2017 ASEM Eco-Innovation Capacity-Building Program

Vietnam

December 2017

ASEM SMEs Eco-Innovation Center

Executive Summary

Overview

The global paradigm shift in the industrial environment has put businesses under pressure to tackle climate change and secure cost-competitive energy and natural resources. However, many small and medium-sized enterprises (SMEs) in developing countries are ill-equipped to cope with climate change. This project aims to build the Eco-Innovation capacity of SMEs in ASEM member states, focusing on four major areas as outlined by the OECD: system, process, product, and business innovation. To this end, the 2017 ASEM Eco-Innovation Capacity-Building Program in Vietnam offers seminars and workshops that train SMEs to run their own Eco-Innovation programs and ultimately lays the foundation for enhancing the green competitiveness of Vietnam, an ASEM member.

Project Results

The 2017 ASEM Eco-Innovation Capacity-Building Program developed Capacity-Building modules to increase awareness on Eco-Innovation in Vietnam and share experience and knowledge on Eco-Innovation areas. The Capacity-Building module for Vietnam, which was decided through consultations with experts and local demand surveys, is energy efficiency. The 2017 ASEM Eco-Innovation Capacity-Building Program resulted in the 20% increase in Vietnam's Eco-Innovation awareness, that is, from 65% to 85%.

Follow-up Measures

The one-on-one intensive energy efficiency consulting for SMEs in Vietnam can be implemented. Moreover, the further cooperation between Korean consultants and local Vietnamese consultants is expected to result in the improvement in the latter's consulting capabilities.

Contents

1. Project Background

1.1 Definition of Eco-Innovation

Background of Eco-Innovation

Sustainable Development General Goals (SDGs) are the common goals for all nations from2016 to 2030. Following Millennium Development Goals (MDGs), they set antipoverty MDGs aimed for as the top priority, but they also aim to alleviate global common threats for all nations, such as polarization of economy and society, intensification of various social inequalities, and environmental destruction, that can threaten continuous developments.
Open Working Group suggested 17 SDGs. These are differentiated from the existing MDGs, as they are in consideration of overall economy, society and environment areas, such as economic growth and climate change.
Major advanced countries, such as EU, the U.S. and Japan are reinforcing environmental regulations every day aiming for cleaner production and building economic system with resource recycling. They are also taking actions to improve environmental characteristics of their products. This applies not only to large enterprises, but also to SMEs, thus they are expected to be gradually exposed to increased costs and regulatory risks from environmental regulations as time goes on.
The large enterprises are responding to the green paradigm, which emphasizes on sustainability of industries by adapting green management system, cleaner production and green technology. However, the SMEs relatively lack human resources, information and etc. compared to large enterprises, thus they cannot actively respond to the green paradigm, such as by adapting environmental management systems.
In order to solve such problems of the SMEs, a green capability reinforcement project, such as ASEM Eco-Innovation Capacity-Building Project for the SMEs, was introduced. Eco-Innovation Capacity-Building Project identifies demand in each country, develop modules and programs according to the demand to enhance the greens capacity, and furthermore, it supports in responding the change of environment in the international community spontaneously.
In particular, the SMEs in developing countries lack information, finance, human resources and etc. needed to build green management system and cleaner production compared to the SMEs in advanced countries, therefore it seems that they are in dire need for the support from Eco-Innovation Capacity-Building Program.

Basic Concept and Development of Eco-Innovation

According to the European Commission (EC), the definition of Eco-Innovation is "all types of innovations that seek for provable developments, aiming for sustainable developments though alleviation of environmental pollution and utilization of resources with responsibilities, which also includes environmental technology, process, system, service and Eco-Innovation that provides environmental effects though it did not mean to."

The Eco-Innovation Observatory (EIO), operated by a three-year plan of EC, also defines Eco-Innovation as "all types of innovations that use natural resources and reduce emissions of harmful materials in daily lives." The definition by EIO is ahead of the existing idea that it is a kind of innovation aimed to reduce negative environmental impacts. Furthermore, such definition includes the means and methods that minimize the use of natural resources during the processes of designing, producing, using, reusing and recycling products and materials.

Meanwhile, according to the definition of the Organization for Economic Cooperation and Development (OECD), Eco-Innovation is differentiated from all of the other innovations for the following reasons: "It results in alleviation of environmental impacts regardless of intention. It also has a wide range that can surpass the traditional structural limits of innovative organizations, therefore accompanies wider range of social agreements that accelerate social-cultural and structural changes."

Eco-Innovation technology reduces or prevents pollutant formation directly from the source; it is any technology that minimizes environmental degradation occurring over the entire product life cycle, from the extraction of raw materials through the manufacturing and consumption of products to their disposal, either by recycling or returning them to nature. It not only includes production technologies that reduce or prevent pollutant formation directly from the source, but also those that provide further management. This can include recycling or conserving materials and energy used in the production process, substituting raw materials with eco-friendly ones, designing processes and improving operation to minimize pollutant formation during production, and better utilizing raw materials to reduce losses.

The concept of Eco-Innovation can be applied to any industry or product. Cleaner production removes or reduces all emissions and wastes in the production process by conserving raw material, water, and energy and eliminating toxic or hazardous materials. While there are many ways to mitigate impact on the environment, safety, and health throughout the entire process, there are three critical factors in realizing Eco-Innovation:

change in mindset, utilization of expertise, and advancement of technology.

1.2 Promotion of Eco-Innovation

[Figure 1] Promotion of Eco-Innovation

One of the main roles of ASEIC, which was established to promote eco-friendliness and low carbon green growth among ASEM members in Europe and Asia, will be to leverage ROK's strong Eco-Innovation capabilities to promote Eco-Innovative practices in other Asian ASEM member states. Since many developing countries are not aware of Eco-Innovation, have not yet recognized the need for it, or lack the technology for it, they are still experiencing the vicious cycle of serious environmental problems and weakening global competitiveness.

