ASEM
SMEs
Eco-Innovation
Center

ASEM Eco-Innovation Consulting Projects for SMEs Best Practices in Vietnam (2011)

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ASEM SMEs Eco-Innovation Center
(ASEIC)


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Executive Summary

Understanding the significance of fully exploiting the potential for eco-innovation and green entrepreneurship among small and medium sized enterprises (SMEs), the ASEM SMEs Eco-Innovation Center (ASEIC) has developed a green growth scheme which encourages SMEs to actively respond to the emerging green growth paradigm for the world economy.
With the main goal of strengthening 'green competitiveness' of SMEs, ASEIC has collaborated with UN organizations such as UNIDO and the UNEP International Resource Panel, global consulting firms and environmental experts around the globe to develop comprehensive strategies and measurable action plans for spreading greener production and management processes, as well as identifying green business opportunities.

In 2011, ASEIC launched its first "ASEM SMEs Eco-Innovation Consulting Project" in four ASEM member states - Indonesia, Malaysia, Thailand and Vietnam - with a total of 33 SMEs. The project consisted of customized consulting services for product, process and system innovation in the participating SMEs. These services helped to improve their overall environmental performance, from process optimization and environmental management, to the development of green business frameworks.

At the end of the consultancy, each company was provided with a set of customized eco-innovation guidelines to be implemented for the long run, including business frameworks for developing green products, services and technologies.

The 2011 "Eco-innovation Consulting Project" focused on two pillar programs: "Diagnosis & Implementation" and "Training & Education". ASEIC used quantitative and qualitative instruments to assess the environmental performance of the participating SMEs. Based on the assessment, both short and long-term environmental management and cleaner production strategies were established for implementation.

During the consultancy, ASEIC also provided training and education to raise awareness about the long-term cost effectiveness and profitability of green management in business.
At the end of the consultancy, each company was provided with a set of customized eco-innovation guidelines to be implemented for the long run, including business frameworks for developing green products, services and technologies.

Recognizing that SMEs are now facing new business opportunities as well as tremendous challenges with the introduction of eco-innovation, assistance from the global community is necessary to encourage SMEs to effectively utilize eco-innovation opportunities, and to help compensate for their lack of information, capability and financing mechanisms.

Therefore, the 2011 "ASEM SMEs Eco-innovation Consulting Project" generated holistic and multifaceted implementation plans for realizing eco-innovation: sharing environmental management and cleaner production strategies, and providing customized green business models. Through this project, ASEIC will continue to engage SMEs in global green growth initiatives, and encourage the innovation and sustainability of SMEs at any stage of the product or service lifecycle.

Background Information

The ASEM SMEs Eco-Innovation Center (ASEIC) aims to promote eco-innovation for small and medium-sized enterprises (SMEs) in Asia and Europe. Its establishment was endorsed by the leaders of ASEM member countries at the 8th ASEM Summit in Brussels, Belgium. ASEIC seeks to serve as an international platform where growing environmental regulations and eco-innovation practices are shared and new business opportunities are created. ASEIC is currently funded by the Small and Medium Business Administration (SMBA) of the Republic of Korea and its office is located in Seoul.

In order to enhance cooperation between Asia and Europe in the area of green growth, ASEIC is mandated to carry out the following activities in three key areas:

Knowledge Sharing

- Establish a web portal for SMEs of ASEM member countries by providing updated global environmental policies, laws, regulations, best practices, issues and news which are relevant to SMEs.

Eco-Innovation Projects

- Provide eco-innovation consulting services for SMEs in Asia and Europe
- Support projects for local development through appropriate technology sharing
- Develop SMEs Eco-Innovation Index (SEI) and evaluate the status of eco-innovation performance of SMEs in Asia and Europe.

Communications

- Establish global partnerships with international organizations
- Hold international conferences designed to exchange the best policies and business practices for ASEM member countries
- Strengthen economic and institutional partnerships among ASEM member countries

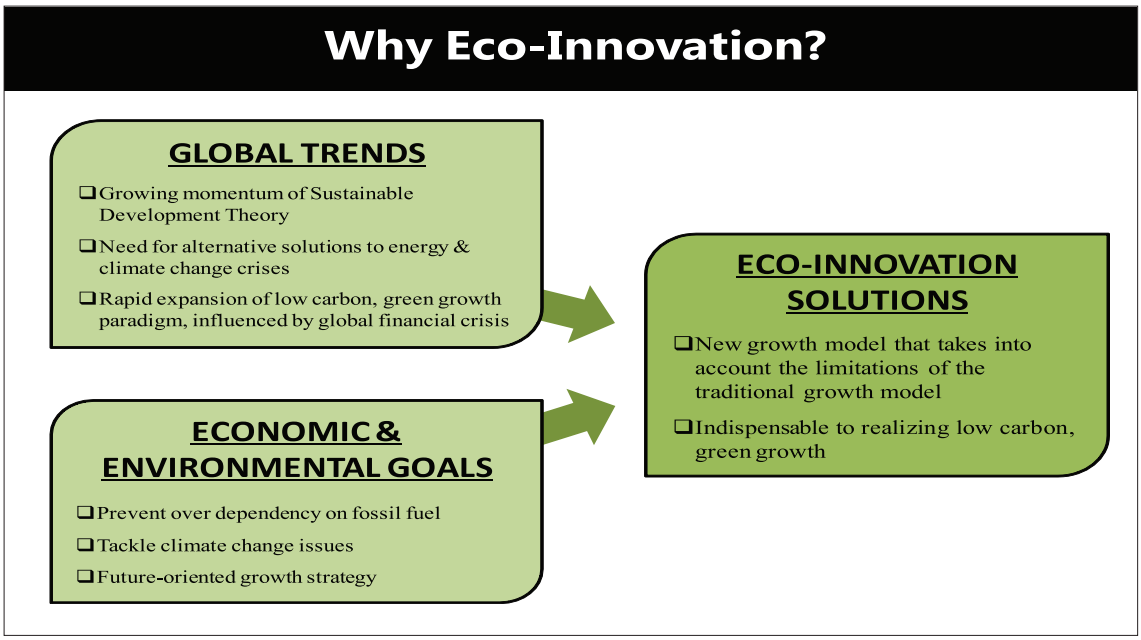
ASEIC supports SMEs in member countries to design and implement local and national strategies on green growth. In doing so, ASEIC is strengthening institutional collaboration with several stakeholders such as the Global Green Growth Institute (GGGI) and the Asia-Europe Foundation (ASEF).

