ASEM
SMEs
Eco-Innovation
Center

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

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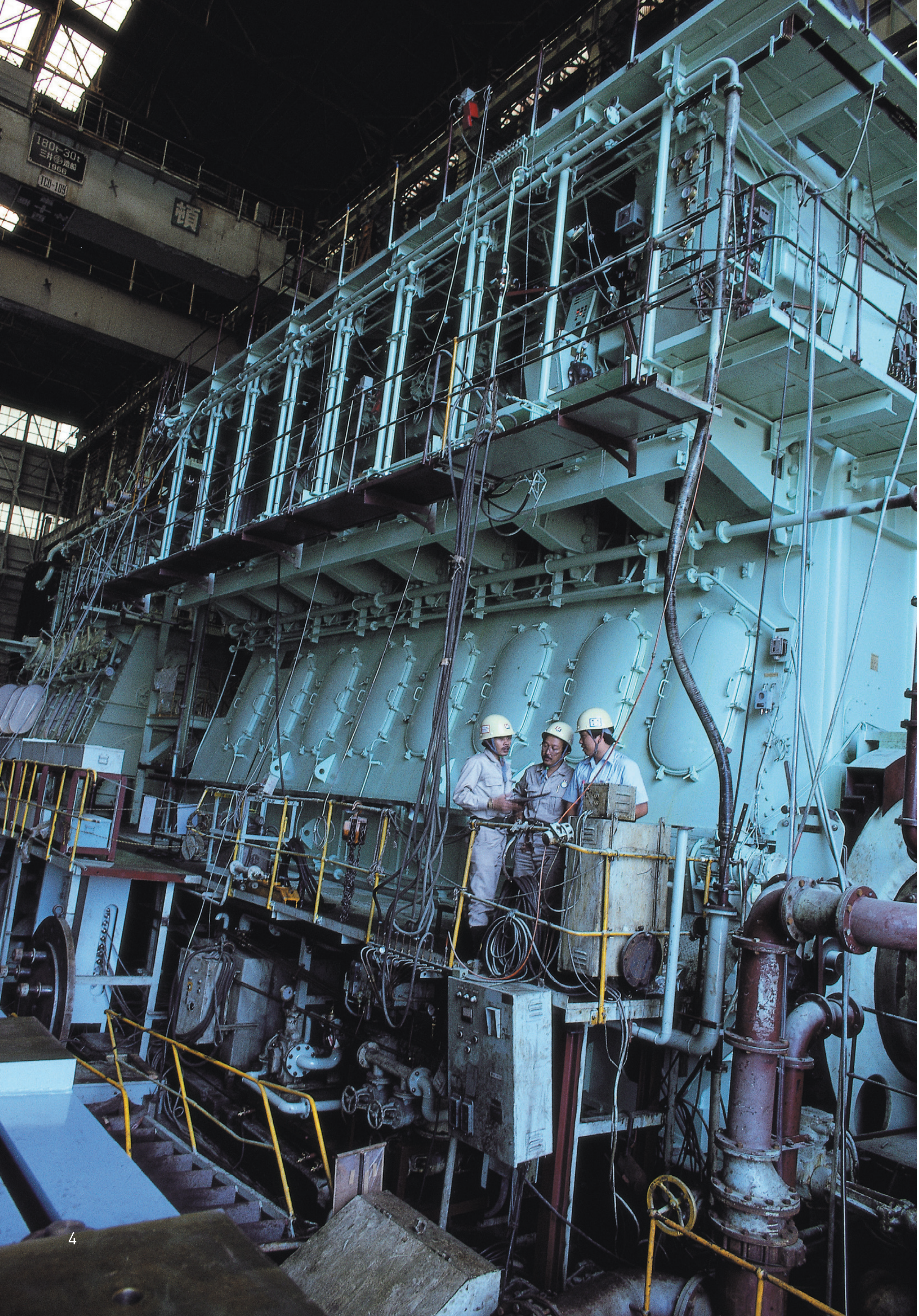
Table of Contents

