

ASEIC

Eco-Innovation Consulting Project in Malaysia

Final Report

2016

A S E M S M E S
E c o - I n n o v a t i o n C e n t e r



Small and Medium
Business Administration



ASEM
SMEs
Eco-Innovation
Center

Project Summary

Overview

ASEM SMEs Eco-Innovation Center (ASEIC) undertook the Eco-Innovation Consulting Project over the course of five years from 2011 to 2015, with 45 Malaysian companies participating in the project. Throughout the project, ASEIC offered tailored solutions to SMEs (small and medium-sized enterprises) in developing countries that are relatively less aware of Eco-Innovation to ease them into eco-friendly transition. The consulting team personally made site visits to companies in Malaysia and proposed eco-friendly solutions fit for local conditions and spearheaded solution activities by quantifying the economic and environmental benefits.

After the five-year project, the consulting team was asked to review the overall outcome and qualitative improvements of the Eco-Innovation solutions. The team should monitor whether the solutions had in fact been carried out and assess its business scope. Failure to actually carry out the solutions would defeat the purpose of the project, as it will fail to achieve the project's ultimate goal of realizing low-carbon technology. Thus, overall monitoring and examination to identify how much of the solutions were implemented or reason for failure to implement, ways to trigger long-term solutions, and the obstacles the companies face are crucial. Monitoring and examining how much of the solutions were carried out are essential. In 2016, the consulting team has decided to introduce the Eco-Innovation Capacity Building Program to identify the status of the participating companies to come up with a follow-up measures, and to identify the problems the participating companies are facing to help them overcome these obstacles.

This follow-up management program for Malaysia is collaboration between ASEIC and local Malaysian partner organization SIRIM Berhad, MOSTI's affiliate and national organization for standards and quality. After five years of the project, the consulting team conducted a year-long status survey on the SMEs to grasp the demand for follow-up management and developed the Capacity Building Program with a goal to build a foundation for local companies that adopted the Eco-Innovation project to expand on its own.

The Eco-Innovation Project was conducted in the following order: adoption of the follow-up management program, undertaking the Capacity Building Program, and Eco-Business Matching. The status survey was conducted to find out whether the participating companies will actually adopt Eco-Innovation and get an idea of the demand for the Capacity Building Program.

The consulting team shared the results of the survey with the participating companies during the first workshop and received feedback from each company. Through additional site visits and interviews,



Framework of the 2016 Malaysia Follow-up Management Program and the Follow-up Project

the team was also able to find out whether the suggested solutions were carried out and if not, the reason behind that as well. The team also gained deeper understanding of technology and provided the information to companies that requested them. In addition, SIRIM Berhad provided information on Malaysian government's Eco-Innovation support policy and funding, seeking practical ways for companies to adopt the program.

The consulting team developed the eco-friendly Capacity Building Program in October for the participating companies to guide their overall understanding of Eco-Innovation, share success cases, teach energy saving theory and waste management theory, and conduct practical training. Furthermore, the team, in conjunction with International Greentech & Eco Products Exhibition & Conference Malaysia (IGEM), held an Eco-Business Matching session to create new Korea-Malaysia eco-friendly businesses and to exchange technology.

For effective matching, the team conducted initial examination to find out the technology demand by the participating Malaysian companies and facilities owned by Korean companies. The team matched Malaysian companies with Korean companies that have the technology and equipment in demand. A total of 20 consultations were held at the Eco-Business Matching session, and the survey revealed that Korean companies showed 91.6% level of understanding of the mutual market, and Malaysian companies 81.8%. The level of satisfaction for the two countries was 89.5% and 90%, respectively. The participants responded that they anticipate an estimated KRW 760 billion of economic benefits in the next three years through this project.

SIRIM Berhad also supports the Eco-Innovation Consulting Project and is considering making its own support program down the road through follow-up management. The team hopes that this follow-up management program will become a platform to share information on the obstacles faced by Malaysian SMEs, factors that hinder Eco-Innovation from moving forward, adequate education program implementation, and the support of the Malaysian government. The consulting team also looks forward to seeing support measures from the Malaysian government to help improve Eco-Innovation for SMEs, and hopes that the SMEs work with the expanding Eco-Innovation system.

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01 Project Background

1.1 Eco-Innovation Concepts

Eco-Innovation Background

In Berlin, March 2014, Working Group III of the Intergovernmental Panel on Climate Change (IPCC) published the 5th Assessment Report, "Climate Change Mitigation." The report asserted that greenhouse gas emissions have reached an unprecedented level in the past decade and that the last greenhouse gas control policy had failed. It warned that if fossil fuel use is not reduced by 70% by 2050, amphibians will become extinct by 2020 and the majority of living organisms will be wiped out by 2080. As such, environmental pollution is a global problem directly related to human survival, and the government recommends reducing the use of fossil fuels as a way to prevent environmental disaster. Moreover, the consulting team expects constraints in corporate activities as companies have to bear the burden of the rising cost from increased fossil fuel use and pay for the waste they are producing. Accordingly, companies that use fossil fuel for production must come up with measures to increase productivity with limited resources. Eco-Innovation is a newly defined concept of producing economic and environmental benefits through eco-conversion of the production process and business administration. It offers ways to seek lower production costs through increased productivity and environmental waste reduction.

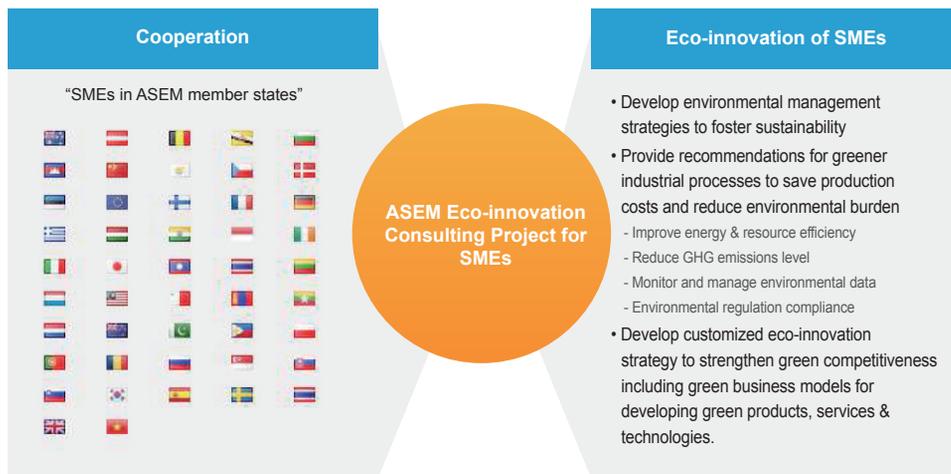
Fundamental Concept and Development of Eco-Innovation

The concept of Eco-Innovation is gradually expanding to include environmental impact-minimizing technology from industrial waste, manufacturing process in the production plant, and eco-friendly products, service, and business. Eco-Innovation used to refer to reducing raw material, water, or energy use, eliminating hazardous materials, optimizing resources, and minimizing waste through Cleaner Production. However, the idea has recently broadened to include optimizing the use of raw materials (e.g., natural resources) and energy, as well as

adopting a new and comprehensive system for green production. According to the European Commission (EC) in 2012, Eco-Innovation includes all types of innovations that can bring environmental benefit regardless of their intent and innovations that can corroborate their aim to reduce pollution and use raw materials efficiently and responsibly.

ASEIC's Eco-Innovation Project also includes raw material extraction and production and waste treatment process during the entire life cycle for sustainable development. It suggests solutions for increasing energy and raw material efficiency, replacing existing materials with eco-friendly materials, and increasing efficiency to minimize contaminants and material loss. In addition, the Eco-Innovation consulting team organizes briefings to share know-hows and raise employees' awareness.

1.2 Expansion of Eco-Innovation among ASEM Member States



By promoting Eco-Innovation to ASEM member states, ASEIC is helping to create a new market by raising awareness on Eco-Innovation and sustainable development, and laying the foundation for Eco-Innovation to expand within ASEM. Asian member states in particular need tailored solutions that take economic feasibility and environmental conditions into consideration because of pollution brought by rapid economic development, use of old facilities, and lack of awareness on Eco-Innovation.