On 10 January 2012, ASEIC signed a Memorandum of Understanding (MoU) with GGGI to synergize efforts to support developing countries in adopting eco-innovative technologies. ASEIC also intends to work with ASEF to further advance green growth in ASEM member countries.

Global Outlook on Eco-innovation

Sustainability and green growth continue to gain momentum in the international community as solutions for revitalizing the stagnating world economy as well as preventing further environmental & economic loss from climate change.

Against this backdrop, eco-innovation has become a concept of great significance to policymakers and businesses.



The term "eco-innovation" was first coined in 1996 by Claude Fussler and Peter James in *Driving Eco Innovation: A Breakthrough Discipline for Innovation and Sustainability* as "new products and processes that provide customer and business value while significantly decreasing environmental impacts". Since then, many definitions of eco-innovation have emerged.

In 2004, the European Union (EU) introduced the Environmental Technology Action Plan (ETAP) to promote the development and implementation of eco-innovation. According to ETAP, eco-innovation is "any form of innovation resulting in or aiming at significant and demonstrable progress towards the goal of sustainable development, through reducing impacts on the environment, enhancing resilience to environmental pressures, or achieving a more efficient and responsible use of natural resources."[1)]

1) European Commission (EC), Environmental Technologies Action Plan; available < http://ec.europa.eu/environment/ etap/index_en.html>.

The Organization for Economic Cooperation and Development (OECD) describes eco-innovation as "the contributions of business to sustainable development while improving competitiveness", analyzing eco-innovation activities in three dimensions - targets, mechanisms and impacts.[2)]

To incorporate eco-innovation in SMEs, the EU established the Eco-innovation Platform (Eco-IP) under the "Europe INNOVA Initiative". The EU's eco-innovation programs for SMEs emphasize the development of environmental technologies. Similar to the EU, the OECD implements eco-innovation programs for SMEs under the "OECD Project on Green Growth and Eco-innovation". The OECD eco-innovation program for SMEs aims to foster both technological and non-technological innovation in SMEs.

Although the concept of eco-innovation is slightly different among organizations, there is a common goal for its implementation - to drive businesses to institute greener processes and management activities, and utilize new business opportunities that are both economically and environmentally beneficial.

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2) Organization for Economic Cooperation and Development (OECD), "Eco-Innovation in Industry: Enabling Green Growth" (2010).

ASEIC's Concept of Eco-innovation

The global transition to low carbon and green economy is encouraging companies to adopt eco-innovation in their business activities. SMEs, however, have not been able to fully exploit the opportunities emerging from eco-innovation. They face barriers and challenges including lack of financing, knowledge, resources and technology - all of which make pursuing eco-innovation difficult. More importantly, most SMEs simply don' t know about the benefits of eco-innovation and don' t have an implementation plan to embrace it.
With this perspective in mind, the "Eco-Innovation Consulting Project" adopted a holistic, multi-faceted approach to foster green growth & sustainability among SMEs.

Although eco-innovation is an evolving concept, the prevailing scope of eco-innovation incorporates both technological and non-technological innovation.
Accordingly, ASEIC conceptualizes eco-innovation as "the development of innovative products, services, processes, or management which aims to optimize the use of energy and resources, and promote business opportunities while preventing or minimizing environmental impact".
Moreover, to generate a diverse range of outcomes, ASEIC has established specific targets and activities within four specific types of potential innovation: process, system, marketing, and management.
The figure below summarizes the category for eco-innovation:

ASEIC conceptualizes eco-innovation as "the development of innovative products, services, processes, or management which aims to optimize the use of energy and resources, and promote business opportunities while preventing or minimizing environmental impact"

Process Innovation

Eco-innovation in process refers to cleaner production, eco-efficiency, and environmental regulations compliance, which result in incremental and radical changes in the production process.

As the most basic type of eco-innovation, process innovation aims to save production costs, minimize negative environmental impact, and conserve energy & resources. ASEIC's 2011 project conducted a thorough audit of the participating companies' production processes, providing short and long-term implementation plans for cleaner production and eco-efficiency.

In addition, the companies were given an environmental data management tool to efficiently monitor the company's environmental performance.

System Innovation

System innovation is institutional reform that considers the environment in the company's corporate strategy. This type of innovation allows the organization to control its operations and improve its environmental performance by publishing periodic sustainable report, establishing comprehensive and systematic management guidelines, and providing effective internal and external communications channels regarding the organization's environmental performance.