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

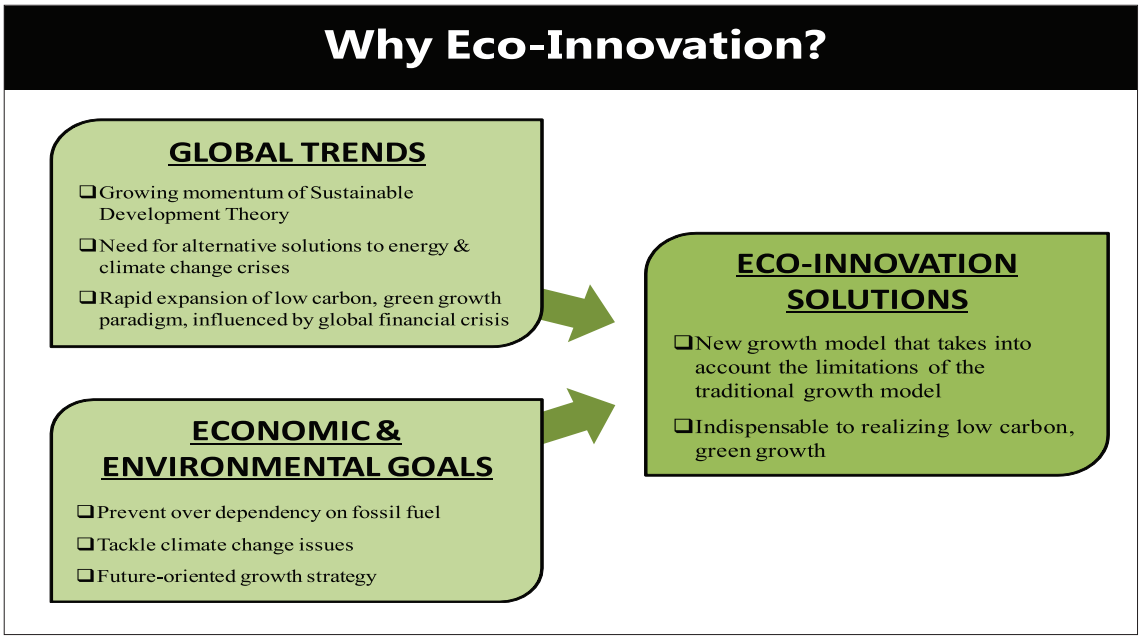
ASEIC supports SMEs in member countries to design and implement local and national strategies on green growth. In doing so, ASEIC is strengthening institutional collaboration with several stakeholders such as the Global Green Growth Institute (GGGI) and the Asia-Europe Foundation (ASEF).

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.

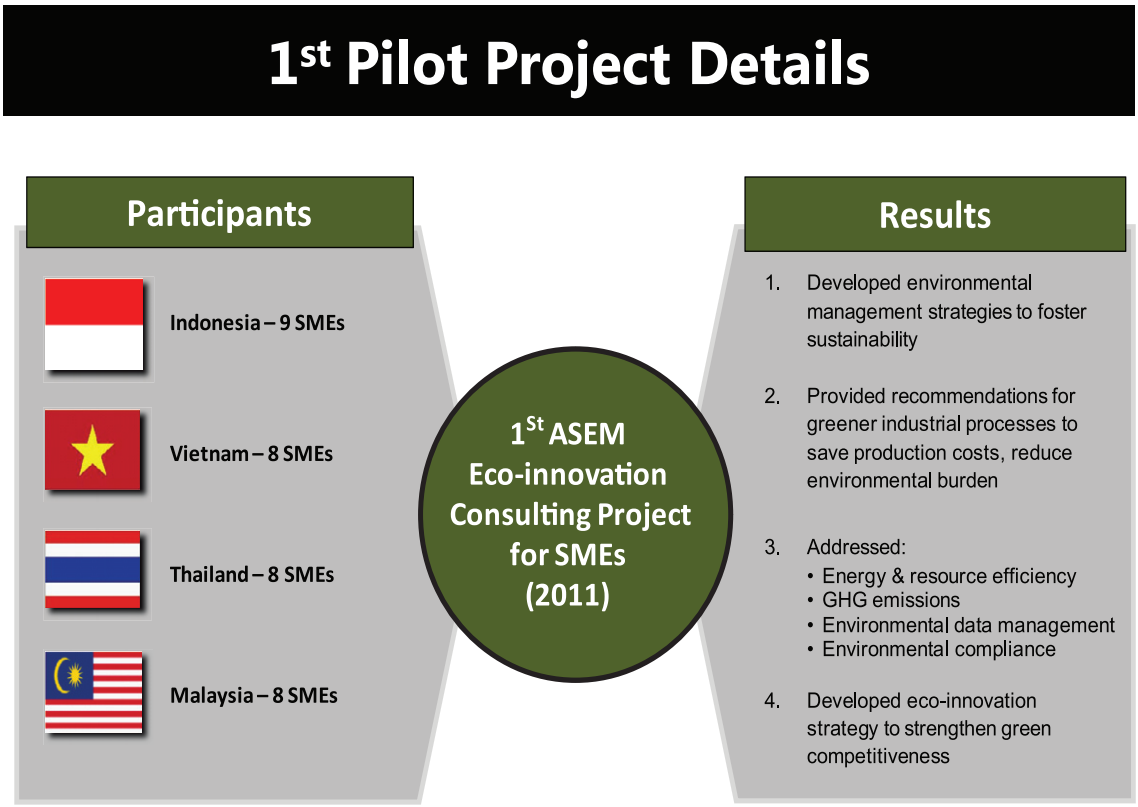
Based on the assessment, each participating SME was provided with a customized green business model that could be implemented in the long run.