Eco-Innovation should be a tool, not for competition, but for sharing technology and experience among companies and countries in an effort to solve global environmental issues together. It is therefore essential to promote best practices (success stories) of Eco-Innovation and cleaner production technologies with countries that have limited access to them through close cooperation with their governments.

Accordingly, the 2017 Eco-Innovation Capacity-Building Project worked with the government and other relevant organizations of the Vietnam to lay the foundation for promoting the idea of Eco-Innovation and building local competencies.

2. Vietnam

Country Overview

<Table 1> Country Overview

Capital	Hanoi
Area	331,000km²(1.5 times Korean Peninsula)
Climate	Subtropic(north), tropic(south)
Population	92,600,000(2016)
Ethnicity	Vietnamese(86%), minorities
Language	Vietnamese(official), English, French, Chinese
Religion	None(81%), Buddhist(9%), Catholic(7%)

(Source : Vietnam Country Facts, Korea EXIM Bank, 2017)

Economic Indicators

<Table 2> Economic Indicators

GDP	200.6 billion USD ('16)
GDP per capita	2,146 USD ('16)
Economic Growth Rate	6.2% ('16)
Inflation Rate	3.7% ('16)
Currency Unit	Dong (D)
Exchange Rate	US$ 1= 22,300 D ('16)
Industrial Structure	Services(44%), Manufacturing(39%), Agriculture(17%) ('15)
Trade Scale	Exported 27.77 Billion USD : Petroleum products, semiconductors, bronze ('15) Imported 9.804 Billion USD : Natural gas, semiconductors, petroleum products ('15)
Major Trading Products	Exports: Clothing, shoes, electronics, fish, crude oil, rice, coffee, wood products Imports: Machinery and equipment, petroleum products, steel, raw materials, plastics, automobiles ('15)

(Source : Vietnam Country Facts, Korea EXIM Bank, 2017)

Definition of SMEs in Vietnam

According to Circular No. 16/2013/TT-BTC enacted on Aug. 12, 2013, SMEs are classified as cooperatives with less than 200 permanent employees and less than VND 2 trillion in annual income.

<Table 3> Definition of SME in Vietnam

	Micro Enterprise	Small-sized Enterprises		Medium-sized Enterprise	
	Employees	Total Capital (VND)	Employees	Total Capital (VND)	Employees
Agriculture, Forestry, Fishing	Less than 10	Less than 1 Million	10 to 200	100 to 500 million	200 to 300
Industry and Construction	Less than 10	Less than 1 Million	10 to 200	100 to 500 million	200 to 300
Trade and Service	Less than 10	Less than 500,000	10 to 50	50 to 250 million	50 to 100

(Source: National Science and Technology Development Agency)

Current Status of SMEs in Thailand

According to the Vietnam SME Association, 500,000 SMEs were registered in Vietnam as of 2014, accounting for 97.5% of all businesses in the country. SMEs produce 40% of Vietnam's annual gross domestic product (GDP) and 51% of its employment. Their investment capital accounts for 30% of all the national registered capital amounting to USD 121 billion.

Supporting Policies for SMEs in Vietnam

The Ministry of Science and Technology has directed its local governments and businesses to operate the Intellectual Property Development Program (2011–2015) and the National Technology Innovation Program (–2020) to support for them to focus on developing technologies and promoting innovation. According to the Council for Encouragement and Development of Small- and Medium-Sized Enterprises, in 2014, the Ministry of Science and Technology and the monitoring body under the National Technology Innovation Program

selected 120 businesses to evaluate until 2020. They evaluate SMEs based on their utilization of high-quality human resources, application of technology, new products, and technological innovation.

<Table 4> Support Policy for SMEs in Vietnam

	Relevant government agency	**Relevant law/regulation**	**Execution plan/program**
SME Promotion	SME Development and Promotion Council	Decree No.90/2001/ND-CP on Support for Development of SMEs (2001)	5-year SME Development Plan (2006-2010)(2005)
	Ministry of Planning and Investment (MPI)		5-year SME Development Plan (2006-2010)(2005)
	Agency for Enterprise Development, MPI	Decree No.56/2009/ND-CP (2009)	
	Ministry of Science and Technology		
	Ministry of Industry and Trade		
Banking Sector	Ministry of Finance [Credit Guarantee Fund]		
	State Bank of Vietnam	Law No.02/1997/QH10 on Credit Institutions	
Nonbank Sector		Decree No.28/2005/ND-CP and Decree No.165/2007/ND-CP (amendment)on MFIs	
		Law No.18/2003/QD on Cooperatives	
		Decree No.48/2001/ND-CP on People's Credit Fund	
Capital Markets	State Securities Commission of Vietnam	Law No.70/2006/QH11 on Securities	

Status of Response to Climate Change

Vietnam ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1994 and the Kyoto protocol in 2002 to respond to climate change actively. Vietnam is one of the five nations most affected by rising sea levels caused by climate change. In line with this, it announced a program in December 2008 envisioning an active response to climate change and sustainable national development. As part of this effort, the "Law on Energy Efficiency & Conservation (EE&C)" entered into force. The policy consists of two stages. The first stage began in 2006 when the Vietnamese government first began to raise awareness on energy efficiency and conservation, and the prime minister approved the National Strategic Program on Energy Saving and Effective Use through the legal document 79/2006/QD-TTg. The second stage began between 2010 and 2011 with the legislation of Resolution No. 50/2010/QH12, and final resolutions and bulletins were circulated to create specific regulations and guidelines afterwards.