To this end, the project conducted an educational seminar on environmental management, assisting the SMEs in developing environmental management system appropriate for their organization.

Marketing Innovation

Marketing innovation refers to the application of eco-friendly design and environmental labeling. Product design is crucial to the organization's production and sales outcome. The project provided companies with simple eco-design tools and guidelines for implementation.

To raise awareness of the various global and national mechanisms available for green marketing, the project provided a comprehensive educational session on eco-labeling and carbon labeling to managers of participating SMEs, and those from other nearby businesses.

Management Innovation

Management innovation was introduced as the most advanced form of innovation. Management refers to the development of the company-wide business strategies that create new business opportunities.

At the final level of eco-innovation, management innovation aims to increase CSR activity through improving the importance of environmental awareness and developing partnerships with local community.

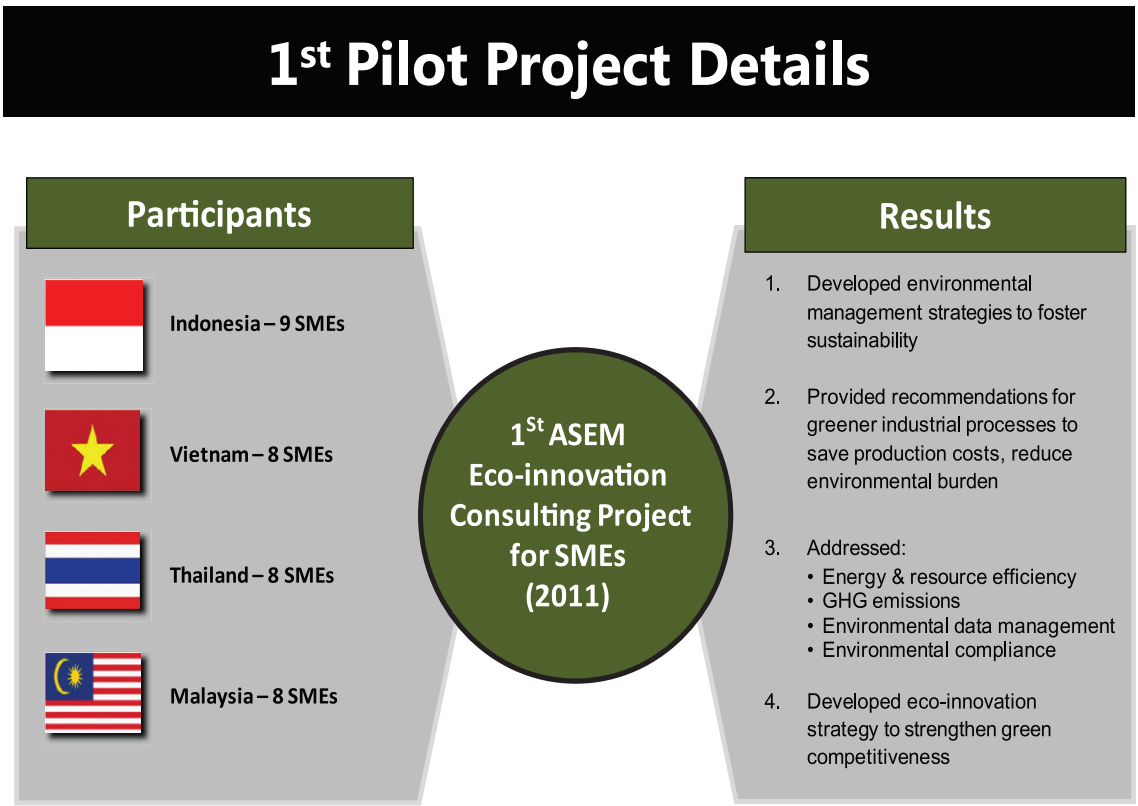
Based on the assessment, each participating SME was provided with a customized green business model that could be implemented in the long run.

Summary of 2011 ASEM SMEs Eco-Innovation Consulting Project

In 2011, ASEIC collaborated with UN organizations such as UNIDO and UNEP international resource panel, global consulting firms and environmental experts around the globe to launch its first "ASEM SMEs Eco-Innovation Consulting Project" in four ASEM member countries - Indonesia, Malaysia, Thailand and Vietnam - with a total of 33 SMEs.

The project consisted of customized consulting services in process, system, marketing and management innovation. Comprehensive strategies and measurable action plans for eco-innovation were developed to improve overall environmental performance, from process optimization and environmental management, to the development of green business strategies. Both quantitative and qualitative instruments were used to assess the environmental performance status of the participating SMEs.

In addition, on-site training and education were provided to raise awareness of the linkage between eco-innovation and growth. At the end of the consultancy, each company was provided with a comprehensive eco-innovation consulting guideline to be implemented in the long run.