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.



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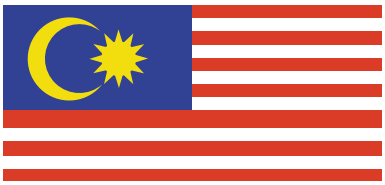


Country Status

Economy & Industry

The GDP growth of Malaysia in 2011 registered at 5.0-5.5% and is projected to expand to 5.0-6.0% in 2012. The steady growth in consumer spending reinforced by strong investment activities allowed the nation to sustain economic growth despite the stagnating economy.

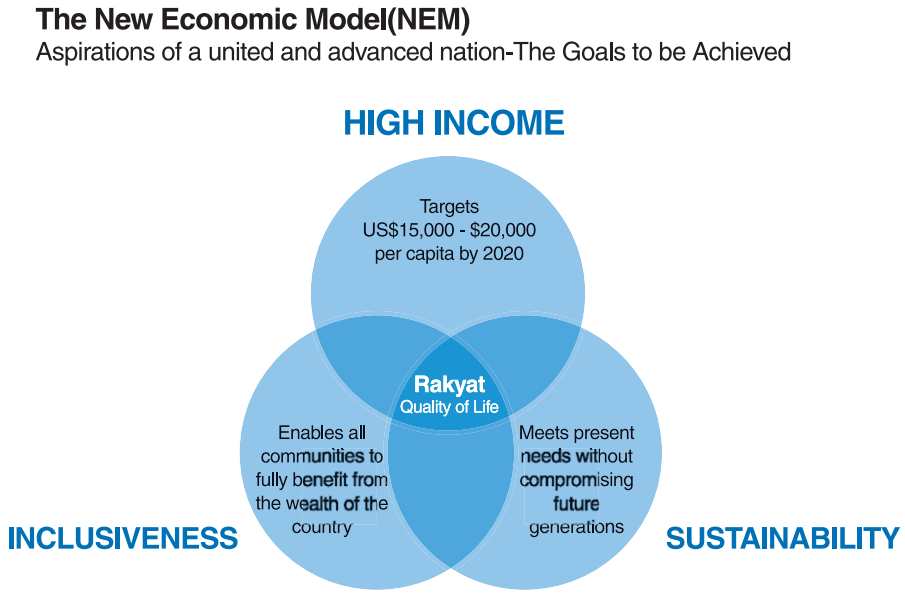
Table 1. GDP Growth in Malaysia (2010-2012)

Domestic Production	2010		2011		2012	
	GDP (USD million)	% growth	GDP (USD million)	% growth	GDP (USD million)	% growth
GDP (constant US prices)	173,715	7.2	196,125	5.0-5.5	206,838	5.0-6.0
Agriculture	40,916	2.1	42,821	4.7	44,590	4.1
Mining and quarrying	39,270	0.2	38,314	-2.4	39,274	2.5
Manufacturing	154,640	11.4	161,663	4.5	168,994	4.5
Construction	18,220	5.1	18,845	3.4	20,161	7.0
Services	322,611	6.8	343,376	6.4	365,551	6.5
GDP (current prices)	237,796	12.7	282,440	10.6	306,107	8.4

Source: Ministry of Finance Malaysia, Quarterly Malaysian Economy.