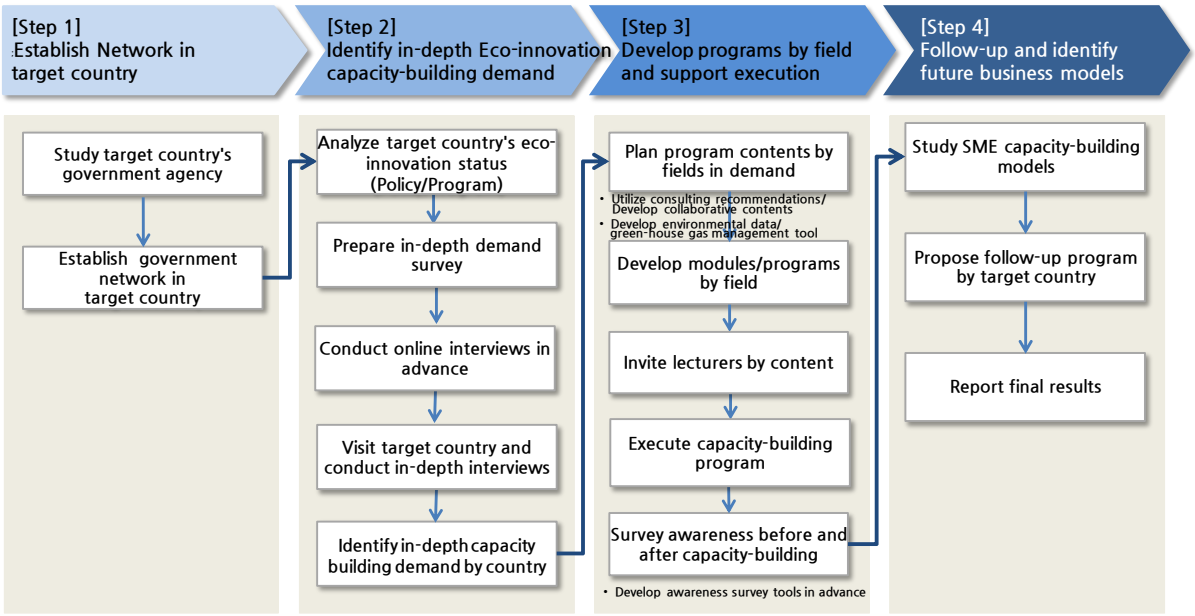
The fundamental legal framework for energy efficiency and conservation in Vietnam is Resolution No. 50/2010/QH12, of which Article 5 contains the specific policies for energy efficiency and conservation, categorizing energy efficiency and conservation as a foremost government goal. Accordingly, the country formulated plans for financial support for promoting energy conservation, efficiency and energy price coordination, and other beneficiary policies. Moreover, on-going efforts are being made to support advanced technology in energy efficiency and conservation, increase investment in its development and application, and develop renewable energy to secure diverse energy sources and environmental protection. For this purpose, the government has promoted the use of energy-efficient facilities and equipment; began a roadmap for introducing energy labeling; and encouraged investment in improving relevant consulting services and in raising public awareness on energy efficiency and energy conservation.

3. Results of Eco-Innovation Capacity-Building

3.1 Project Execution Details

Objective Framework

The project consists of four steps. Step 1 establishes a cooperative network with government and partners. Step 2 identifies the demand for capacity building towards Eco-Innovation in depth. Step 3 develops the Capacity-Building and training programs for respective sectors. Step 4 builds a system that encourages voluntary participation from the recipient country and prepare for follow-up programs.



[Figure 2] Eco-Innovation Framework

3.2 Main Activities

3.2.1 Establishing Networks

Small and Medium Enterprises Development Support Center 2(SMEDEC 2)

[Figure 3] Website of SMEDEC

Small and Medium Enterprises Development Support Center 2 (SMEDEC 2) is a government institution established to increase the Vietnamese SMEs' capacity and competitiveness through enhancing academic knowledge and management capability, and encouraging technology research and related exchanges. It plans and executes various support programs for the growth of SMEs from sectors related to science and technology, energy conservation consulting, education, and applied program. It also supports document filling, as well as SME development projects involving products, equipment, and materials. It drafts long-term development strategies for SMEs and executes various SME support programs in coordination with domestic/foreign partners and experts in the related fields.

3.2.2 Identifying Demand

Request for Proposal

Vietnam requested for capacity-building on energy efficiency, targeting the food and beverage, and lumber industries. Its purpose is to disseminate Eco-Innovation knowledge and expertise by improving the operational energy management capability of local SMEs.

Relevant Legislation/Program

Vietnam passed legislation to support SMEs in 2001, and two master plans were formulated in 2006 and 2011 to carry out programs to improve SME competitiveness continuously. The support program for "Enhancing Productivity and Quality of Products and Goods for 10,000 Vietnamese Enterprises until 2020" is a remarkable ongoing undertaking. Moreover, the "SME Innovation Program" and "Green Technology Transfer and

Consulting Program" were implemented in coordination with foreign institutions.

Online Demand Survey

According to our survey, most local SMEs have an issue with increasing production costs because of the excessive energy used by low-efficiency equipment that they operate; therefore, they require capacity-building in energy efficiency areas to address this issue. Based on the survey, the target industries in need of capacity-building are food and beverage processing and lumber, as indicated above in the "Request for Proposal".

<Table 5> Online Demand Survey

ASEM Eco-Innovation Preliminary Demand Interview

- Date(s): May 25, 2017, 12:00
- Method: Conference call
- Interview hosts: Hankyung Lee, Kyeongyeon Kim (Consultants from ECO&PARTNERS CO., LTD.)
- Interviewees: Ms. Pham Minh Chi, R&D Manager, Ms. Ha, Project Coordinator

Visit Demand Survey

Vietnam is promoting improvements in energy efficiency to businesses at the government level, implementing policies under the "Law on Energy Efficiency & Conservation (EE&C)" to respond actively to climate change and assure sustainable national development. The SMEDEC 2 requested a two-day seminar on energy efficiency. It requested to provide a seminar for all participants for the voluntary improvement of energy efficiency in Vietnam for the morning of the first day. It wished to plan a training of trainers (ToTs) program for energy managers, as well as business and local energy management consultants, for the afternoon and on the second day of the seminar. The capacity-building seminar targeted the furniture manufacturing and food and beverage processing industries.