ASEIC promotes Eco-Innovation and seeks to expand within ASEM by sharing annual Eco-Innovation success cases. More notably, it aims to act as a platform for ASEM member states to make a smooth transition into using in-demand green technology through mutual cooperation.



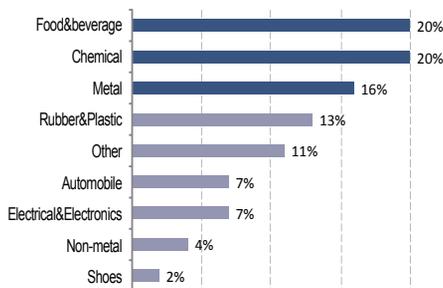
02 The Necessity of Follow-up Management Programs

2.1 The necessity of Eco-Innovation Follow-up Management Program and Follow-up Projects

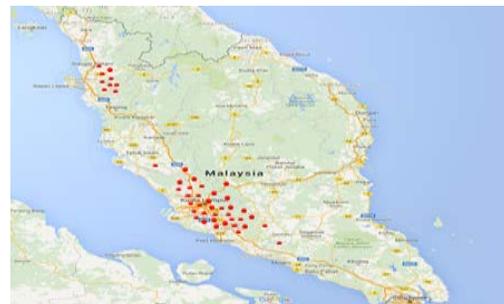
Malaysia Eco-Innovation Consulting Project Status

ASEIC undertook the Eco-Innovation Consulting Project for over five years from 2011 to 2015, with 45 Malaysian companies participating in the project. Quantified expectations of the participating companies are as follows:

Category	2011	2012	2013	2014	2015	Total
Number of Companies	8	8	9	10	10	45
Economic Benefit	145,846	276,789	72,070	2,903,960	5,885,820	9,284,487
Number of Solutions	51	73	112	68	78	382
Co ₂ Reduction	273.00	366.70	275.74	959.14	1,856.04	3,730.62



Participating Industry Distribution



Participating Company Locations

Eco-Innovation Consulting Project uses experts from various fields to produce economic and environmental results through eco-conversion in the production process and business administration through tailored site visits to participating companies. It facilitates lower production costs by increasing productivity and reducing environmental waste.

The main purpose of Eco-Innovation Consulting Project was to consult newly participating companies. Hence, once the project was over, the consulting team had no chance to assess whether the existing participants carried out the solutions, follow up on their performance, and gather information on the obstacles they faced.

As a result, the Follow-up Management Program aimed to revitalize the Eco-Innovation Project with the cooperation and support from the local government. The consulting team needed to come up with a program to continuously boost Eco-Innovation for Malaysian SMEs by resolving the issues faced by the participants and devising a follow-up management system.

2.2 Project Objectives (Malaysia)

The Goal of Malaysia Eco-Innovation Follow-up Management Program and Follow-up Project

The ultimate goal of this project is to establish an adequate follow-up system by analyzing the Eco-Innovation Project solutions and technology used during the five years of ASEIC's Malaysia consulting project and understanding the cause behind the low level of implementations.

To reach this goal, the consulting team needed to design an Eco-Innovation Capacity Building Program and raise awareness on Eco-Innovation. The team uncovered additional technology that can be applied to the existing companies and identified the need for a reinforcement program for the participating companies and employees.

The team needed to provide the participating companies with solutions, and did so by holding an Eco-Business Matching session for the participating Malaysian companies and Korean companies with in-demand technology.

Partner organization SIRIM Berhad has decided to provide various programs and offer support funds to implement the solutions to help Eco-Innovation Consulting Project take root in Malaysia.

2.3 Detailed Plans and Methods

Project Launch Framework

The consulting project lasted six months. The first step was to devise a follow-up management program, the next step was to carry out the Capacity Building Program, and the last step was Eco-Business Matching.





2.4 Devising Follow-up Management Plans

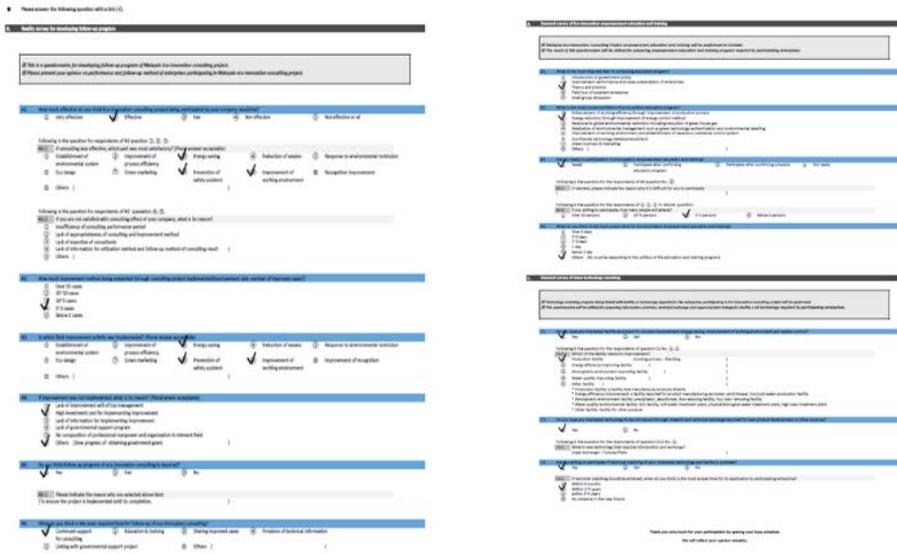
Government and Partner Organizations

The Eco-Innovation Consulting Project is collaboration between ASEIC and local Malaysian partner organization SIRIM Berhad’s Environmental Technology Research Centre (ETRC). A national organization for standard and quality, SIRIM Berhad ranks 15th in the world and provides a wide range of services including industry research, testing and certification, product standards consulting, product certification, consultation for SMEs, Eco-Innovation consulting, training, and advisory services.

Creating and Conducting Status Survey

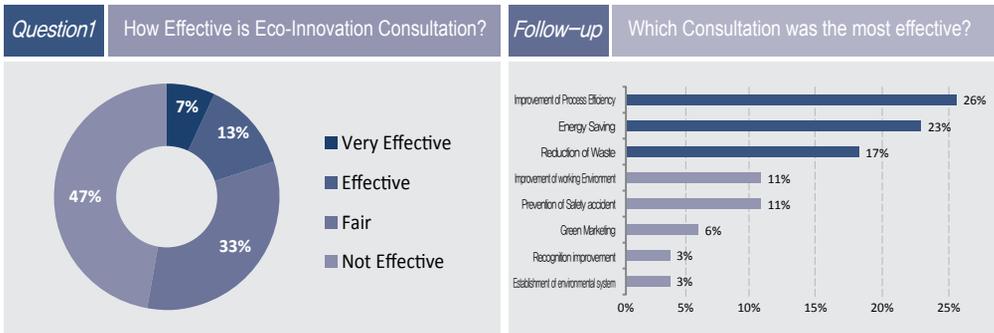
The consulting team created a status survey for the 45 participating companies in preparation of the Malaysia Eco-Innovation follow-up program. The survey covered the following areas:

- Eco-Innovation Consulting Project for participating companies
- Implementing solutions, reasons behind failure to implement, and obstacles
- Identifying demand for Capacity Building Program and training
- Identifying demand for applied technology and additional information on technology



Status charts

Status Survey Analysis

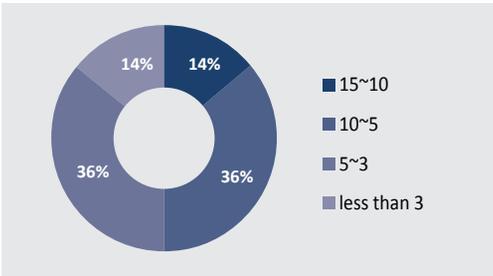


87% of the participating companies found the Eco-Innovation consulting project to be effective.