In March 2010, Malaysia's New Economic Model (NEM) was developed under the Economic Transformation Program (ETP) to foster sustainable growth, emphasizing the synergy of three key criteria: high income, inclusiveness and sustainability.

Figure 1. The New Economic Model



Source: National Economic Advisory Council, *Economic Transformation Programme for the New Economic Model.*

The New Economic Model aims to drive growth in 10 National Key Economic Areas (NKEAs), in which Malaysia has a competitive advantage: 1) oil, gas and energy, 2) palm oil & related products, 3) financial services, 4) wholesale & retail trade, 5) tourism, 6) ICT, 7) education services, 8) electrical & electronics, 9) business services, and 10) agriculture.[3)]

3) National SME Development Council, Annual Report 2010/09, Chapter 7 "Growth Drivers in the New Economic Model", 2010.

Status of SMEs

According to the Department of Statistics Malaysia, SMEs account for 99% of total business establishments. The table below is a detailed configuration of SMEs in Malaysia:

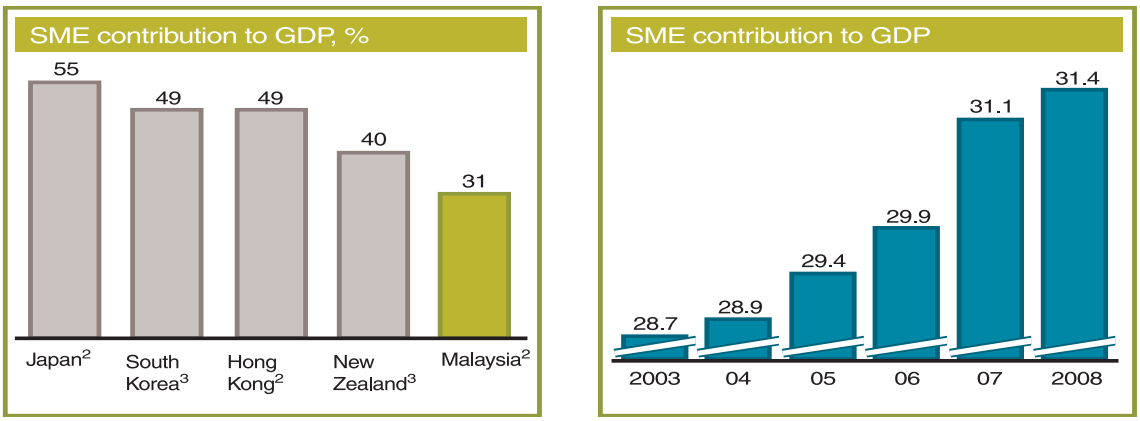
Table 2 Establishment and Enterprise Census of Malaysia

Sector	Micro	Small	Medium	Large	Total
Manufacturing	21,516	15,796	2,061	1,420	40,793
Services	381,585	83,037	10,084	2,819	477,525
Agriculture	31,838	1,755	575	343	34,531
Total	434,939	100,608	12,720	4,582	552,849

Source: Department of Statistics Malaysia, *Census of Establishment and Enterprise, 2005.*

Currently, SMEs contribute to 31% of the nation's GDP with the share of the manufacturing sector at a mere 8%. Although the business activities of SMEs have gradually increased over the past decade, the current contribution is relatively low compared to other Asian economies.

Figure 2. SME Contribution to GDP



Source: Prime Minister's Department, The Economic Planning Unit, *Tenth Malaysia Plan 2011-2015, 2010.*

In 2009, the total expenditure on support programs for SMEs amounted to approximately 954 million USD (30.5 billion RM).[4] As one of the key priorities for the Tenth Malaysia Plan, the government support programs for SMEs aim to encourage growth and strengthen competitiveness of SMEs.

Moreover, eight strategic reform initiatives for SMEs were adopted by the government under the New Economic Model including the development of sustainable growth that encourages and supports investments in eco-innovation and green technology.

4) National SME Development Council, Annual Report 2010/09, Chapter 3 "Policies on SME Development", 2010.

In 2012, Malaysia ranked 20th out of 132 countries in the Environmental Performance Index (EPI) with an average score of 62.51. Malaysia scored high in environmental health which includes the management of air and water quality, but scored moderately in ecosystem vitality, scoring the lowest in the criteria for climate change and forestry.