<Table 6> Visit Demand Survey

Date	June 13th 2017, 09:30
Project	ASEIC Eco-Innovation local Capacity-Building program module development and

	identifying underlying demand
Location	SMEDEC2 Office, Hochiminh City
Korean Participants	ASEIC : Kang Yoon Ji PM ECO&PARTNERS CO., LTD. : Lim Dae Woong Principal Partner, Kim Kyeong Yeon Senior Consultants
Vietnam Participants	• **SMEDEC2** - Nguyen Thi Thu Phuong(Deputy director) - Nguyen Thi Phoung Yen(R&D manager), - Pham Minh Chi(Consultancy deputy manager) - Nguyen Thi Thu HA(Project coordinator) - 정동식 Advisor(National IT Industry Promotion Agency) • **SMEs Associations** - Dinh Ngog Phoung (Secretary of Bhin Doung Funiture Assoc.) - Bui Kim Oanh(Vice director of Yeuh Hsiang Co., Ltd.) - Chau Hong Anh(General manager of Learning Choice Co., Ltd)
Discussed	• **Demand for Capacity-Building** - (Day 1) Seminar in Energy efficiency area - (Day 2) Tot (Training of trainer) for local energy consultants • **Target Industry** - Furniture, Food and Beverage processing
Picture	 

3.2.3 Program Development

Capacity-Building Seminar Overview

For Vietnam, a two-day capacity-building seminar was planned on energy efficacy. In the morning of the first day, a seminar for personnel from SMEs was held, and in the

afternoon and on the second day, a workshop that included an energy diagnostic exercise was conducted.

<Table 7> Program Overview

	Day 1	Day 2
Date	Sep. 27 (Wed)	Sep. 28 (Thur)
Subject	Energy Efficiency	
Participants	(Morning) SME (Afternoon)SME, Association, Government, Trainers	SME, Association, Government, Trainers
Target Industry	Furniture, Food and beverages	Furniture, Food and beverages
Subject	Efficient Energy Management at SMEs	Education for trainers on establishing voluntary energy management systems
Participant Number	(Morning)150 (Afternoon)50	50

Lecturers

Capacity-building programs in energy efficiency areas hinge on transferring expertise in deriving energy conservation solutions by conducting diagnoses on energy performance of businesses and delivering relevant knowledge. Experts with years of experience in the field were invited to deliver lectures on energy diagnostics cases. For the ToT program, educating the participants on energy measurement and data analysis tools is important, so an expert in energy diagnostics who is familiar with utilizing the latest tools and techniques was invited.

- **Jung-il Ryu, CEO, ENsign Co.,Ltd.**

ENsign Ltd. is a first-class energy diagnostic business with an A rating in energy evaluation. It was recognized as an excellent diagnostic institution for consecutive years (2013–2016). In the past 17 years, the business has conducted energy diagnostic projects and greenhouse gas assessment projects for more than 100 renowned foreign and Korean businesses such as Samsung Electronics, LG Electronics, and Hyundai Rotem.

- **Jong-su Choi, Senior Engineer, Ace Co.,Ltd.**

Mr. Choi has handled energy diagnostic projects and Energy Saving Company (ESCO)

projects and participated in various education projects concerning climate change and energy analysis for Korean companies for the past six years.

- **Dae-woong Lim, Principal Partner, ECO&PARTNERS Co., Ltd.**

Mr. Lim is the Principal Partner of ECO&PARTNERS Co., Ltd. and serves as the representative for Korea in the United Nations Environment Programme (UNEP) Financial Initiative. He majored in environmental sustainability and has participated in various projects regarding climate change for the past 23 years. As a former technical advisor for the Carbon Disclosure Project and a former member of the steering committee for the UN Global Compact Korea Association, he has been engaged in global cooperation for climate change response.

Capacity-Building Seminar Module Overview

"CT4" introduced best practices of Eco-Innovation to enhance participants' understanding on the definition of Eco-Innovation. "EE2" shared a case of the emissions trading system in Korea to prepare SMEs for entry into the international emissions trading market. "EE3" shared the best practices in setting up energy conservation plans and energy conservation. "EE4" explained energy-consuming utilities. "EE5" conducted an actual energy diagnostic exercise and taught methods for analyzing the results and deriving improvement solutions from them.

<Table 8> Modules used in Vietnam Project

Category	Classification Number	Module Name	Usage
Energy Efficiency	EE1	Trend on global climate change	
	EE2	**Status of climate change response of Korea**	○
	EE3	**Cases of energy efficient technology application**	○
	EE4	**Theory of energy utilities and its characteristics**	○
	EE5	**How to measure the utilities with equipment**	○
Cleaner Tech	CT1	The need of 3J5S in workplace	
	CT2	3J5S Methodology	
	CT3	Cases of 3J5S application	

	CT4	**Introduction to Eco-Innovation**	○
	CT5	Cases of Eco-Innovation application (general)	
	CT6	Cases of Eco-Innovation application (dyeing wastewater management)	
	CT7	Introduction to GreenBiz	
Eco-Innovation for industrial parks	EIC1	Introduction to Eco-Innovation for industrial parks and its status	
	EIC2	Eco-Innovation models for industrial parks	
	EIC3	Benefits of Eco-Innovation models for industrial parks	
Eco-design	ED1	Introduction to eco-design	
	ED2	Procedures to adopt eco-design	
	ED3	Global enterprise's eco-design tools and cases	
	ED4	Cases of eco-design products	
	ED5	Eco-design practice	
Eco-labeling	EL1	Introduction to eco-labeling and its need	
	EL2	Cases of eco-labeling application	
	EL3	Introduction to Environmental Product Declaration	
	EL4	Introduction to Green Building Certificate and cases	
Green marketing	GM1	Introduction to green marketing and its trend	
	GM2	Cases of green marketing	

Capacity-Building Seminar Program

The capacity-building in Vietnam was a two-day seminar, with the morning of the first day being a seminar for a large number of participants. In the afternoon of the first day and on the second day, lectures on field energy diagnosis and practice in a ToT format were delivered to small groups. The ToT targeted energy management personnel at SMEs and local energy consultants to improve their capability for the autonomous performance of energy diagnoses and continuous practice of energy management and energy audit locally.

