthening the System and Operation on Standards and Conformance for Energy Efficiency and Labeling
Thematic Area: Private Sector Development	Cooperation Scheme：Technical Cooperation Project
Division in Charge：Team 1, Private Sector Development Group	Total Cost: Approximately 440 million Yen
Project Period：23 November 2013 ～ 22 November 2016 Supporting Organization in Japan：Ministry of Economy, Trade and Industry (METI), The Japan Electrical Manufacturers' Association (JEMA), Japan Refrigeration and Air Conditioning Industry Association (JRAIA), Japan Air conditioning and Refrigeration Testing Laboratory (JATL), International Standard Innovation Technology Research Association (IS-INOTEK)	Counterpart Agencies： - Directorate for Standards, Metrology and Quality (STAMEQ), Ministry of Science and Technology (MOST) - Viet Nam Standards and Quality Institute (VSQI), STAMEQ - Quality Assurance and Testing Center 1 (QUATEST 1), STAMEQ - Quality Assurance and Testing Center 1 (QUATEST 3), STAMEQ - Bureau of Accreditation (BoA), MOST - General Directorate of Energy(GDE), Ministry of Industry and Trade (MOIT) - Testing and Verification Center for Industry (TVCI), Viet Nam National Coal-Mineral Industries Holding Corporation Limited (VINACOMIN), MOIT

1-1 Background of the Project

In recent years, energy saving has been one of the crucial policies to tackle climate changes in the world. The Government of the Socialist Republic of Viet Nam (hereinafter referred to as "GOV") has been implementing a several measures related to energy saving policies. With regard to revision of standards for Energy Efficiency (EE) testing and application of Minimum Efficiency Performance Standards (MEPS) and enforcement of energy labeling, the compulsory energy labeling for household air conditioners has been enforced since July 1st, 2013, and that for household refrigerators has been enforced since January 1st, 2014.

As for Vietnamese testing standards for the certification of EE labeling for air-conditioner and refrigerator, there are some issues in the standard system to be solved, although a part of international standards proposed by Japan were incorporated in the standards system. In Viet Nam, moreover, EE testing laboratories for household air-conditioner and refrigerator which were designated by GOV was only TVCI under VINACOMIN, MOIT, and they were lack of capacity and reliability for the operation.

Under the circumstances, the GOV requested the Government of Japan (hereinafter referred to as "GOJ") to implement a technical cooperation project to strengthen the capacity of EE testing and capacity of revising EE and other energy-related standards. Following the approval of the request by GOJ, JICA conducted the detailed planning survey in June 2013 and the Record of Discussions (R/D) was signed between the GOV and JICA on September 17, 2013 on "Project on Strengthening the System and Operation on Standards and

Labeling for Energy and Efficiency and Labeling”(hereinafter referred to as“the Project”). The three-year Project was commenced in November, 2013.

1-2 Project Overview

(1) Overall Goal

Energy-efficient products are prevailed in accordance with the energy efficiency policies.

(2) Project Purpose

Operation of the energy efficiency testing laboratories for air conditioners and refrigerators is strengthened.

(3) Outputs

1. Capability of revising energy efficiency standards and other energy related standards is improved according to the practical use of air conditioners and refrigerators.
2. Capability of the energy efficiency testing laboratories for air conditioners and refrigerators is improved.
3. Capability of accreditation and designation of the energy efficiency testing laboratories for air conditioners and refrigerators is improved.

(4) Inputs (As of end of May 2016)

(Japanese Side)

- Experts: 4 long-term experts and 9 short-term experts(121.92 Man/Month)
- Training in Japan (five times, No. of participants; 35 persons):
- Provision of Equipment: Approximately 228 million JPY (= 45,341 million VND)
- Local Cost: approximately 24 million JPY (approximately 4,702 million VND)

(Vietnamese Side)

- Counterpart: 31 persons (including Project Director and Project Manager)
- Provision of office space for Japanese experts: Four (4) rooms have been provided for the experts at STAMEQ, QUATEST 1, and QUATEST 3.
- Local Cost: For the Project period, 900 million VND by STAMQE, 1,018VND by QUATEST 1 and 1,050 million VND by QUAEST 3 were born by Vietnamese side.