The most effective consultations were improvement of process efficiency, energy saving, and waste reduction.



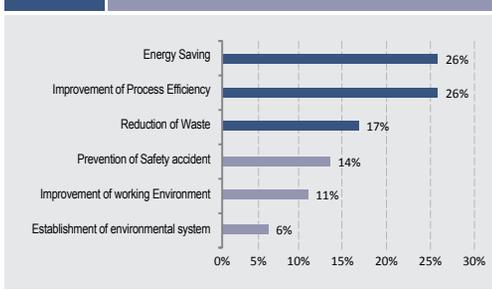
Question2 How far along have you implemented the solutions?



50% of participating companies carried out five or more solutions.

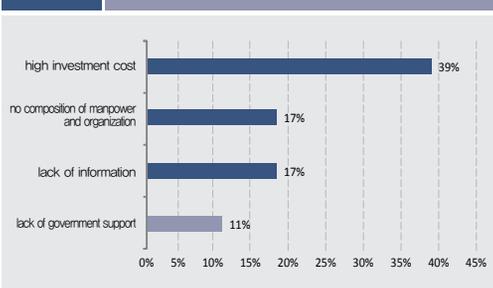
※ An average of eight solutions were carried out per company.

Question3 In which areas are the solutions completed?



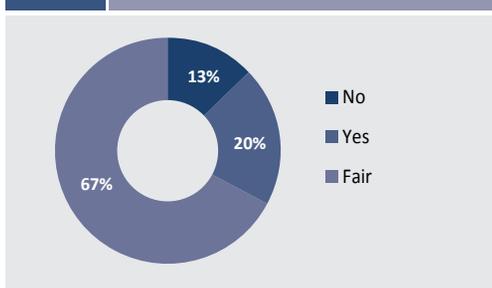
Areas that made improvements were energy saving (26%), improvement of process efficiency (26%), and waste reduction (17%).

Question4 What was difficult in carrying out the solutions?



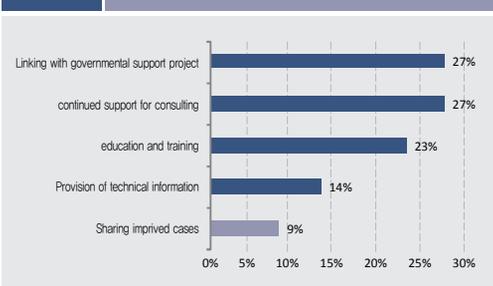
Implementing solutions was difficult because of high investment cost (39%), no composition of manpower and organization (17%), and lack of information (17%).

Question5 Is follow-up Management necessary?



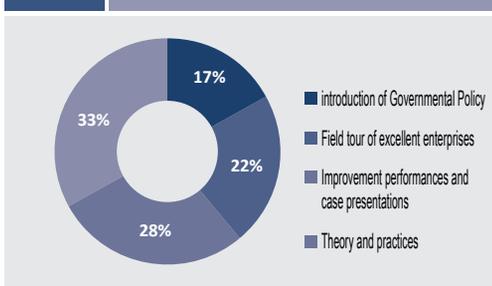
87% of participating companies found follow-up management to be necessary.

Question6 What do you need for a follow-up?

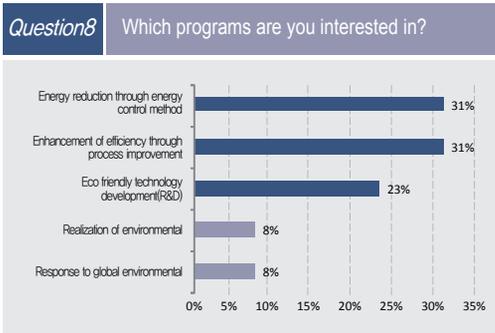


Participating companies requested governmental support connections (27%), continued support for consulting (27%), and education and training (23%) as a follow-up.

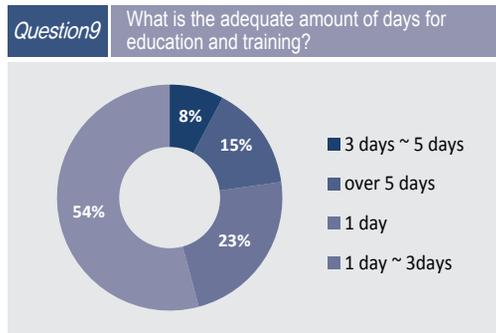
Question7 In what areas do you need education and training?



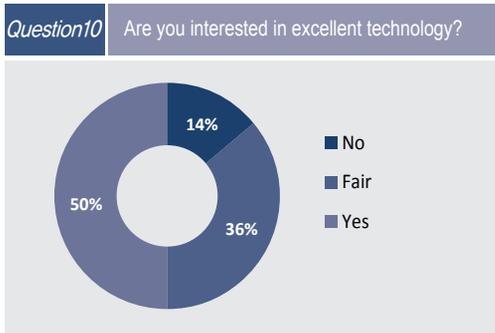
Participants wanted theory and practices (33%), improvement performances and case presentations (28%), and site visits to top enterprises (22%) for education and training.



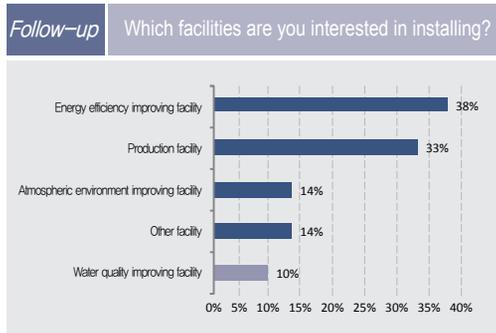
Participants were interested in learning about energy reduction methods (31%), increased process efficiency (31%), and eco-friendly technology development (23%).



54% of participating companies preferred one to three days for education and training, while 23% preferred one day.



86% of participating companies showed high interest in increased efficiency and energy saving technology.



Participants showed interest in energy efficient facilities (38%) including water heating system, chiller, cooling tower, and air compressor, and production facilities (33%) including packing machine and grinder.

Out of 45 participating companies, 51% responded to the survey, and the consulting team identified solutions that were not carried out and reason for lack thereof, and barriers, demand for education and training program, and technology of interest. Using the results of the survey, the team developed a follow-up management program for capacity building and improvement activities.



Pre-workshop

The consulting team introduced plans for the "2016 Malaysia Eco-Innovation Follow-up Management Project" to the participating companies and organized a pre-workshop to collect detailed opinions of the survey results.

- Pre-workshop: Malaysia Eco-Innovation Consulting Project Follow-Up Management
- Date: July 26th, 2016 (Tues.)
- Location: Concorde Hotel (Shah Alam)
- Audience: Malaysia Eco-Innovation Consulting Project Participants

Program

Time	Program	Speaker
10:00 ~ 10:30	Registration	-
10:30 ~ 10:40	Opening Address	SIRIM
10:40 ~ 11:00	Introduction of ASEIC	ASEIC
11:00 ~ 11:20	Introduction of Follow-up Management and Project	ECOYE
11:20 ~ 12:00	Introduction of the business value of the Eco-Innovation Consulting Project and Future Support Projects	SIRIM
12:00 ~ 12:30	Malaysia Eco-Innovation Consulting Project Success Cases	WT Plastic Bodibasixs
12:30 ~ 13:30	Lunch	-
13:30 ~ 13:45	Status Survey Analysis	SIRIM
13:45 ~ 16:00	Detailed Group Discussions	ECOYE
16:00 ~ 16:10	Closing Remarks	MOSTI
16:10 ~ 16:30	Photo session	All



Photo session



Pre-workshop program



Detailed discussions on the status survey result

The participants were divided into two groups for detailed discussion and shared the results of the survey. Details of the discussions were as follows:

- Strengths, weaknesses, and necessary improvements of Eco-Innovation Consulting Project
- Results of the status survey
- Current conditions and obstacles of the participating companies
- Areas of interest in the Capacity Building Program for the participating companies
- Opinions on Eco-Business Matching and the direction of the final workshop



Announcing the results of the discussion

After the discussion session, each group presented their findings. The Eco-Innovation Consulting Project embodied a new form of consultation project; because the consultations were broken down into quantitative, qualitative, and numerical solutions, it helped the participants decide on the improvement activities of their choice. A majority of participants were also satisfied with the consultation on energy efficiency. Once the project ended, however, no the details were provided about the consult, applied technology, or contact information. Hence, the participating companies had difficulty carrying out additional solutions.