<Table 9> Day 1 Program

(Day 1) ASEM Eco-Innovation Capacity-Building; creating a sustainable operational environment for SMEs					
Time	Module	Module Name	Specifics	Lecturer	Format
0740-0800	Registration				
0800-0815	Welcome Remarks from STAMEQ or SMEDEC2 Opening Remarks from ASEIC				
0815-0830	MOU Signing Ceremony between ASEIC & SMEDEC2				
0830-0835	What is Eco-Innovation? (watching a video clip)				
0835-0845	Introduction to ASEIC			ASEIC	Lecture
0845-0920	CT4	Introduction to Eco-Innovation	Why Eco-Innovation: Introduction and best practices	Ms. Kim Kyeongyeon, Senior Consultant, ECO&PARTNERS Co., Ltd.	Lecture
0920-1010	EE2	Status of climate change response of Korea	Introduction to the Emission Trading Scheme: A case study of the Korea Emission Trading Scheme and opportunities for Vietnam	Mr. Lim Dae woong, Principle Partner, ECO&PARTNERS Co., Ltd.	Lecture
1010-1100	EE4	Theory of energy utilities and its characteristics	Energy management for SMEs: Energy reduction planning and a tool for energy management	Mr. Ryu Jeongil, President, Ensign Co.,Ltd.	Lecture
1100-1110	Coffee Break				
1110-1200	EE3	Cases of energy efficient technology application	Energy efficiency in workplace: Case studies on energy reduction in furniture and food & beverage industries	Mr. Ryu Jeongil, President, Ensign Co.,Ltd.	Lecture
1200-1300	Lunch				
1300-1350	EE4	Theory of energy utilities and its characteristics	Energy-consuming utilities in workplace: Basic theories and characteristics	Mr. Ryu Jeongil, President, Ensign Co.,Ltd.	Lecture
1350-1440	EE5	How to measure the utilities with equipment	Practice: how to measure the utilities with equipment I	Mr. Choi Jongsu Senior Consultant, ACE Co.,Ltd..	Group Exercise
1500-1510	Coffee Break				
1510-1650	EE5	How to measure the utilities with equipment	Practice: how to measure the utilities with equipment II	Mr. Choi Jongsu Senior Consultant, ACE Co.,Ltd.	Group Exercise

<Table 10> Day 2 Program

(Day 2) Tot for sustainable energy management at local SME operations					
Time	Module	Module Name	Specifics	Lecturer	Format
1040-1100	Coffee Break				
1100-1150	EE5	How to measure the utilities with equipment	-Analysis of the result of the measurement with a tool -Discovering solutions based on the analysis and economic analysis for validation I	Mr. Ryu Jeongil, President, Ensign Co.,Ltd.	Lecture/ Exercise
1150-1310	Lunch				
1310-1500	EE5	How to measure the utilities with equipment	Discovering solutions based on the analysis and economic analysis for validation II	Mr. Choi Jongsu Senior Consultant, ACE Co.,Ltd.	Lecture/ Exercise
1500-1520	Coffee Break				
1520-1610	EE5	How to measure the utilities with equipment	Case studies on energy efficient technologies and practices (economizer, inverter, operation optimization, heat insulation, etc)	Mr. Choi Jongsu Senior Consultant, ACE Co.,Ltd.	Lecture
1610-1700	EE5	How to measure the utilities with equipment	Understanding and utilization of the energy audit result	Mr. Ryu Jeongil, President, Ensign Co.,Ltd.	Lecture

3.2.4 Seminar Implementation Support

The capacity-building seminar was held on September 27–28, 2017, at the Lotte Legend Hotel in Ho Chi Minh City. About one hundred participants attended on the first day of the seminar, and about 30 participants joined the ToT workshop.

[Figure 4] Capacity-building in Vietnam

3.2.5 Awareness Improvement

To quantitatively identify the effectiveness of the capacity-building project, an evaluation tool was developed to measure the improvement in the participants' awareness on the topics that were discussed and their level of satisfaction with the seminar. The level of understanding before and after the seminar was evaluated on a five-point scale (i.e., fully aware, fairly aware, partly aware, limitedly aware, and not aware). The level of satisfaction on content/lecturer/seminar was similarly evaluated using a five-point scale (i.e., excellent, good, average, fair, and poor).

<Table 11> Survey items and survey sheet

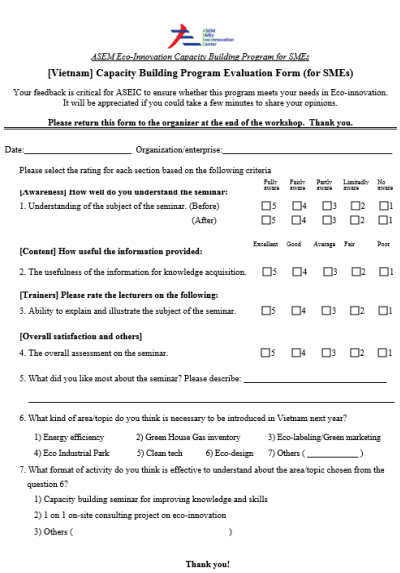
<Survey Overview>

1. [Awareness] Level of awareness before and after seminar
   - Understanding on seminar topics (before/after)

2. [Content] Evaluation of seminar content
   - Usefulness of lecture material in acquiring subject matter knowledge

3. [Lecturer] Evaluation of lecturers
   - Ability to explain and express content

4. [Seminar] Overall evaluation



ASEM Eco-Innovation Capacity Building Program for SMEs

[Vietnam] Capacity Building Program Evaluation Form (for SMEs)

Your feedback is critical for ASEIC to ensure whether this program meets your needs in Eco-innovation. It will be appreciated if you could take a few minutes to share your opinions.