2 Terminal Evaluation Team

Member of the Evaluation Team

Japanese side

Name	Title	Occupation
Mr. UEDA Takafumi	Leader	Senior Advisor (Private Sector Development), JICA
Mr.SETA Katsuo	Conformity Assessment	National Institute of Technology and Evaluation (NITE)
Mr. TANIGAWA Keisuke	Cooperation Planning	Deputy Assistant Director, Team 1 of Private Sector Development Group, JICA
Mr. MINAGAWA Yasunori	Evaluation Analysis	Senior Consultant, Consulting Dept., SKK Research & Consulting Inc.

Member of the Evaluation Team	Vietnamese side		
	Name	Title	Occupation
	Dr. Vu Van Hong	Director	Director, International Cooperation Department, STAMEQ
	Mrs. Ngo Thi Ngoc Ha	Deputy Director	VSQI
	Mr. Kim Duc Thu	Director	QUATEST 1
	Mr. Truong Thanh Son	Vice Director	QUATEST 3

Period of Evaluation	05 June 2016 ～ 25 June 2016	Type of Evaluation：	Terminal Evaluation

3 Project Performance

3-1 Achievements

(1) Output 1

Indicator: Degree of understanding about a revision of standards for energy efficiency testing and application of MEPS and energy efficiency labeling and grading for air-conditioners and refrigerators

Output1 will be achieved.

In Output 1, technical support to Viet Nam has been provided in collaboration with related Japanese institutions for harmonization with international standards on testing standards for refrigerator and air conditioner and training has been conducted in the Project to secure appropriateness of revision of EE standards. Through these activities VSQI have expanded their knowledge about how to identify and resolve the problems of conventional domestic standards for harmonization with international standards. As a result, the revision of EE testing standards for air conditioner has been completed, while the draft of the revision on EE standard for refrigerator is expected to be submitted to the minister of Science and Technology by the end of September 2016. VSQI in collaboration with GDE revised MEPS and EE grading standards of labeling based on revised EE testing standards for air conditioner. Considering the observation above, it can be said that the capability of revising the related standards at Viet Nam side has been improved and that Output1 will be achieved by the end of the Project period.

(2) Output 2

Indicator: Increase in the number of energy efficiency testing for air-conditioners and refrigerators by the energy efficiency testing laboratories

Output 2 will be achieved.

In Output 2, the Project assisted the improvement of capability on EE testing at Viet Nam side by 1) setting-up of EE testing equipment for air conditioner in QUATEST 3, 2) training on EE testing for air conditioner to QUATEST 3 and TVCI, 3) the setting-up of EE testing equipment for refrigerator in QUATEST 1 and 4) training on EE testing for refrigerator to QUATEST 1, QUATEST 3 and TVCI. A table below shows the number of issue of test reports by testing laboratories in Viet Nam, as of 15 June 2016 which shows a trend toward increase of number of EE testing for air conditioner and refrigerator. Simulation assessment team consisting of short-term experts conducted simulation assessments on QUATEST 1 for refrigerator

EE testing and on QUATEST 3 for air conditioner. These were not formal accreditation process but the laboratories were required corrective actions for non-conformities found by the team. Corrective actions taken by QUATEST 1 and QUATEST 3 have been confirmed to be appropriate, which shows the technical level of these laboratories satisfies international requirements. At the same time, these laboratories were assessed by BoA team and granted formal accreditation, based on ISO/IEC 17025.

Although each EE testing laboratory has become capable for implementing EE testing for air conditioner and refrigerator by themselves, inter-laboratory comparison to confirm reliability of the testing results is expected to be completed by the end of the Project period.

Table: Number of Issue of Test Reports

Laboratory	Category	Designation by MOIT	Accreditation By BoA	(Jan. – Dec.) 2013	(Jan. – Dec.), 2014	(Jan. – Dec.), 2015	2016 (As of 15 June)
TVCI	Refrigerator	May 23, 2011	Jan 19, 2011	153	164	182	105
	Air conditioner	ditto	ditto	294	178	248	191
QUATEST 1	Refrigerator	Dec. 16, 2015	Mar. 03, 2016				31
QUATEST 3	Refrigerator	Jun. 05, 2014	Nov. 27, 2014		20	46	45
	Air conditioner	Jan. 14, 2016	June 10, 2016				42

Source: Information provided by the Project office

(3) Output 3:

Indicator: Increase in the number of testing requirements for the energy efficiency testing laboratories accredited by BOA and designated by GDE

Output 3 will be achieved.