NGÂN

VIETNAM

Country Status

Economy & Industry

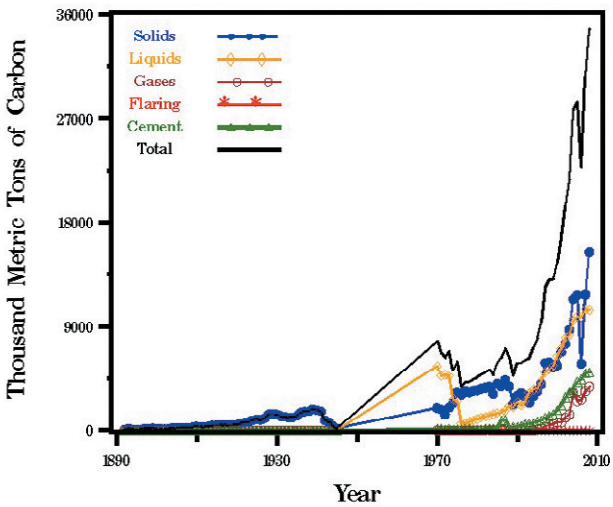
Vietnam's economic outlook is upbeat in comparison to other regions in the world. Analysts forecast annual real GDP growth at 6.7% from 2010 to 2011 and to accelerate to 7.2% from 2012 to 2014. However, the General Statistics Office (GSO) of Vietnam noted that the year-on-year inflation rate hit 11.8% in December 2010. Moreover, unusually high credit growth in the past, high lending rates, and weak risk management capacity are potential systemic risks in the financial sector.

In Vietnam, there were approximately 400,000 SMEs in 2011, representing 99 percent of the total number of businesses in the country, employing 77 percent of the workforce, and accounting for 80 percent of the retail market. The leading industrial sectors are food processing, garments, shoes, machine building, mining, cement, chemical fertilizers, glass, tires, oil, coal, steel, and paper. The manufacturing, as well as the information technology and other high-technology industries are now growing rapidly and constitute a large share of the national economy. However, the state-dominated industrial sector, which accounts for about 45 percent of the country's GDP, still suffers from inefficiency and low productivity, thereby retarding the growth of the private sector.

Status of Energy and the Environment

Vietnam's CO_2 emissions have more than doubled over the past decade (Figure 1). Under a business-as-usual scenario, Vietnam's energy demand will more than double and total energy-related greenhouse gas (GHG) emissions will triple by 2030. The industry, transport, and power sectors are projected to account for the bulk of the increase in GHG emissions.

Figure 1. CO_2 Emissions from Vietnam



Source: CDIAC (Carbon Dioxide Information Analysis Center)

The Vietnamese government has approved the National Strategy for Natural Disaster Prevention, Response and Mitigation to 2020

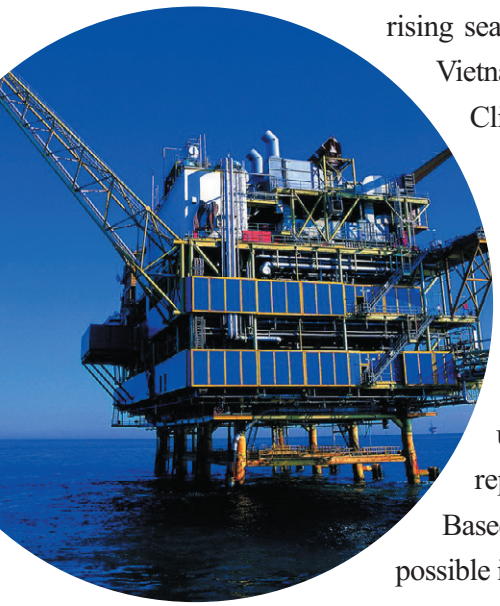
The combined industrial fuel and electricity use accounts for almost half of the total commercial energy use in Vietnam.

Rapid industrialization had brought today's factories, which used to be located far from densely-populated areas, into the urban areas. In Hanoi, 70 percent of the industrial plants fail to meet environmental standards (Hanoi Environmental Committee, 1992). Water contamination also poses a serious threat to the city. About 70 percent of the source of contamination is from domestic sewage and 30 percent from industrial sewage. The sewage from pulp, paper, fabric, food, and chemicals is 35 million m^3 per year, and contains 100 tons of sulfuric acid and 4,000 tons of hydrochloric acid.

Air pollution, water contamination, and sanitation-related health problems can be identified as symptoms of industrial pollution. Since waste collection services are not fully established in most locations, the city's solid waste collection efficiency is very low. The average collection efficiency ranges from 40 to 70 percent and most urban centers in Vietnam do not have adequate or appropriate facilities to treat hazardous wastes.

Green Growth & Environmental Policy

The Vietnamese government has approved the National Strategy for Natural Disaster Prevention, Response and Mitigation to 2020, which predicted the scenarios on climate change and rising sea level by 2100. Meanwhile, to actively respond to climate change, the Vietnamese Government approved the National Target Program to Respond to Climate Change (NTP-RCC) in 2008.



The strategic objective of the NTP-RCC is to assess the impacts of climate change on industries, sectors, and provinces in each period. It aims to implement feasible action plans to effectively respond to climate change in the short and long term to ensure sustainable development, tap all the opportunities for economic development on the low-carbon path, use energy effectively and economically, explore new energy sources, replace fossil fuels by renewable energy, and develop green industries. Based on climate change and sea-level rise scenarios, Vietnam is assessing the possible impacts and formulating suitable responses.

In order to support the implementation of NTP-RCC, the Government and donors decided to formulate the Support Program to Respond to Climate Change (SP-RCC). The main objective of SP-RCC is to promote climate change adaptation activities and GHG reduction through policy dialogues toward sustainable development. SP-RCC is also supporting aid harmonization and coordination for policy-related activities as well as technical and financial assistance provided by the government, donors, NGOs and private organizations for climate change response in Vietnam.