Please return this form to the organizer at the end of the workshop. Thank you.

Date:_____ Organization/enterprise:_____

Please select the rating for each section based on the following criteria

	Fully aware	Fairly aware	Partly aware	Limitedly aware	No aware
[Awareness] How well do you understand the seminar:					
1. Understanding of the subject of the seminar. (Before)	☐5	☐4	☐3	☐2	☐1
(After)	☐5	☐4	☐3	☐2	☐1

	Excellent	Good	Avarage	Fair	Poor
[Content] How useful the information provided:					
2. The usefulness of the information for knowledge acquisition.	☐5	☐4	☐3	☐2	☐1
[Trainers] Please rate the lecturers on the following:					
3. Ability to explain and illustrate the subject of the seminar.	☐5	☐4	☐3	☐2	☐1
[Overall satisfaction and others]					
4. The overall assessment on the seminar.	☐5	☐4	☐3	☐2	☐1

5. What did you like most about the seminar? Please describe: _____

6. What kind of area/topic do you think is necessary to be introduced in Vietnam next year?
   1) Energy efficiency 2) Green House Gas inventory 3) Eco-labeling/Green marketing
   4) Eco Industrial Park 5) Clean tech 6) Eco-design 7) Others (_____)

7. What format of activity do you think is effective to understand about the area/topic chosen from the question 6?
   1) Capacity building seminar for improving knowledge and skills
   2) 1 on 1 on-site consulting project on eco-innovation
   3) Others ( )

Thank you!

Averages were drawn for each day to calculate an average value in the awareness and satisfaction for the two-day seminar, and the results were likewise averaged. This process was done so that each day of the seminar can be given an equal weight even though their number of participants were different.

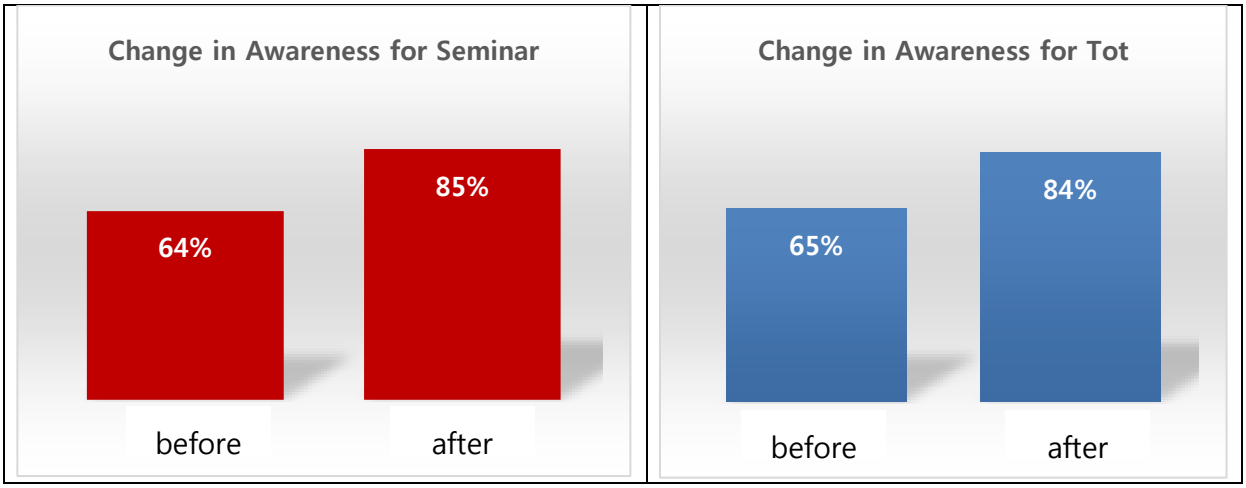
The five-point scale was converted to 0%–100*%,* as shown in the following figure, to analyze the change in awareness. A paired sample t-test was conducted to compare the difference between before and after the capacity-building in a single group to test the change in value. If the *p*-value of the t-test is less than 0.05, then the change can be considered significant. However, if it is greater than 0.05, it is not significant because, this indicates that there was no actual change although the average may have improved.

<Table 12> 100% conversion table for 5-point scale

No aware	Limitedly aware	Partly aware	Fairly aware	Fully aware
0%	25%	50%	75%	100%

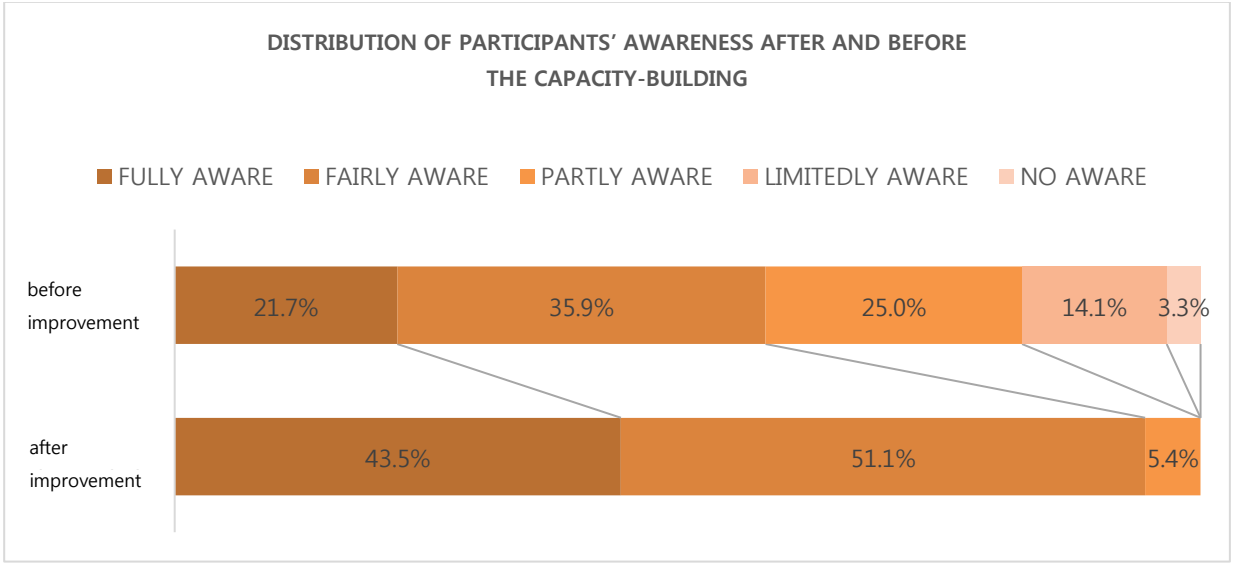
After the first day of the seminar, the participants' awareness increased from 64% to 85%, with 21 percentage point change and after the second day, the participants' awareness increased from 65% to 84%, with 19 percentage point change. The paired sample t-test