Government Support Project Connections

According to the results of the status survey, the most prominent obstacle was the cost of initial investment. To resolve this issue, the consulting team conjoined the Follow-up Management Program with a government support program to alleviate investment costs for the participating companies and push the improvement activities forward.

The consulting team selected ten companies that most actively partook in the improvement activities and visited them with SIRIM Berhad consultants. The purpose of the visit was to examine the solution outcome, examine additional consultation requests, and establish plans on conjoining government support and the consulting project through interviews.



The consulting team visited selected companies to examine solution outcomes and additional requests made during the consultation.

The team, in conjunction with government support, identified the processes and facilities that needed improvements and primarily discussed the obstacles and grounds for solution needs. They shared interview logs from site visits to make connections with the government support project and to carry out further improvement activities.



Site visit logs of corporate requests and government support connections

After the site visit, the team proposed additional solutions to companies that sought process and facility improvements through government support programs, by providing technology information, adequate facilities, volume measurement, and maintenance. As a final step, after reviewing the companies, the team plans to consult SIRIM Berhad to apply for government support programs.

Support Programs by SIRIM Berhad

SIIMF

SIRIM Industrial Innovation Model Fund (SIIMF) is SIRIM Berhad's support fund that can be used for Malaysian SME's technology-centered solutions. SMEs that want to apply for SIIMF must indicate their commitment to expand and extend the technology they adopt and produce quantitative results.

Project Financing

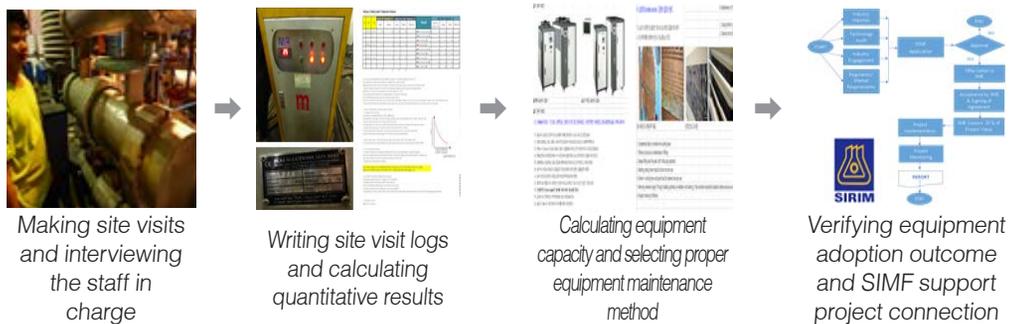
SIIMF provides 80% of the total project financing depending on the companies' qualifications. The application is delivered to the approval committee when the company agrees to pay for the remaining 20%. Support programs must check the validity of the project.



Available Items	Unavailable Items
<ul style="list-style-type: none"> • Designing and manufacturing machinery and equipment • Raw material, parts, component equipment purchase for product development • Consultation for SMEs • Designing a prototype for product development • Technology analysis, market entrance and expansion 	<ul style="list-style-type: none"> • Capital asset purchase or lease (e.g., buildings, vehicles, furniture) • Use for collateral or loan • Marketing or promotional activities

Project Financing Steps

SIMF project financing will be carried out in the following order: identifying processes and facilities in need of improvement through site visits, identifying obstacles, calculating quantitative performances, selecting installation equipment, and applying for funds. The funding is determined by SIRIM Berhad's approval committee.



※ Site visit companies' facilities of interest and list of technology

Company Name	Facility and technology in need
Techbond Manufacturing Sdn Bhd	Dust collector for raw materials and automatic packaging facility
SB Tape International Sdn Bhd	CO ₂ heat pump for energy efficiency
MTS Fibromat (M) Sdn Bhd	Induction heater for extrusion machines, automated processing facility, and grinder to recycle plastic
Wilron Products Sdn Bhd	Induction heater for extrusion machines and a replacement for the inverter-type air compressor
Uni 1 Food Sdn Bhd	Automatic packaging facility and small wastewater treatment facility
Master Material Manufacturing Sdn Bhd	Dust collector for raw material input and the latest eco-friendly industrial agitator
Polyway Industry Sdn Bhd	Cooling tower and replacement for proper-capacity chillers for cooling process
Ideal Health care Sdn Bhd	Defect filtering device and automatic label inkjet printer
Bodibasixs Manufacturing Sdn Bhd	CO ₂ heat pump for energy efficiency and automatic cap-locking device
Sri Kota Rubber Manufacturing Sdn Bhd	Induction heater for extrusion machines

2.5 Capacity Building Program

Running the Capacity Building Program

The consulting team conducted the Capacity Building Program to revitalize the Eco-Innovation improvement activities - the main purpose of the 2016 Malaysia Eco-Innovation Follow-up Management Project - for the participating Malaysian companies.

- Final workshop: Follow-up Management for the Malaysia Eco-Innovation Consulting Project
- Date: October 6th, 2016 (Thurs.)
- Location: KLCC (Kuala Lumpur Convention Centre) Seminar Room 406 - 407
- Audience: Participating companies of the Malaysia Eco-Innovation Consulting Project

Program

Category	Time	Program	Speaker
Capacity Building Education #1	10:00 ~ 10:50	Eco-Innovation Overview - Eco-Innovation trend; export and import regulations - Utilization of environmental certification, eco-design, etc.	SIRIM Berhad
	10:50 ~ 11:10	Coffee Break	-
	11:10 ~ 12:00	Energy management methodology	Ecosense
-	12:00 ~ 13:00	Lunch	-
Capacity Building Education #2	13:00 ~ 14:50	Waste management theory and practice (includes fun game)	CTA, ECOEYE
	14:50 ~ 15:00	Coffee Break	-
	15:00 ~ 16:00	Energy-saving theory and practical training (Energy saving measures for general-purpose technology) - includes chillers, cooling towers, and air compressors	Ecosian

Using the status survey results, the consulting team examined the Capacity Building Program requested by the participating companies and took opinions from the pre-workshop into consideration. The team designed the Capacity Building Program as requested by the participating companies to meet their needs.





Capacity Building Program Composition

The Capacity Building Program largely focused on energy and waste management. The energy management portion of the program included theoretical and practical education on the necessity of energy management system, energy management case studies and results, and energy-saving methods. The waste management portion of the program included theoretical and practical education on causes of waste production, waste prevention measures, and waste management methods.



Group photo session



Theoretical and practical training

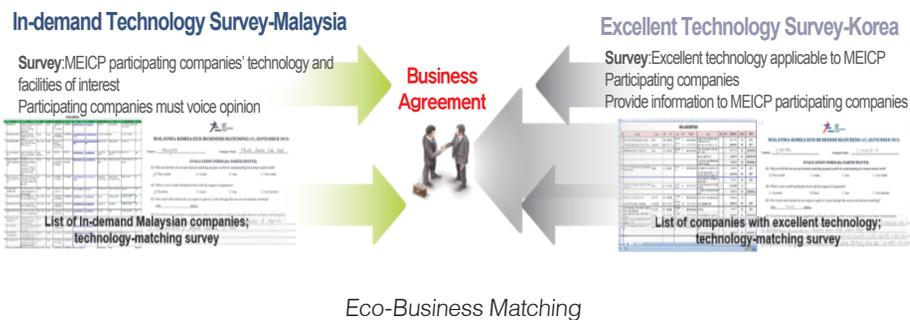


Hands-on training session

2.6 Eco-Business Matching

Korea-Malaysia Eco-Business Matching

The consulting team conducted a Korea-Malaysia SMEs Eco-Business Matching for new business expansion. The team inspected technology and equipment that can be used in Malaysian SMEs and Korean companies that own them, and arranged a one-on-one consultation between the two. Korean companies had the opportunity to expand their new business while Malaysian companies were given the chance to improve.