The main legal and policy frameworks that support the development of the energy efficiency and renewable energy markets are the following:

- The Electricity Law was signed on 03 December 2004 and took effect on 01 July 2005;
- The National Energy Development Strategy of Vietnam, approved on 27 December 2007, gives priority to the development of renewable energy and the achievement of the following targets: increase energy share to about 3% of the total commercial primary energy (1.4 million tons of oil equivalent or TOE in 2010) to 5% in 2020 and 8 % of the total commercial primary energy, (9.0 million TOE in 2025), and 11 % (35 million TOE in 2050).
- The Master Plan for Renewable Energy, submitted to the government for final approval, covers the national goal for developing new and renewable energies as defined in the National Strategy for Energy Development to 2020, with the ambitious goal of increasing the share of renewable energy to 3% by 2015, and to about 4% of the total capacity by 2025.

- The Law on Environmental Protection 2005, effective since 2006, includes the compulsory strategic environmental assessment (SEA) tool.
- The National Target Program in Response to Climate Change offers incentives for emissions reduction and low carbon economic development in 2008.
- The Law on Energy Saving and Efficiency was adopted in the National Assembly on 17 June 2010 to provide many incentives for energy efficiency and conservation as well as cleaner production measures.
- The Ministry of Finance introduces new environmental tax measures that promote energy efficiency and renewable energy indirectly by imposing taxes on oil, gas, coal and specific pollutants.
- The Ministry of Industry and Trade (MoIT) drafted an action plan in response to climate change in September 2010.

These national strategies are the guiding instrument for Vietnam to pursue environmental protection until 2020. In addition to environmental assessment on a countrywide level, it covers land issues, water conservation, biodiversity, forest cover, and air pollution. It also outlines future environmental challenges for Vietnam, including the dichotomy between economic growth and sustainable development.

These national strategies are the guiding instrument for Vietnam to pursue environmental protection until 2020.

The national government has demonstrated a strong commitment to strengthening strategic, legislative and institutional mechanisms for environmental protection and management. The strategic and policy framework has been enhanced through the development and adoption of a number of high level strategies including the National Strategy for Environmental Protection to 2010 with Vision to 2020 (NSEP).

The Law on Environment Protection (LEP) was completed in late 2005 and is due to be adopted in mid-2006. The revised LEP will result in substantial changes to the structure and content of the main piece of environmental legislation in Vietnam. Information received to date indicates that the revision will strengthen the legislation and introduce requirements for strategic environmental assessment and increased responsibility of ministries and departments in managing environmental issues.

Other important pieces of environment - related legislation that have been developed in recent years include the revised Law on Water Resources, the revised Land Law, the Forest Protection and Development Law, and a number of regulations relating to fines for environmental pollution/violations, wastewater charges and the establishment of the Vietnam environmental protection fund.

Vietnam has established the Ministry of Natural Resources and Environment (MoNRE) as the line ministry with the central responsibility for environmental issues. MoNRE is responsible for the current process of decentralization of environmental responsibilities from the national to the provincial and local levels. The government introduced the concept of cleaner production in 1996.[3)]

Table 1. Major Programs on Cleaner Production

Program	Agency	Partnerships	Period
Enhancement of CPI awareness and adoption capacity	MOIT	MONRE, Ministry of Information & Communication (MIC)	2010~ 2020
Establishment & operation of the database and information homepage specialized in CPI	MOIT	MONRE, MIC	2009~ 2020
Technical support for CPI application at industrial factories	MOIT	MONRE, MIC	2009~ 2020
Perfection of the network of CPI supporting organizations	MOIT	Provincial People's Committee	2009~ 2015
Perfection of the finance-related mechanism & policies for CPI adoption promotion	Ministry of Finance (MOF)	MOIT	2010~ 2012

Source: KOTRA(http://www.globalwindow.org)

3) http:www.adb.org/default/files/pub/2005/country-environmental-analysis.pdf

Eco-Innovation Success Stories

Success Story 1: Energy Efficiency

Summary

Duc Giang Garment is an Original Equipment Manufacturer (OEM) for clothes that intends to conserve energy and reduce the use of raw material in its entire operations. It avails of eco-innovation consulting services to curb energy consumption by reusing waste heat from the steam and preventing radiation loss. This is expected to result in a reduction of 11,238 USD and 189.1t of CO_2 per year. The set of goals on energy conservation had been put forward and is a work in progress.

Duc Giang Garment was able to achieve cost reduction of 11,238 USD and 189.1t of CO_2 per year.

Problem

The Duc Giang Garment uses a large amount of energy in the ironing and cleaning processes. The steam produced by the coal boiler is supplied in an independent process through a connection pipe, and a large amount of heat was lost via aged traps and non-insulated pipes.
In addition, discarding the steam condensate (90℃) by the dryer results in significant energy loss, thereby increasing the company's production cost.

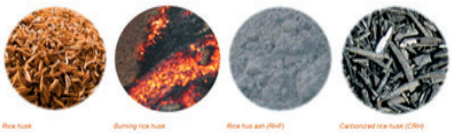
Improve method

As in the figure above, the discarded condensate is clean water liquefied from steam. The water tank and pipe were connected to use the condensate as water (40℃) for washing. Moreover, since the steam produced in the boiler can be transported a far distance if necessary, the aged pipes and traps were repaired and insulated to minimize heat loss, thus preventing energy wastage.

This is a basic method for efficient use of heat energy that does not require much investment. Duc Giang Garment was able to achieve cost reduction of 11,238 USD and 189.1t CO_2 per year through such innovative methods. It prevents the continuous leak and utilizes the condensate discarded from the ironing process. Targets for 2012 are being pursued through the recommendations proposed in the eco-innovation consulting activity.