yielded p-values of 9.4×10^{-6} ~ 9.6×10^{-5} for the two days, which are less than the statistically significant level of 0.05, signaling an actual improvement in awareness.



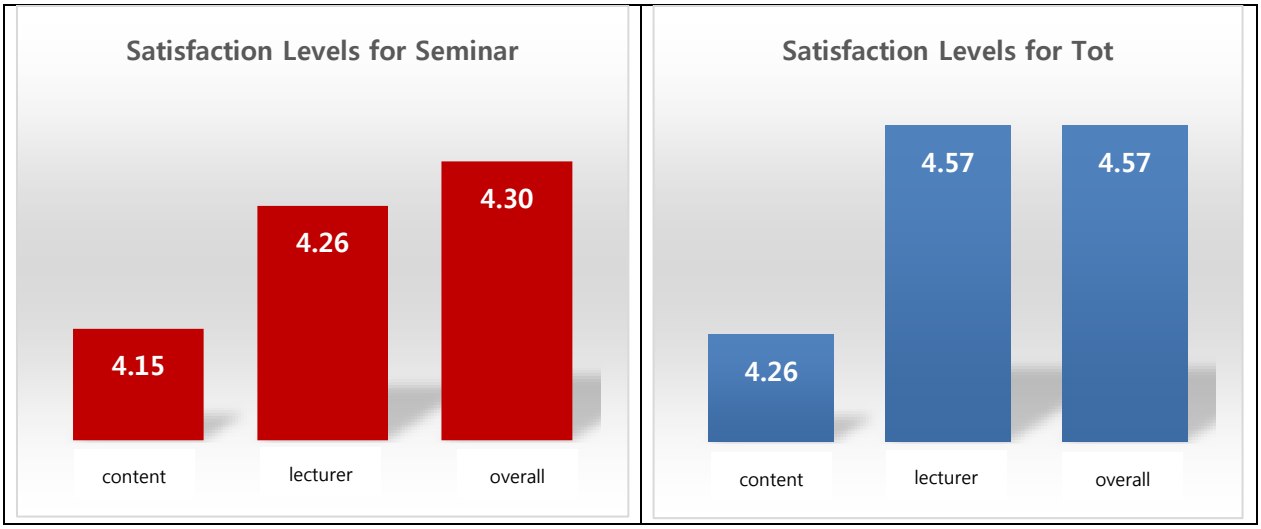
[Figure 5] (left) Changes in awareness for seminar (right) Changes in awareness for Tot

From 57.6% of participants that responded with fully aware / fairly aware before the seminar, the number increased to 94.6% after the seminar, yielding a 37 percentage point increase.



[Figure 6] Distribution of participants' awareness before and after the capacity-building

For Day 1, the recorded satisfaction levels were 4.15 and 4.26 for the contents lecturers, respectively, which are equivalent to 4.3 overall satisfaction. For Day 2, the recorded satisfaction levels were 4.26 and 4.57 for contents and lecturers, respectively, which gave an overall satisfaction of 4.57.



[Figure 7] (left) Satisfaction levels for Seminar (right) Satisfaction levels for Tot

4. Follow-Up Measures

4.1 Need for a Voluntary Follow-Up System

The target countries' continuous engagement in Eco-Innovation activities following the conclusion of this project is important. Therefore, the target countries must possess the necessary capabilities to enable them to respond to environmental problems autonomously. These capabilities can be developed through a long-term capacity-building program. A permanent capacity-building program of which purpose is to identify country-specific environmental problems that reflect local demand should be established. The target countries can participate in the capacity-building program to build their own abilities to respond to the changes in the environment actively.