- Pre-workshop: Malaysia Eco-Innovation Consulting Project Follow-Up Management
- Date: October 7th, 2016 (Fri.)
- Location: KLCC (Kuala Lumpur Convention Centre) Seminar Room 406 - 407
- Audience: Participating companies of the Malaysia Eco-Innovation Consulting Project

Program

Category	Time	Program	Speaker
Capacity building education #3	09:00 ~ 09:40	SME improvements and investment support Program Overview	SIRIM Berhad
-	09:40 ~ 10:00	Coffee Break	-
Eco-Business Matching	10:00 ~ 12:00	Korea-Malaysia Eco-Business Matching Program - Matching Malaysian SMEs and Korean companies with in-demand technology	Ecoeye
-	12:00 ~ 13:00	Lunch	



The consulting team used the survey results and discussions from the pre-workshop to find out in-demand technology for Eco-Business Matching. During site visits, the team also conducted interviews to determine the feasibility of bringing in the in-demand technology to the Malaysian companies. At the same time, the team looked into Korean SMEs with the technology and equipment in demand and arranged a site visit to include them in the Eco-Business Matching Program.



Making site visits to inspect in-demand technology

Participating Companies of Eco-Business Matching

Two Memoranda of Understanding (MoU) were reached at the Eco-Business Matching out of 20 matches made from the pool of 13 Korean companies and 11 Malaysian SMEs. The matching consultation became an arena of determining the feasibility of technology application and business connections.

Korea		Malaysia	
1 Korea ENG	8 ECOSENSE	1 Tech Bond Snd Bhd	8 FREE The Seed Sdn Bhd
2 Jung-il Engineering	9 Sun Energy LED	2 MTS Fibromat (M) Sdn Bhd	9 Nets Printwork Sdn Bhd
3 ASIA Gentra	10 Living Care	3 Master Marial Snd Bhd	10 Ever Delicious Snd Bhd
4 Gong-myung Induction	11 Dae-jin Environment Industry	4 Polyway Industry Sdn Bhd	11 Titan LED SND BHD
5 KB Tech	12 GS Caltex	5 AO Advance Automaion Sdn Bhd	-
6 DCNCA	13 In-Sun Motors	6 Bodibasixs Snd Bhd	-
7 Boo Sung Engineering	-	7 SBTape SND BHD	-



MoU reached between Korean and Malaysian SMEs



Eco-Business Matching Program



Eco-Business Matching Assessment

The consulting team received feedback from the participating companies of the Eco-Business Matching Program. The results revealed that Korea has a 91.6% level of understanding of the mutual market and Malaysia 81.8%. Korea showed 89.5% level of satisfaction while Malaysia showed 90%. The participants also revealed that they anticipate an estimated KRW 760 million worth of economic benefit in the next three years through this program.



MALAYSIA-KOREA ECO-BUSINESS MATCHING (7, OCTOBER 2016)

Country: PERIA ASIA ORIENTA Co., LTD Company Name: ASIA ORIENTA Co., LTD
President JUNG SEUNG

EVALUATION FORM (for PARTICIPANTS)

Q1. Did you find the one-on-one business matching program useful for understanding the mutual market trend?
 Very Useful Useful Fair Not Useful

Q2. What is your overall satisfaction level with the support of organizers?
 Excellent Good Fair Not Satisfied

Q3. How much sales amount do you expect to gain in 3 years through this one-on-one business matching?
 USD 760 Million

Q4. If you have any comments or suggestions, please let us know so that we can apply them to our future work programs.
Business collaboration has not enter the environmental policy under the Andongia
government has limited your reach benefits in being adverse during negotiations
The future programs also should be set with in accordance with Government's policy related

Matching satisfaction survey for Korean SMEs



MALAYSIA-KOREA ECO-BUSINESS MATCHING (7, OCTOBER 2016)

Country: Malaysia Company Name: Bandaruas Manufacturing

EVALUATION FORM (for PARTICIPANTS)

Q1. Did you find the one-on-one business matching program useful for understanding the mutual market trend?
 Very Useful Useful Fair Not Useful

Q2. What is your overall satisfaction level with the support of organizers?
 Excellent Good Fair Not Satisfied

Q3. How much sales amount do you expect to gain in 3 years through this one-on-one business matching?
 USD 1.5 Million

Q4. If you have any comments or suggestions, please let us know so that we can apply them to our future work programs.
Need more a longer technical workshop training

Matching satisfaction survey for Malaysian SMEs

03 Site Visit Reports

3.1 Techbond Manufacturing Sdn Bhd

Company Overview

Established in 1990, Techbond Manufacturing Sdn Bhd produces customer-tailored wood glue, automotive adhesives, construction adhesives made with water-based glue and hot-melt adhesives. These products are used for construction work, woodwork, and book binding. The company is ISO 9001 and ISO 14001-certified.

Techbond Manufacturing Sdn Bhd runs two main production processes: one that uses water-based adhesives and another that uses hot-melt adhesives. The company, however, is facing raw material losses, reduced productivity, and deteriorating working conditions during the packaging process, raw material input, and transportation process. Hot-melt and water-based adhesives in common use the most energy during the heating process, which use electric heaters and thermal water boilers.

Site Visit Interviews

The consulting team suggested six solutions for the 2015 Malaysia Eco-Innovation Consulting Project. Among them, three were pushed through - streamlining cooler operation, adjusting excess air ratio for thermal oil boilers, and save energy source per unit. Streamlining cooler operation cooled products but streamlining cooling towers allowed energy efficiency. Adjusting excess air ratio for thermal oil boilers saved energy by adjusting combustion air. The company is also building a periodic management system to monitor excess air ratio. It switched the LPG tank capacity from 50kg to 200kg to increase fuel efficiency, lowering energy cost and producing economic results.

The interviewee answered that the company needs to conduct internal inspections, as they have to design a long-term plan and bear the burden of paying the investment cost for the three solutions - switching the tank heating system, improving water-based adhesive packaging methods, and improving working conditions for the water-based adhesive blending process.



Areas of Interest



Improving product packaging

Improving raw material input

The company first wanted to improve the final hot-melt product packaging process. This production process - product input, measurement, proper re-measurement, and final packaging - was done manually, causing inefficiency. Secondly, raw materials with high viscosity may rub on the packaging vinyl while inserting bulk-type raw materials, leading to raw material loss and waste production. An estimated 2kg of raw material per barrel, or about 400kg per month, are lost and are processed as waste. The consulting team suggested additional solutions to increase process efficiency, recover lost raw materials, and reduce waste.

Government Support Project Connections (additional support needs)

In 2015, Techbond Manufacturing Sdn Bhd requested solutions to improve working conditions for water-based adhesive blending process using the support fund from SIRIM Berhad. To improve working conditions, the company wanted to prevent raw material from being dispersed and wanted to adopt a dust collecting facility to reuse leftover raw materials. Consultants of SIRIM Berhad plan to utilize support funds by submitting equipment request forms to the approval committee.

3.2 SB Tape International Sdn Bhd

Company Overview

Established in 1996, SB Tape International Sdn Bhd began as a large-scale manufacturer, importer, and distributor of double-sided tapes. The company develops new types of eco-friendly tape through continuous R&D, and has obtained ISO14001 and OSHAS18001 certifications to build an environment management system and occupational health and safety management system, respectively.

SB Tape International Sdn Bhd's manufacturing process consists of inserting raw materials into a blending tank to produce an adhesive blend, coating the film of the tape with adhesive, rewinding the tape, cutting, and shipping the final product.

Site Visit Interview

The consulting team suggested nine solutions for the 2015 Malaysia Eco-Innovation Consulting Project. Among the suggestions, six improvements were made - streamlining air compressor operation, strengthening thermal oil boiler insulation, replacing LED lamps, improving packaging process, improving the recall system for defected packages, and improving the packaging box transportation system. The company replaced air compressor pipes with loop-type pipes to streamline air compressing, subsequently saving energy. It also further reinforced thermal insulation to save energy on thermal oil boilers. Finally, it implemented solutions to increase manpower and efficiency.