Table 1. Improvement Goals for 2012

Item	Effect
Replacement of T5 lighting for the entire factory	Securing luminance for tasks and energy conservation
5% reduction in air compressor unloading rate	Reducing electric energy by 41t of CO_2 for 5,774 USD
Total replacement of old machines with high efficiency sewing motor	Reducing energy use of the cooling facility by controlling the indoor temperature in the factory
Replacement of boiler coal	Reviewing the process of using rice husk



Rice Husk Briquette (Biomass Fuel)

Characteristics	Result
Ingredient	100% from Rice husk
Calorific	4,200 kcal/kg
Moistructure	< 8 %
Sulfur content	0.02

Technical information

Describe	Parameter
Shape	Hexagon
Length	10cm ~ 40cm
Dimension	5cm ~ 8.5cm diameter
Packing	Bag(PE) or carton (30kg)

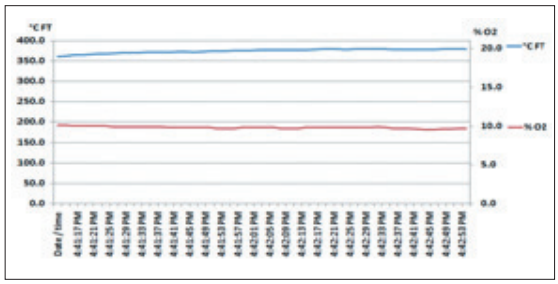
Success Story 2: Reuse Waste Heat

Summary

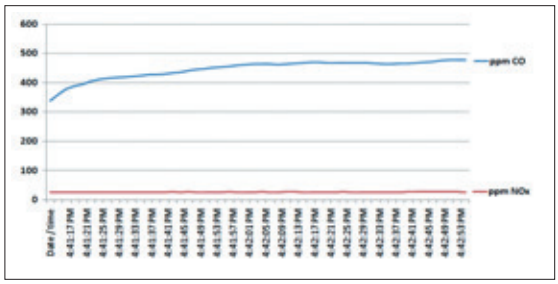
The Nhat Quang Steel Company specializes in the field of manufacturing. Specifically, it provides steel products for industrial steel structures, the motor and car industry, civil and interior design, and civil and industrial mechanics. The company uses a large amount of energy because zinc-based galvanized steel products emit harmful substances into the atmosphere.
In order to solve this problem, the air ratio for the zinc galvanizing heat treatment process was adjusted. Stepwise improvements are being promoted according to an internal plan for recollection of waste heat.
Once the improvements are complete, a cost reduction of 112,199 USD and 776.5t CO_2 per year is expected.

Problem

The current zinc galvanizing heat treatment facility that uses a large amount of energy is composed of eight heat treatment furnaces and a plate connected as tunnels. Exhaust gas is emitted through an integrated exhaustion.



<Exhaust gas temperature and oxygen concentration from heat treatment >



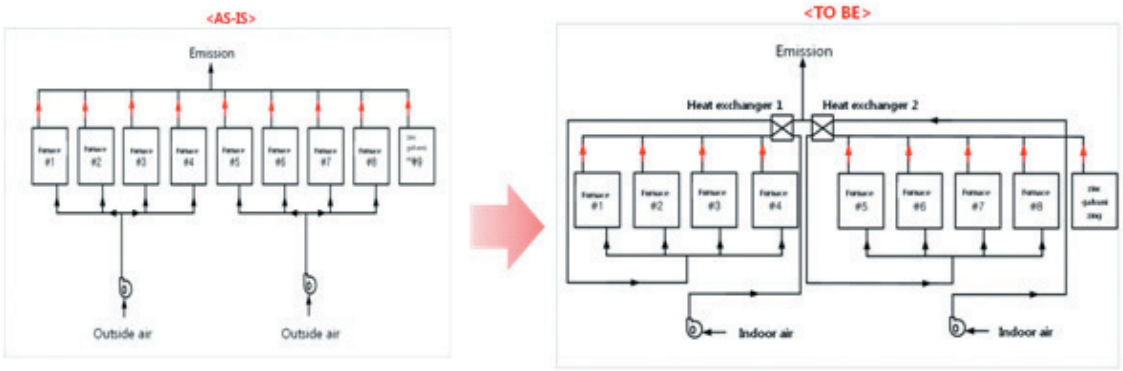
<CO and NOX>

Result of gas analysis (Integrated exhaustion)

For energy reduction, gas analysis was conducted on integrated exhaustion and nine zones of the heat treatment furnace to deduce the data shown in the graphs above. Looking at the second graph, emissions of CO was measured at 450 PPM by the gas analysis at the last integrated exhaustion time. In the nine heat treatment zones, CO emission was measured to be 12,000 PPM in Zone 1 and 20,500 PPM in Zone 2. Black smoke was formed because of incomplete combustion due to a low air ratio (1.0). However, the remaining Zones 3~9 showed heat loss from discharging an unnecessary overheated air surplus (1.75 on average). Looking at the first graph, the integrated exhaust gas was sufficiently useful with a temperature of 370 (℃) but was being discharged as is.

Method

For optimal combustion, the heating burner was adjusted for each zone to achieve the optimal combustion air ratio (1.2). A management log and manual were prepared for regular monitoring. In addition, the waste heat from the exhaust gas has some economic use within the company. Three methods were suggested according to the amount of investment. The first method involves connecting additional pipes for preheating of the combustion air. The second method shown in the figure below entails installing a heat exchanger to recollect high temperature heat and preheat the combustion air to reduce energy. The third method requires installing and using a waste heat generator, which can be done when a much larger investment is to be made.