Since the number of testing requirements in above indicator does not increase, instead of the number of testing requirements, the Joint Evaluation Team evaluated extension of accreditation and designation scope for the energy efficiency testing laboratories accredited by BOA and designated by GDE as indicator 3. Designation means an action which GDE permits testing laboratories to conduct EE testing and Accreditation means an action which BoA recognize testing laboratories to meet ISO/IEC 17025.

In Output 3, the Project has assisted the improvement of capability of accreditation and designation of EE testing laboratory for air conditioner and refrigerator through implementing training on uncertainty of measurement, participation to BoA' s seminar as a lecturer of EE testing of air conditioner, and organizing mutual witness activities between two assessment teams, i.e. BoA assessment team and simulation assessment team. As a result, the capability of accreditation by BoA was improved and developed, and, EE testing both for refrigerator and for air conditioner using new standards was included within their accreditation scope. Since EE testing laboratory for refrigerators in QUATEST 1 and that for refrigerator and for air-conditioner in QUATEST 3 have been accredited designated by GDE and accredited by BoA during the Project Period, that Vietnamese side has accumulated business experiences on accreditation and designation of EE testing laboratory. The operation system on EE testing laboratories for air-conditioner and refrigerator in Viet Nam has become the system with three testing laboratories.

(4) Project Purpose

Indicator 1: Improvement of capability by designated energy efficiency testing laboratories

Indicator 2: Increase in the number of accredited and designated energy efficiency testing laboratories

Project Purpose will be achieved by the end of the Project period.

The operation of EE testing laboratories for air conditioner and refrigerator has been strengthened in Viet Nam through the installation of new EE testing facilities, accreditation of EE testing laboratory by BoA and the designation by GDE, and training activities of the Project (Indicator 1). All Outputs are expected to be achieved by the end of Project period without any significant delay. Newly installed EE testing facilities have been on operation in QUATEST 1 for refrigerator and in QUATEST 3 for air-conditioner. Since there was only TVCI which has been operating as EE testing laboratory, the number of EE testing laboratories has been increased (Indicator 2).

3-2 Review Based on the five (5) Criteria

(1) Relevance: High

Since GOV has come out various energy efficiency and conservation policies and enacted laws and regulations in the field of energy efficiency and conservation such as Decision 79/2006/QD-TTg dated 14/4/2006 'Approval of National Target Program on saving and efficient use of energy' and Decree 21/2011/ND-CP dated 29/3/2011 'Detailed stipulation and enforcement of Law on saving and efficient use of energy', this Project is in line with the policies of GOV. According to Japan's Country Assistance Program for Viet Nam in December 2012, promotion of economic growth and strengthening of international competitiveness is set as one of pillars for the assistance to Viet Nam which includes the issue of standards and conformance besides custom and statistics to promote investment. The Project components are along with the policy of the GOJ. Since only TVCI was designated as EE testing laboratories for air-conditioner and refrigerator GDE and lack of capacity and reliability for the operation before the Project start, MOST had requested that the operation of EE testing was strengthened. Also, the Project responds to the needs of manufacturers to provide correct information to users concerning the EE performance of their products of air-conditioner and refrigerator. Since JICA has implemented a former project, "Project on Strengthening the System and Operation on Standards and Conformance", 2009-2013, with STAMEQ as the C/P, human network among institutions concerned was already developed. GOJ has been promoting EE and labeling program in collaboration with JEMA and IS-INOTEK, targeting ASEAN countries, by implementing similar activities with the Project and Japan has been keeping advantage in utilizing of human network for dispatch of Japanese experts. Therefore, the relevance of the assistance by the Project is high.

(2) Effectiveness: High

Project Purpose will be achieved by the end of the Project period. The capability of the operation of EE testing laboratories for air conditioner and refrigerator has been strengthened (Indicator 1) in Viet Nam through the installation of new EE testing facilities, OJT on operation and activities for securing reliability of measurement accuracy (Output 2). In addition, the improvement of capability of revision of EE testing standards (Output 1) and that of the accreditation of EE testing laboratory by BoA and the designation

by GDE (Output 3) contributed to the strengthening of EE testing operation system. On the other hand, although there was only TVCI which was available for EE testing for air-conditioner and refrigerator in Viet Nam, the operation system on EE testing has increased the number of available laboratory for EE testing into three through the Project implementation (Indicator 2).