The interviewee responded that three processes - installing blending process heat exchanger, installing adhesive transportation pump and saving time for cooling process, and installing CO₂ heat pump – need long-term planning and detailed inspection.

Areas of Interest



Water heaters



CO₂ heat pump

SB Tape International Sdn Bhd consumes a substantial amount of energy on using electric heaters to produce hot water used in the raw material blending process. To save energy, the company wanted to use the CO₂ heat pump suggested by the consulting team, but had to bear the burden of high investment cost.

Government Support Project Connections (additional support needs)

SB Tape International Sdn Bhd hopes to adopt the CO₂ heat pump using the support fund from SIRIM Berhad. It was highly committed to forming connections with the support program, as support funds will relieve the burden of paying for the investment. Consultants of SIRIM Berhad plans to help the company use the support funds by submitting an equipment request form to the approval committee.

3.3 MTS Fibromat (M) Sdn Bhd

Company Overview

Established in 1999, MTS Fibromat (M) Sdn Bhd is an experienced manufacturer of erosion control products. Designed for soil erosion control and embankment protection, the company's products are applied to civil engineering.

MTS Fibromat (M) Sdn Bhd consumes the most amount of energy during the extrusion molding process, the main process of the entire production. Furthermore, the banding process - adhering plastic pads – produces various manufacture defects, causing less products to be transferred to the next step.

Site Visit Interview

The consulting team suggested nine solutions for the 2015 Malaysia Eco-Innovation Consulting Project. Among them, seven solutions were pushed through and completed - replacing raw materials for cost reduction, streamlining banding process, streamlining air compressors, using ring blowers, adjusting heat temperature settings for compression molding, improving grind process, loading, and transporting in between processes. The company was able to save raw material costs tremendously by replacing all raw materials with recycled ones. Manufacturing loading devices allowed higher transportation efficiency between processes. It also saved energy by replacing air compressor pipes with loop-type pipes to streamline the compressed air transportation.

They added that two improvements that were not carried out do not pose a significant problem to the production.

Areas of Interest



Automatic facilities



Heating system



Latest grinder model

MTS Fibromat (M) Sdn Bhd implemented almost all solutions proposed at the 2015 consultation, and showed keen interest in installing automatic facilities as part of the plant relocation plan. They requested information on automatic facilities to increase efficiency as production is currently carried out manually. The company was also interested in adopting induction heaters to save energy consumed by molding machines that have been approved by other participating companies.

Government Support Project Connections (additional support needs)

MTS Fibromat (M) Sdn Bhd is looking to adopt automatic facilities using the support fund from SIRIM Berhad. Automatic facilities falls under the equipment selection step of the process and should be placed in the newly relocated factory. After the facility selection is made, consultants of SIRIM Berhad plan to help the company use the support funds by submitting an equipment request form to the approval committee.

3.4 Wilron Products Sdn Bhd

Company Overview

Wilton Products Sdn Bhd manufactures packaging wraps, paper, bookbinder, cars, and water-based adhesives and hot-melt adhesives used in architecture, construction, sanitation, cigarette, and DIY crafts. The company has branches in Penang, Ipoh, Kuantan, Johor Baru, and continuously strives to meet customer demands and spearhead the challenging market.

Wilson Products Sdn Bhd runs two production processes: one that uses water-based adhesives and the other that uses hot-melt adhesives. Both consume the most energy in the heating process which uses electric heaters and thermal oil boilers.

Site Visit Interview

The consulting team suggested nine solutions for the 2014 Malaysia Eco-Innovation Consulting Project. Among them, five were pushed through and completed - adjusting excess air ratio for thermal oil boilers, installing thermal insulation for heat transfer system, increasing chiller efficiency, lowering air compressor pressure, and improving packaging for water-based adhesives. The company periodically adjusts and manages air combustion ratio and reduces fuel consumption with thermal insulation from the heat transfer system. It also efficiently manages chillers by periodically improving COP efficiency. It increased energy efficiency by reducing load and lowering pressure setting to prevent air compressor from leaking air.

Four items on the improvement agenda that have not been implemented were mostly core processes, or the blending processes. The company responded that though it had a strong will to make improvements, decisions must be made conservatively due to lack of experts within the company.



Areas of Interest



Inverter-type air compressor



Induction heating system

Wilron Products Sdn Bhd owns a molding machine for the hot-melt adhesive production and wanted to increase productivity and energy efficiency by replacing the existing band heater with an induction heater. The company was also interested in saving energy by replacing old air compressors with inverter-type air compressors.

Government Support Project Connections (additional support needs)

As mentioned earlier, Wilron Products Sdn Bhd hopes to improve its induction heater or inverter-type air compressor by using support funds from SIRIM Berhad. Consultants of SIRIM Berhad plans to help the company use the support funds by submitting an equipment request form to the approval committee.

3.5 Uni1 Food Industries Sdn Bhd

Company Overview

Established in 1992, Uni 1 Food Industries Sdn Bhd is a cookie manufacturer. It obtained a halal certification in 1995 and began a modern-style mass production. ISO 9001:2008 and Hazard Analysis Critical Control Point (HACCP) certified, the company makes continuous development and provides high quality products to its consumers.

All cookie manufacturing processes are automatic with the exception of the packaging process. Cookie baking and cooling processes use the most energy, and the company is continuously devising and implementing energy efficient procedures. No toxic substance is formed in any of the processes, but wastewater may form from the cookie crumbs while cleaning the manufacturing equipment.

Site Visit Interview

The consulting team suggested ten solutions for the 2014 Malaysia Eco-Innovation Consulting Project. Among them, five were pushed through and completed - improving steam-solvent ventilation facility, changing the location of the indoor coolers, preventing compressed air leakage, lowering target pressure for the air compressor, and increasing chiller efficiency. The company resolved all issues that might pose a problem for a food manufacturer. To save energy, it also implemented solutions for utility facilities.

The company responded that of the other five solutions, three solutions - improving cookie oven ventilation system, installing buffering table for packaging, and reinforcing insulation for the thermal transfer system - needed detailed follow-ups, depending on the production facility. It added that it had difficulty making improvements for two solutions - adjusting excess air ratio for burners and preheating air supply for burners - due to lack of experts within the staff and expert organizations.

Areas of Interest



Automatic box packaging device



Small-scale wastewater treatment facility

Uni 1 Food Industries Sdn Bhd is considering adopting automatic box packaging device to expedite production efficiency. It is also looking for equipment and technology to treat wastewater produced by cookie crumbs during the equipment cleaning process. The consulting team has provided information on automatic facilities and small wastewater treatment facility that can be installed right away.

Government Support Project Connections (additional support needs)

Uni 1 Food Industries Sdn Bhd plans to use support funds from SIRIM Berhad to either adopt automatic packaging equipment or cookie wastewater facility. Consultants of SIRIM Berhad plans to help the company use the support funds by submitting an equipment request form to the approval committee.

3.6 Master Materials Manufacturing Sdn Bhd

Company Overview

Established in 1979, Master Materials Manufacturing Sdn Bhd manufactures decorative materials. It manufactures raw materials used for concrete floor stamping, wall stamping, waterproofing, and coating, and performs construction. The company carries out efficient production and construction as it is ISO 9001:2008-certified.

Master Materials runs two types of production lines: cement manufacture for floors and walls and waterproof coat manufacture for the finish. A problem was raised for each process: the cement manufacturing process produced dust when blending cement, sand, silica powder, and additives, exacerbating working conditions and the blending machine used to manufacture waterproof coat to melt the adhesives was worn, also exacerbating working conditions and efficiency.