4.2 Identifying Country-Specific Eco-Innovation Model and Feasibility

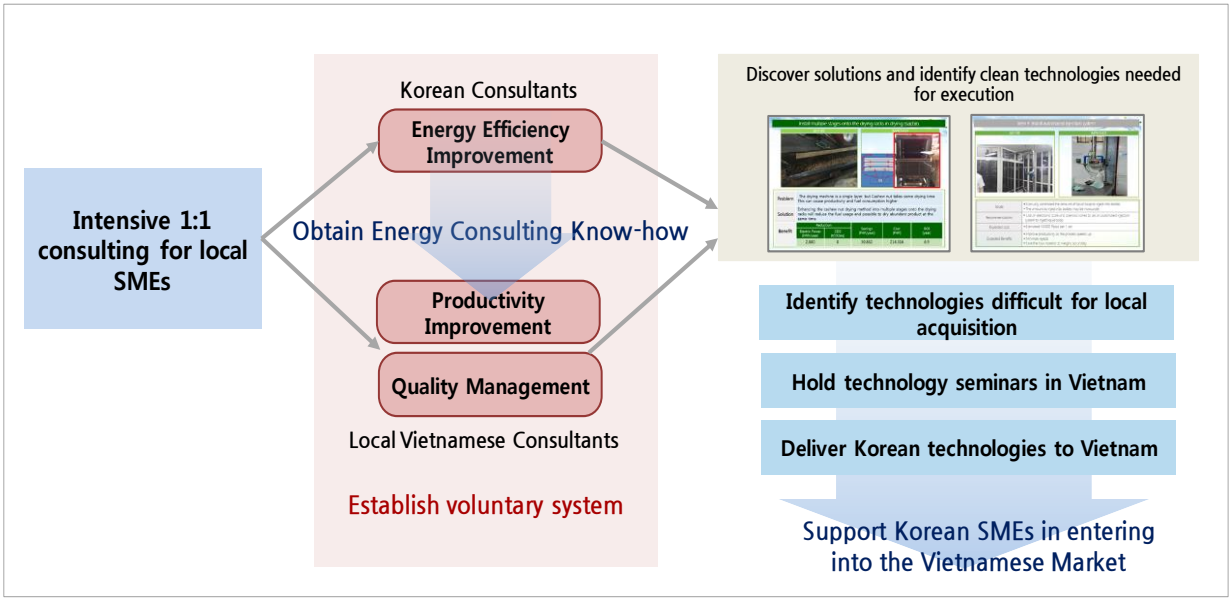
A survey for the seminar participants was undertaken to reflect the local demand and identify future Eco-Innovation project models. The survey results indicated that most of the participating countries have demand for the areas of capacity-building that are equal to or more specific but similar to those having been discussed in the seminar. Based on the survey results, we conducted interviews with partners from each country and identified that the followings are the particularly necessary to build their capabilities towards Eco-Innovation.

<Table 16> Next year project demand survey

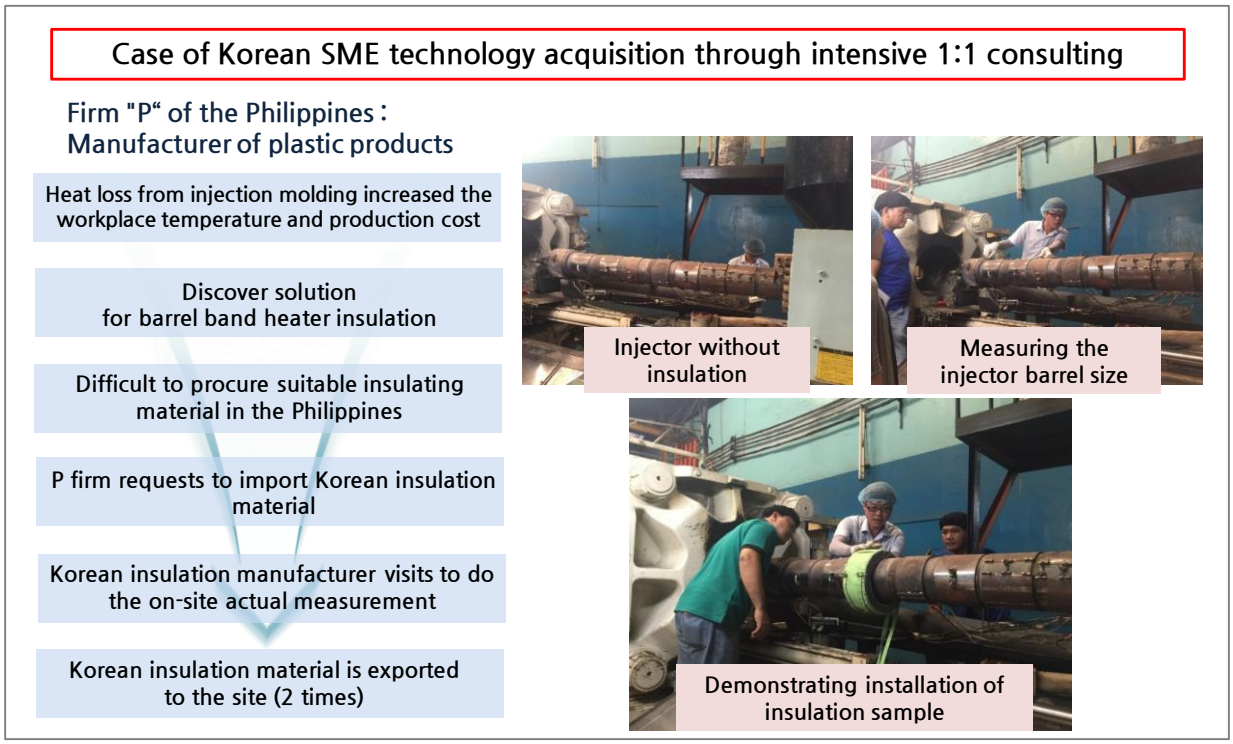
Country	**Survey Results**		**Partner Institute Interview Results**
	Demand Area	Capacity-Building Format	
Vietnam	1. Clean Tech (55) 2. Energy Efficiency (26)	1. Seminar (56) 2. 1:1 Consulting (15)	1:1 intensive consulting on energy efficiency / Seminar on clean tech

Vietnam's SMEDEC 2 emphasized the importance of the cooperation between Korean and local consultants in building Eco-Innovation capability. One-on-one intensive consulting projects targeting local SMEs can divide specialty areas for each country.

The areas for one-on-one intensive training projects can be classified into energy efficiency improvement, productivity improvement, quality assurance, and so on. Korean consultants can be dispatched to local businesses to evaluate energy usage and provide measures to improve the energy efficiency of production facilities. In areas where the SMEDEC 2 already possesses the consulting capability, such as improving productivity and quality assurance, local consultants can already perform consulting works. Through the process, local Vietnamese consultants can naturally acquire the expertise of Korean consultants to increase their capabilities. Moreover, after identifying technologies that are difficult to acquire locally but necessary for making improvements, technical seminars can be held so that Korean SMEs possessing the technologies can deliver their products to partners in Vietnam. This will function as a bridgehead for Korean businesses with clean technologies to advance into the Vietnamese market.



[Figure 8] Eco-Innovation model suitable to Vietnam



[Figure 9] Case for one-on-one intensive consulting to share Korean SMEs' skills