Promoting factors to the achievement of Project purpose are as follows:

Utilization of human networks which was developed during the implementation of the former project with STAMEQ as the C/P, devoted works by engineers working their EE testing laboratories at Viet Nam side, and smooth communication between Japan and Viet Nam for technical-based issues.

(3) Efficiency: High

Following inputs and activities were efficient or effective to achieve each Output.

- Training in Japan; among Project' s activities, training in Japan was very effective and useful to make participants into JICA project motivated, to learn knowledge on advanced field and so on.
- Dispatch of Japanese experts; In the Project, besides four long-term experts, short-term experts were dispatched for program of technical transfer on various topics as technical transfer.
- Provision of equipment; new EE testing facility has been set up in QUATEST 1 for refrigerator and in QUATEST 3 for air-conditioner respectively. In Viet Nam, there was only TVCI who has EE testing laboratory for refrigerator and air-conditioner so far. Now, a plural number of the laboratory is functioning in Viet Nam.
- Installation of EE testing laboratory for air conditioner into TVCI by NEDO project; The Project supplied knowhow of construction on facilities for EE testing laboratory for air conditioner, including specification of facility design, to NEDO.

(4) Impact: High positive impact

Two indicators of the Overall Goal are set as follows:

Indicator 1: Increase in the share of energy efficiency labeled products in Vietnam market

Indicator 2: The number of application and registration of energy efficiency labeled products by designated energy efficiency testing laboratories

There is already a strong tendency that EE products are prevailing in the markets of refrigerators and air conditioners in Viet Nam (Indicator 1). Since the number of testing and the share of such products are both increasing, the number of application and registration is assumed to be also increasing (Indicator 2). Therefore, Evaluation Team assessed that the prospect of achieving the Overall Goal is promising.

The followings were confirmed as ripple effect; Currently the governmental institutions concerned in EE are keeping PR activities on the promotion of the purchase of EE products; This Project enabled "Support Program to Respond to Climate Change", SP-RCC, (Japanese ODA program loan) to include the revision of EE testing standards for refrigerator and air conditioner into their policy actions; and the installation of similar facilities for air conditioner at QUATEST 3 and TVCI made inter-laboratory comparison easier and will contribute to improving total reliability of EE testing in Viet Nam.

(5) Sustainability: Relatively High

- Policy and Institutional Aspect: Since GOV is put their priority on energy efficiency related policies such as Decision 79/2006/QD-TTg dated 14/4/2006 'Approval of National Target Program on saving and efficient use of energy', the continuation of these policies by the GOV is very high.
- Financial and Organizational Aspect; According to STAMEQ, after the completion of the Project, QUATEST 1 and QUATEST 3 will be required by GOV to be self-financing institutions. However, if a laboratory proposes a budget for activities such as human resource development, the government will allocate its budget until the stable management will be realized. Set-up of testing fee is one of crucial issues for a laboratory to be self-financing. Current testing fees seem to be low, not reflecting necessary costs, for example, long-term maintenance costs of testing facilities. In Viet Nam, there is a structure for promoting energy efficiency by updating the standards regularly. The testing laboratories are prospected to expand its business and strong ownership and enthusiasm of Viet Nam side can be expected. Staffs in charge of testing are allocated appropriately.
- Technical Aspects; EE testing in QUATEST 1 and QUATEST 3, including daily maintenance, can be done by the current staff. For air conditioner, in order to maintain reliability of testing facilities, periodical comparison with a laboratory of a higher level is indispensable.

3-3 Factors that have promoted the implementation of the Project

(1) Factors Concerning the Planning:

Utilization of networks among the participating institutions developed in the former project;

Since JICA has implemented a former project, "Project on Strengthening the System and Operation on Standards and Conformance", 2009-2013, with STAMEQ as the C/P, human network among institutions concerned was already developed so that the network was utilized in the planning of the Project. The recruitment of long-term experts as well as short-term experts has been made smoothly. For training activities in Japan, prior coordination with institutions concerned such as JEMA and IS-INOTEK were implemented timely. The information sharing with Viet Nam side contributed to the smooth project management.