Site Visit Interview

The consulting team suggested six solutions for the 2014 Malaysia Eco-Innovation Consulting Project. The team proposed three solutions for the cement manufacturing process: improving raw material packaging, installing dust collectors for raw material input, and installing inverter to control the rotation for the blending process. It proposed three solutions for the waterproof coat manufacturing process: improving acrylic adhesive melting process, recalling solvent waste, and switching the type of blending machine. Master Materials Manufacturing Sdn Bhd responded that it faced some difficulties while implementing these suggestions. The company responded that it looked for a raw material supplier for the raw material packaging process but was hard to find one in Malaysia. It plans to adjust two solutions on the agenda because it plans to alter the layout of the raw material production for cement. Additionally, it bears the burden of the high investment cost of switching to a new blending machine. It also added that when the switch is made, the three proposed solutions will be achieved immediately.

Areas of Interest



Plans to alter the process layout



Plans to replace blending machine

To improve productivity and working conditions, Master Materials Manufacturing Sdn Bhd hopes to install a dust collector to collect dust from the cement blender. It is also reviewing options to bring in new facilities to replace the old waterproof coating blender that is reducing productivity and emanating foul odor from the solvents.

Government Support Project Connections (additional support needs)

Master Materials Manufacturing Sdn Bhd hopes to install a dust collector and a new acrylic adhesive-melting blender using the support fund from SIRIM Berhad. Consultants of SIRIM Berhad plans to help the company use the support funds by submitting an equipment request form to the approval committee. In addition, SIRIM Berhad agreed to continue providing the company with technology information and equipment necessary to implement the solutions, as these are difficult to obtain in Malaysia.

3.7 Polway Industry Sdn Bhd

Company Overview

Established in 1984, Polway Industry Sdn Bhd is a manufacturer of plastic injection molding product that uses industrial HDPE. For over 30 years, Polway Industry Sdn Bhd developed plastic injection molding products used in a wide range of industries and manufactured both plastic parts and goods. It is primarily an original equipment manufacturer (OEM) and has the technology and experience to manufacture customer-demand products.

Polway Industry Sdn Bhd owns a water cooling system to make quality plastic goods. The cooling water is used to cool the injection molds and ideally should be maintained at 12°C, but is currently maintained at a higher level at 19°C, 21°C, and 25°C. Higher temperature causes manufacture defects and slows down production. The temperature of the cooling water cannot be lowered to 12°C presumably because a single chiller is used for multiple injection molding machine and does not have the sufficient cooling capacity.

Site Visit Interview

The consulting team suggested five solutions for the 2012 Malaysia Eco-Innovation Consulting Project. Among them, four solutions were pushed through and completed - managing air compressor maintenance, establishing a separate air compressor room, improving recycling through waste separation, and improving working conditions. The company confirmed that efficient management of air compressors saved energy and is continuously carrying out 5S production site activities to improve working conditions.

The company added that it is holding off labeling products to manage its inventory as it is not a matter of considerable significance.



Areas of Interest



Chiller and cooling tower maintenance methods



Selecting chillers with proper capacity

The consulting team selected chillers with proper capacity for each injection molding and suggested chiller and cooling tower maintenance methods to periodically maintain the cooling water temperature. In addition, manufacture defects are fished out manually, causing low efficiency, which led the team to become interested in devices that detect defects automatically.

Government Support Project Connections (additional support needs)

Polway Industry Sdn Bhd hopes to introduce proper capacity chillers to increase productivity and prevent manufacture defects using the support funds from SIRIM Berhad. Consultants of SIRIM Berhad plans to help the company use the support funds by submitting an equipment request form to the approval committee.

3.8 Ideal Healthcare Sdn Bhd

Company Overview

Established in 1999, Ideal Health Care Sdn Bhd manufactures disposable medical and healthcare products. It produces various surgical instruments, medical equipment, medical protection wear, and expendable goods. The company is ISO 9001:2008 and ISO 14001:2004 certified and additionally acquired ISO 13485:2003 to build a medical instrument quality management system. Ideal Healthcare Sdn Bhd, a domestic market player, is also expanding into overseas market to its neighboring countries.

Ideal Healthcare Sdn Bhd is highly interested in plant sanitation management as it manufactures health-related products. It is making improvement efforts but its productivity is not up to par. For instance, many workers are assigned to pack and print the manufacture date and the identification code manually, but manual work is slow and causes manufacture defects, leading to problems like damage to the company reputation.

Site Visit Interview

The consulting team suggested 12 solutions for the 2013 Malaysia Eco-Innovation Consulting Project. Among them, ten solutions were pushed through and completed - managing the temperature setting of the office air conditioner, managing the molding process at the injection site, preventing compressed air leakage, managing panel boards, managing warehouse, marking injection site hallways, finding statistics of monthly power use, maintaining a clean working environment, managing power factors, and for workers, keeping a clean body. Ideal Healthcare Sdn Bhd added that it implemented these solutions without the burden of paying a big sum.

The company also added that it is holding off installing office lights and replacing energy-efficient light bulbs because of high investment costs.

Areas of Interest



Automatic defect detector



Automatic inkjet label printer

Ideal Healthcare Sdn Bhd is considering adopting automatic label inkjet printer and automatic defect detector to raise productivity. These automatic facilities will likely increase productivity, prevent defect manufacture, and reduce labor. The team has provided the principles of and information on Korean and Taiwanese technology and is currently selecting automatic facilities for the company.

Government Support Project Connections (additional support needs)

Ideal Healthcare Sdn Bhd hopes to bring in automatic inkjet label printer and automatic defect detector using the support fund from SIRIM Berhad. Automated facilities fall under the equipment selection step of the process and should be placed in the new factory after relocation. Once the selection is made, the consultants of SIRIM Berhad plan to help the company use the support funds by submitting equipment request form to the approval committee.

3.9 Bodibasixs Manufacturing Sdn Bhd

Company Overview

Established in 1992, Bodibasixs Manufacturing Sdn Bhd manufactures personal care products by blending basic chemical products in a set ratio. As an OEM, all of the company's products are sold to other brands.

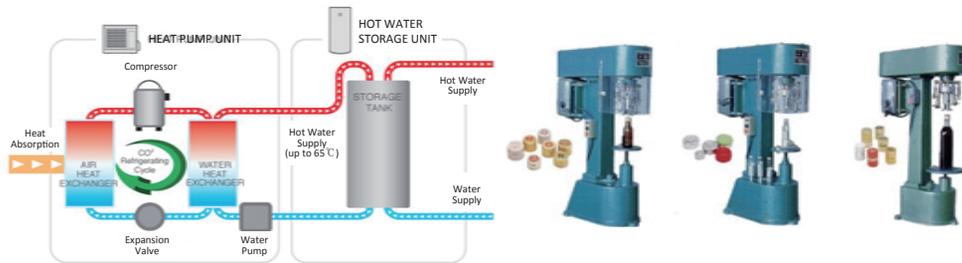
Bodibasixs Manufacturing Sdn Bhd has high energy consumption and was particularly interested in increasing energy efficiency. It uses the most energy in the blending process and is currently testing out the solutions suggested by the consulting team. It also uses electric heaters to heat blending water, and the company was compelled to replace it due to its insufficient capacity and substantial energy consumption. In addition, a mistake made during the plastic cap locking process by a worker has generated many defects, and the company asked for a solution to this problem.

Site Visit Interview

The consulting team suggested seven solutions for the 2015 Malaysia Eco-Innovation Consulting Project. Among them, three were pushed through and completed - separating supply line for cold and heated water, preventing compressed air leakage, and improving product input measurement deviation. Separating the supply line for cold and heated water in particular requires alteration of the entire production line, and therefore a testing facility had been installed to verify the process. The company anticipates that altering the supply line will save a substantial amount of energy. It also saved energy by preventing compressed air leakage. It prevented excessive product input by improving product input measurement deviation.

Four solutions - installing CO₂ heat pump, improving warehouse conditions, recalling pipe residues, and improving box packaging - however, were not yet implemented. To this, the company responded that installing CO₂ heat pump and improving warehouse conditions were not easy because of the high investment cost. In addition, the team informed that they could not implement solutions for recalling pipe residues and improving box packaging as they have not yet verified the applicability of these changes to the current process.