<Waste heat recollection system using heat exchanger>

The Nhat Quang Steel is preparing to install the heat exchanger using the second method of utilizing the waste heat, as described by the figure above. The total cost of the heat exchanger and piping is 10,686 USD. With an annual cost reduction of 112,199 USD per year by adjusting the air ratio and recycling waste heat, the cost is expected to be covered within 0.4 years. Also, greenhouse gas can be reduced by 776.5t of CO_2 per year. Furthermore, Nhat Quang Steel installed and managed storage for raw materials to further reduce the loss of resources and promote better cleanliness in the workplace. It is reviewing methods for appropriate use of ammonia and for efficiency improvements in wastewater treatment.

The total cost of the heat exchanger and piping is 10,686 USD. With an annual cost reduction of 112,199 USD per year by adjusting the air ratio and recycling waste heat, the cost is expected to be covered within 0.4 years. Also, greenhouse gas can be reduced by 776.5t of CO_2 per year.

Conclusion

Today, small and medium-sized enterprises (SMEs) form the backbone of most of ASEM member states' economies. In Europe alone, SMEs represent 99 percent of all businesses, providing jobs to more than 100 million people. In Asia, SMEs constitute the lifeblood of many industries. Eco-innovation offers SMEs opportunities to save costs, expand to new markets, create new jobs, and reduce pressure on the environment.
Against this backdrop, ASEIC was established to ensure that SMEs play a vital role as dynamic developer and adopter of eco-innovation in the world economy.
In 2011, ASEIC launched its first "Eco-Innovation Consulting Project" to provide SMEs with opportunities and mechanisms to strengthen their green competitiveness by integrating eco-innovation in the company's entire business operations.

In Asia particularly, eco-innovation is still a new phenomenon. The greatest challenge among governments is how to foster an environment that enables SMEs to easily explore and pursue their innovative ideas at a much lower risk. The most common barriers are lack of access to finance or venture capital, inadequate information, poor management skills, and the protection of intellectual property rights. The project aimed at assisting SMEs in overcoming these hurdles to empower their green competitiveness.

The scope of eco-innovation in the project was diverse - reflecting the different needs of the participating countries. In Indonesia, high energy price was the biggest concern for SMEs. Accordingly, greening production processes, from simple housekeeping measures to advanced facility improvements, were the primary focus of eco-innovation in Indonesia. Similarly in Thailand, process innovation was prioritized. In Vietnam, SMEs were mostly concerned with allocating finance for new facilities. Accordingly, the eco-innovation consulting prioritized enhancement options that could be implemented at low costs. In Malaysia, however, the needs of SMEs were much more diverse, requiring an integrated approach to eco-innovation.

Limitations of this project include low awareness of the "ASEM SMEs Eco-Innovation Consulting Project" by the SMEs, the short time period given for the consultancy, and the challenge of allocating funds to implement some of the costly eco-innovation options recommended by the consultants. Despite these barriers, the impact of the "Eco-Innovation Consulting Project" should not be underestimated - the participating companies implemented more than half of the recommendations made by the consultants, and were able to benefit economically, socially and environmentally.

Based on the experiences of the first pilot project, future "Eco-Innovation Consulting Projects" will strive to pioneer green growth and sustainability among SMEs.

Annex:

1. Introduction of Participating Agencies

Eco-Frontier Co. is a global brain & business group dedicated to sustainability and green growth. Since its founding in 1995, Eco-Frontier has provided consultancy on green growth & sustainability policies, environmental management, sustainable finance, carbon credit trading, and green technology development for nearly 1,000 leading private and public organizations. Its headquarters is located in Seoul, Republic of Korea, with overseas branches and affiliates in Malaysia, Indonesia, China, U.S. and the U.K. Moreover, Eco-Frontier is actively engaged in global green initiatives as the official Korean partner of UNEP FI and UN PRI. In recent years, its business has expanded to developing business frameworks and investment schemes for overseas renewable energy projects. Based on its expertise and experience in developing green business strategies, Eco-Frontier provided customized eco-innovation solutions to the participating SMEs in Indonesia and Malaysia.

ECOEYE Co., Ltd was incorporated in 2003 and is based in Seongnam City, South Korea. ECOEYE mainly provides professional services on the clean development mechanism, emissions trading, value engineering, sustainability reports, integrated environmental management systems, eco-design, and green marketing. In this project, ECOEYE provided consulting services and education to participating SMEs in Thailand and Vietnam as the main service provider. Also, ECOEYE recruited local multinational consulting firms specializing in energy, environment, cleaner production, and sustainable development with good international networks.

Prof. Sangwon Suh

Prof. Sangwon Suh (University of California, Santa Barbara) is an expert of the environment (LCA, Cleaner production) and the UNEP International Resource Panel. In this project, He educated the Vietnamese and Thai SMEs in collaboration with ECOEYE. He also provided work for the development of a broader international network.

The United Nations Industrial Development Organization (UNIDO) is a specialized agency of the United Nations. Its mandate is to promote and accelerate sustainable industrial development in developing countries and economies in transition, and work towards improving living conditions in the world's poorest countries by drawing on its combined global resources and expertise. UNIDO experts were responsible for providing information and education in this project.