(2) Factors Concerning the Implementation Process:

Although the Project sites are spread over three locations including STAMEQ in Hanoi, QUATEST 1 in Hanoi and QUATEST 3 in HCMC, the communication between Japanese experts and Vietnamese side have been tried by email or the Project team meetings which have been held according to circumstances. It was confirmed that communication among Japanese expert team and Vietnamese side including STAMEQ, VSQI, QUATEST 1, QUATEST 3, TVCI, and BoA was smooth. This communication contributed to smooth activities of the Project.

3-4 Factors that have hindered the implementation of the Project

(1) Factors Concerning the Planning: N/A

(2) Factors Concerning the Implementation Process:

GDE's participation in the Project was not always actively. Japanese expert team has provided sufficient

information regarding training, seminars and JCC to GDE appropriately. However, there was little improvement.

3-5 Conclusion

The team confirmed that the expected outputs have largely been achieved without any critical problem or notable delay in the implementation of the Project. QUATEST 1 and QUATEST 3 have been accredited by BoA as EE testing laboratories. QUATEST 1 and QUATEST 3 have been designated by GDE as EE testing laboratories. The revision on EE standards for air conditioner was completed and that for refrigerator is expected to be drafted by the end of the Project by VSQI. The relevance and effectiveness of the Project are evaluated as High. Also, sufficient input and certain achievement of Outputs were confirmed and prospect to the achievement of Overall Goal is positive. Therefore, efficiency and impact are evaluated as High. As for the sustainability, although policy and organizational aspects are positive, there some concerns regarding financial and technical aspects. Therefore, sustainability is evaluated as Relatively High. Totally, it can be concluded that the Project will achieve the Project Purpose within the cooperation period.
The team, therefore, concluded that the Project would be terminated as scheduled.

3-6 Recommendations

➢ **Recommendation for Remaining Period of the Project**

1) The revision of EE testing standards for refrigerator (VSQI)
   The revision draft of standards for EE testing is now under preparation and VSQI should be able to submit it to Minister of Science and Technology by the end of September 2016 for his approval. JICA expert team should provide support until the end of the Project period, if necessary.

2) Maintenance training (QUATEST 1, QUATEST 3)
   The engineers at QUATEST 1 and QUATEST 3 should continue to participate in training activities for laboratory maintenance to further strengthen their capacity on maintenance management.

3) Inter-laboratory comparison for EE testing of refrigerator (QUATEST 1, QUATEST 3, TVCI)
   Inter-laboratory comparison for EE testing of refrigerator should be completed by the end of September 2016.

4) Support of starting discussion on collaboration between Vietnamese side (QUATEST 3, TVCI) and JATL for mutual evaluation testing for air conditioner
   QUATEST 3 and TVCI should discuss and agree on the necessity of future mutual evaluation testing for air conditioner and start to negotiate on collaboration with JATL. JICA expert team should support this process until the end of the Project.

➢ **Recommendation for Future**

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 in every one to two years.

- QUATEST 3 and TVCI should establish agreement of collaboration with JATL to conduct mutual evaluation testing in every two to four years among the three laboratories.

2) Appropriate testing fees (QUATEST 1, QUATEST 3, TVCI)

In order to maintain financial sustainability of testing laboratories, following factors should be taken into consideration in setting testing fees: cost of mutual evaluation, maintenance cost by suppliers, depreciation cost of testing facilities and equipment.

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.

3-7 Lessons learned

(1) Promotion of the project by the collaboration with other cooperation scheme

Internalization of external factors of technical cooperation project into policy actions under Japanese ODA program loan is expected to get strong commitment of the recipient country. This approach will work as one of the effective methods to get strong commitment of the government of the recipient country for the project.

(2) Utilization of accreditation with ISO/IEC standards

- Setting accreditation with an international standard as a target of counterpart organizations for strengthening the organizations provides a clear and objective goal and contributes to keeping their motivation at a high level. In the case of the Project, laboratories accredited with ISO/IEC 17025 which specifies "General requirements for the competence of testing and calibration laboratories", are widely recognized that they have an international level management system and maintain technical competence to conduct reliable testing in the fields of the accreditation scope. There exist several international standards in other fields, such as ISO 15189 for medical laboratories, ISO 14065 for verification bodies of greenhouse gas, ISO/IEC 17065 for product certification bodies, and so on. When there is a suitable international standard in the field of a JICA project, accreditation with the standard is encouraged to be utilized as a target of counterparts for strengthening the organizations.

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