Areas of Interest



CO₂ heat pump principle

Auto-lock cap device

Bodibasis Manufacturing Sdn Bhd showed particular interest in adopting CO₂ heat pumps to replace electric heaters, and the consultants provided information on CO₂ heat pump technology, manufacturer, and proper capacity measurement for an internal review. The company was also interested in auto-lock caps to prevent manufacture defects that may occur from manual work.

Government Support Project Connections (additional support needs)

Bodibasis Manufacturing Sdn Bhd has decided to use support funds from SIRIM Berhad to introduce CO₂ heat pump. Consultants of SIRIM Berhad plan to help the company use the support funds by submitting an equipment request form, which includes facility technology, investment cost, and expected energy efficiency, to the approval committee.

3.10 Sri Kota Rubber Manufacturing Sdn Bhd

Company Overview

Established in 1989, Sri Kota Rubber Manufacturing Sdn Bhd manufactures rubber used in automotive parts. It mostly produces vehicle sealing and weather strips used in car doors, and began OEM manufacture for automotive parts in 1994. In 2004, it received quality assurance certificate approved by the automobile industry in Europe and the United States by obtaining ISO TS 16949, and has since exported rubber molds to markets around the world.

The manufacturing process of Sri Kota Rubber Manufacturing Sdn Bhd is largely classified into two parts: vulcanization, where rubber is extruded and molded, and pressing, where rubber is molded through insulation. Rubber extrusion and hot air production in the first process and heating molds in the second process consumes a substantial amount of energy.

Site Visit Interview

The consulting team suggested seven solutions for the 2014 Malaysia Eco-Innovation Consulting Project. Among them, three were pushed through and completed - repairing air-bubble-filled defects during the curing process, improving iron strip oil removal method, and recycling waste rubber. About 13% of goods manufactured were defects because air bubbles formed during the curing process where rubber is molded, heated, and cooled. Analysis revealed that defects occurred when raw material particles were too big and coarse. Replacing the raw material, however, lowered the percentage of defects. Heating iron straps with burners to eliminate oil increased fuel consumption and raised safety issues, but replacing the entire process with electric hot air drying resolved both problems.

The consulting team suggested that the company recycle waste rubber and pulverize them into powder to use as raw material, and the company responded that they are currently conducting the test.

Four solutions, on the other hand, were difficult to implement - improving cooling water insertion method for molding machines, installing motor power saver, improving moisturizing and drying process, and improving power factors. The company added that they could not simply cease the production to implement the solutions as they have to meet their clients' production capacity demands and the manufacturing process has to be conducted in a certain sequence.

Areas of Interest



Facilities in need of repair

A representative of Siri Kota Rubber Manufacturing Sdn Bhd inquired whether the induction heater, voted as the success case at the pre-workshop held this year, can be applied to the rubber extrusion molding. Upon inspection, it in fact turned out to be possible. The company is currently discussing the results of the test with an induction heater supplier. They are also discussing raw material loss and deteriorating working conditions caused by old and leaking releasing agent – a spray-type agent used to separate rubber from the mold. The consulting

team subsequently suggested high-efficiency spray and has agreed to make periodic replacements.

Government Support Project Connections (additional support needs)

Siri Kota Rubber Manufacturing Sdn Bhd plans to use support funds from SIRIM Berhad to remove band heater from the rubber extrusion molding process and install an induction heater. It will first test the applicability and energy efficiency, and if the outcome is successful, the company will immediately fill out a support fund application form with a consultant from SIRIM Berhad.



04 Implications

ASEIC undertook the Eco-Innovation Consulting Project over the course of five years since 2011 with ASEM member states with the goal to minimize environmental impact caused by SMEs. The project has become a foundation of sustainable development in various countries including Malaysia through environmental impact reduction diagnosis and guidance, including process diagnosis and waste and energy management. The status survey of participating companies showed positive evaluation on not only cost reduction and energy reduction through the solutions but also improving green business. Partner agency SIRIM Berhad also found this project as an opportunity to acquire technology and information that could help local SMEs through Korea's green technology and consulting expertise.

Malaysian companies praised the opportunity for improvement, increase productivity, and increase energy efficiency through the solutions proposed by the Eco-Innovation Consulting Project team that otherwise would have been looked over. A number of participants who did not have access to qualitative and quantitative outcome of the solutions answered that they will refer to the project to decide on their direction of improvement. They also added that the representatives from each participating companies were able to recognize the problems through not just the consultation but also from the workshop by learning about the success cases of other countries that participated in the previous Eco-Innovation projects.

While the project garnered mostly positive reviews, there was also advice for future improvement. One feedback suggested that the consulting team monitor the progress of the solutions after the project ends. The consulting team had a hard time providing additional support to the existing participants while also carrying out consultations for the new participants. Existing companies also had a hard time receiving support on a regular basis while at the same time making evaluations on the solutions. A big portion of the respondents pointed out that deciding whether to invest on the proposed solutions was difficult as the companies were not provided with the necessary information on technology or the outcome.

The participants added that more improvements and economic benefits would have been

gained had these obstacles been taken care of and follow-ups conducted regularly.

The final goal of the Follow-up Management Program for the Malaysia Eco-Innovation project was to identify the participating companies' status and resolve the obstacles they face to continuously implement the solutions. The program also mandated that information be provided on solutions that were cut short and have the participants decide on whether to implement the solutions after they have received the follow-up management, including learning about the success cases. The program also cut investment costs by conjoining with government support program and raised the participants and company representatives' awareness on Eco-Innovation.



05

Malaysia: Environmental Conditions and Further Development

5.1 Current Environmental Conditions

Malaysia, the leading chair of ASEAN, achieved a rapid 10.2% GDP growth in 2014. Yet fast economic growth brought new challenges for the country, as urban areas grew highly congested and households and industries generated increasingly more pollutants. Thus, environmental pollution is becoming a real problem throughout Malaysia and public awareness of the issue's severity and interest in developing environmental solutions are still low.

The economic growth has also recently resulted in Malaysia's price of energy increase by 29% between 2013 and 2014 and by an additional 6% in 2015, posing a greater burden on energy costs to industrial and buildings sectors. For this reason, Malaysian industry and building sectors are highly interested in energy management and energy saving methods.

5.2 Further Development

The participating companies have a hard time actually implementing the solutions proposed by the Eco-Innovation Consulting Project. Moreover, owing to the corporate decision-making structure, they were able to collect opinions - that it is more helpful to make decisions on investment direction when more information is provided - through the follow-up program. Unlike the existing engineering and scientific approach, the follow-up program should resolve these problems and take a procedural approach to the solutions from a business management standpoint.

Malaysian partner organization SIRIM Berhad is also applying the concept of Eco-Innovation on its own SME consulting projects. The role of the follow-up management program was found to be just as important as the consultation itself.

The consulting project needs a sufficient preparation period to carry out the follow-up program to continuously monitor the participating companies, track solution performances, conjoin support projects to cut investment costs, and provide capacity building education to raise green awareness among the participants. Therefore, the program must assist local government agencies in developing their own programs and building a system to help them expand voluntarily via the Capacity Building Program. This follow-up program has become an opportunity to educate SIRIM Berhad the importance of follow-up management. SIRIM Berhad plans to implement this program voluntarily on a regular basis. If SIRIM Berhad simultaneously undertakes the SME consulting project and the sustainable follow-up management program, it will generate a more efficient result than the current Eco-Innovation Consulting Project. Other participating countries of the Eco-Innovation Consulting Project besides Malaysia are also expected to face similar methodological issues. If suggesting solutions, urging the participants to carry out the solutions, and giving government support become a system, the Eco-Innovation Consulting Project will achieve more solution outcomes and set example to other ASEM member states who are preparing for eco-friendly business management and global warming.



Appendix (attachment)

1. *Company Status Survey*
2. *Site Visit Log for Project Support Affiliation*
3. *Korea–Malaysia Eco–Business Matching Satisfaction Survey*
4. *Pre–Workshop Presentation*
5. *Final Workshop Presentation*



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