Vietnam Cleaner Production Center (VNCPC) was established on 22 April 1998 within the framework of the project VIE/96/063, signed by the Ministry of Education and Training (MOET) and the United Nations Industrial Development Organization (UNIDO). The VNCPC delivers to service providers and to industries high quality services such as cleaner production assessments, financial engineering, technology advice, and training and information. In this project, VNCPC provided support to the training workshop and it also works for the development of a network between necessary Korean and Vietnamese institutions and industries.

Eco Design Consultant Co., Ltd. (EDC) is the first private sustainable consultancy in Thailand since 2000. EDC provides practical industrial engineering, economic and ecological sustainable business advice. The sustainable series training are informed by Industrial Engineering (IE), Economic Value Added (EVA) and Life Cycle Thinking (LCT), The role of EDC in this project was to provide full support for the recruitment of participant for the eco-innovation consulting service and scheduling, training workshops, and the development of a broader network between appropriate Korean and Thai institutions and industries.

OWW Consulting located in Malaysia has become a leading international provider of Corporate Social Responsibility (CSR) solutions and Socially Responsible Investment (SRI) research in Asia Pacific, Europe and the Middle East. In this project, the role of OWW Consulting was recruitment for eco-innovation consulting.

2. List of Participating SMEs

A. Malaysia

Company name	Main products
Exis Tech Sdn. Bhd.	Semiconductor manufacturing equipment
Malaysian Agri Group of Companies (Myagri)	Agricultural fertilizers
Coscolab Sdn. Bhd.	Cosmetics and beauty products
Tex Cycle Technology (M) Bhd.	Waste disposal, recycling
IPALM (Malaysia) Sdn. Bhd.	Biomass(pellet, briquette)
K-Plastics Industries Sdn. Bhd.	Plastic bottles
Sweetkiss Food Industry Sdn. Bhd.	Chocolate and confectionery
F&B Nutrition Sdn. Bhd.	Coffee cream, condensed milk

B. Indonesia

Company name	Main products
PT. Ajidharmamas Tritunggal Sakti	Silica glass fiber
PT. Hasura Mitra Gemilang	Electrical and electronics, automobile parts (plastic parts)
PT. Indonesia Daeyang Korea	Styrofoam packing material
PT. Innoware Indonesia	Plastic containers
PT. Kones Taeya Industry	Sports balls
PT. Ostec Indonesia	Electrical and electronics, automobile parts (plastic parts)
PT. SeAH Precision Metal Indonesia	Steel tube, wire, capacitor
PT. Sentralindo Teguh Gemilang	Paper Box
PT. Space Technology	Generators and other industrial goods

C. Thailand

Company name	Main products
Tipco Biotech Co., Ltd	Fruit extracts(Juice, Cosmetic Raw Materials)
Leonics Co., Ltd	Solar Components
CNC International	Nonwovens
Chaiwachara Autoparts Industry Co.,Ltd	Rubber Products
Image_Interholding Co.,Ltd	Leather Sofa
TSP Metal Work Co.,Ltd	Metal products (agricultural)
Prevalence Industrial Co.,Ltd	Remote Control
Thai Motor Chain Co.,Ltd	Motorcycle chain

D. Vietnam

Company name	Main products
Golden Gate	Ceramics
Hagenco	Garment
MinhcuongMC	Cranes and industrial structures.
Duc Giang Garment Corporation	Garment
Hong Nam Mechanical Joint Stock Company	Cranes and industrial structures.
DONG Anh Electrical Equipment Manufacturing Joint Stock company (EEMC)	Transformers
Dong Phat Joint Stock Company	Thread
Nhat Quang Steel	Galvanized steel products

3. ASEM Members

Asia
(17)

COUNTRY	CAPITAL
Republic of Korea	Seoul
Lao People's Democratic Republic	Vientiane
Mongolia	Ulaanbaatar
Malaysia	Kuala Lumpur
Myanmar	Naypyitaw
Socialist Republic of Vietnam	Hanoi
Brunei Darussalam	Bandar Seri Begawan
Singapore	Singapore
Republic of India	New Delhi

COUNTRY	CAPITAL
Republic of Indonesia	Jakarta
Japan	Tokyo
People's Republic of China	Beijing
Kingdom of Cambodia	Phnom Penh
Kingdom of Thailand	Bangkok
Republic of the Philippines	Manila
Islamic Republic of Pakistan	Islamabad
ASEAN Secretariat	

Europe
(28)

COUNTRY	CAPITAL
Hellenic Republic	Athens
Kingdom of the Netherlands	Amsterdam
Kingdom of Denmark	Copenhagen
Federal Republic of Germany	Berlin
Republic of Latvia	Riga
Romania	Bucharest
Grand Duchy of Luxembourg	Luxembourg
Republic of Lithuania	Vilnius
Republic of Malta	Valleta
Kingdom of Belgium	Brussels
Republic of Bulgaria	Sofia
Kingdom of Sweden	Stockholm
Kingdom of Spain	Madrid
Slovak Republic	Bratislava

COUNTRY	CAPITAL
Republic of Slovenia	Ljubljana
Republic of Ireland	Dublin
United Kingdom of Great Britain and Northern Ireland	London
Republic of Estonia	Tallinn
Republic of Austria	Vienna
Italian Republic	Rome
Czech Republic	Prague
Republic of Cyprus	Nicosia
Portuguese Republic	Lisbon
Republic of Poland	Warszawa
French Republic	Paris
Republic of Finland	Helsinki
Republic of Hungary	Budapest
European Commission	

The Third Group
(3)

COUNTRY	CAPITAL
Australia	Canberra
Russian Federation	Moscow

COUNTRY	CAPITAL
New Zealand	Wellington

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