Status of Environment & Energy

In 2012, Malaysia ranked 20th out of 132 countries in the Environmental Performance Index (EPI) with an average score of 62.51.[5] Malaysia scored high in environmental health which includes the management of air and water quality, but scored moderately in ecosystem vitality, scoring the lowest in the criteria for climate change and forestry.

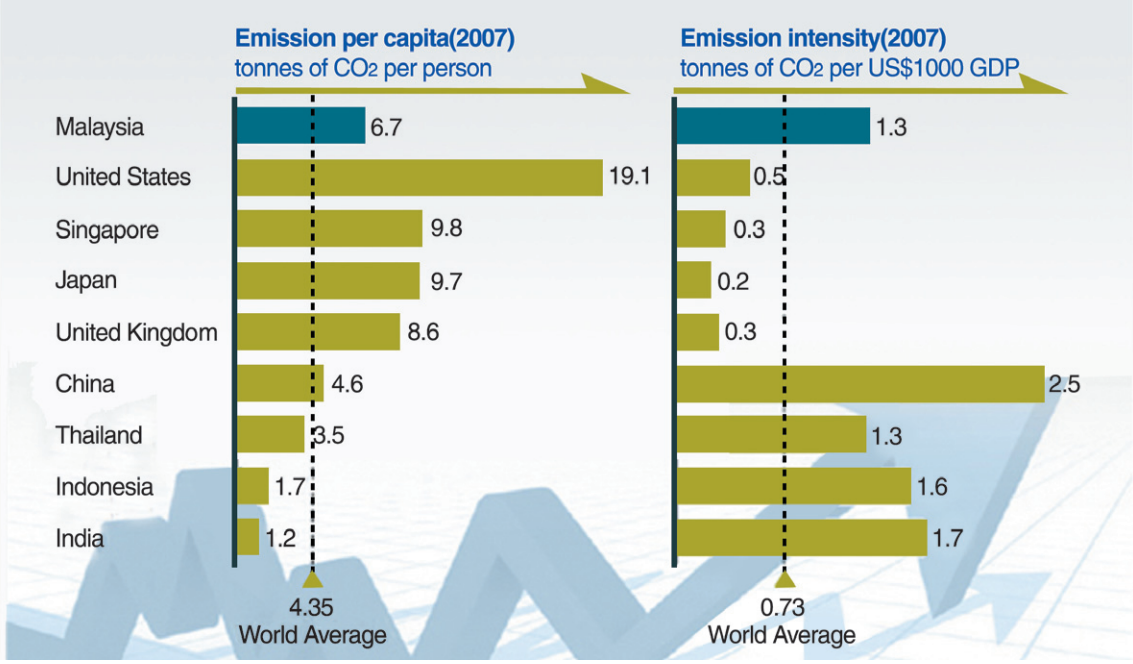
In recent years, Malaysia has developed a systematic environmental monitoring system for air & water quality and waste management. Since 2011, the Malaysian Department of Environment has initiated a mandatory reporting on Environmentally Hazardous Substances (EHS) in addition to

5) Environmental Performance Indicator was established by the World Economic Forum to measure environmental performance of countries in six criteria including air quality, water quality, natural resources, biodiversity, and energy. The research is conducted by Yale University and Columbia University. Available at <http://epi.yale.edu/>.

measuring the level of air and water quality. In regards to waste management, the government has been regulating the proper disposal of scheduled wastes under the Environmental Quality (Scheduled Wastes) Regulations of 2005.

According to the UNDP Human Development Report 2007/2008, Malaysia emits 6.7% of the total global CO_2 emissions, with an emissions intensity of 1.3%. Although the level of total contribution is relatively lower than other parts of the world, Malaysia's emissions intensity is significantly higher than the world average. World Bank data also indicates that the emissions level of Malaysia has been gradually increasing - in 2001 the total amount of GHG emissions was 136,716ktoe, whereas in 2008 it increased to 208,267.3ktoe.[6)]

Figure 3. Emissions Level of Malaysia



Source: The Economic Planning Unit, *10th Malaysia Plan*, "Chapter 6: Building an Environment that Enhances Quality of Life", 2010.

6) World Bank <http://data.worldbank.org/>

National Indicator for Green Growth: A Climate-Resilient Economy

Sustainability is one of the key priority areas for Malaysia's New Economic Model. Accordingly, the government has established strategies for exploring opportunities and challenges of promoting a climate-resilient, green economy in tandem with three major national green growth policies.

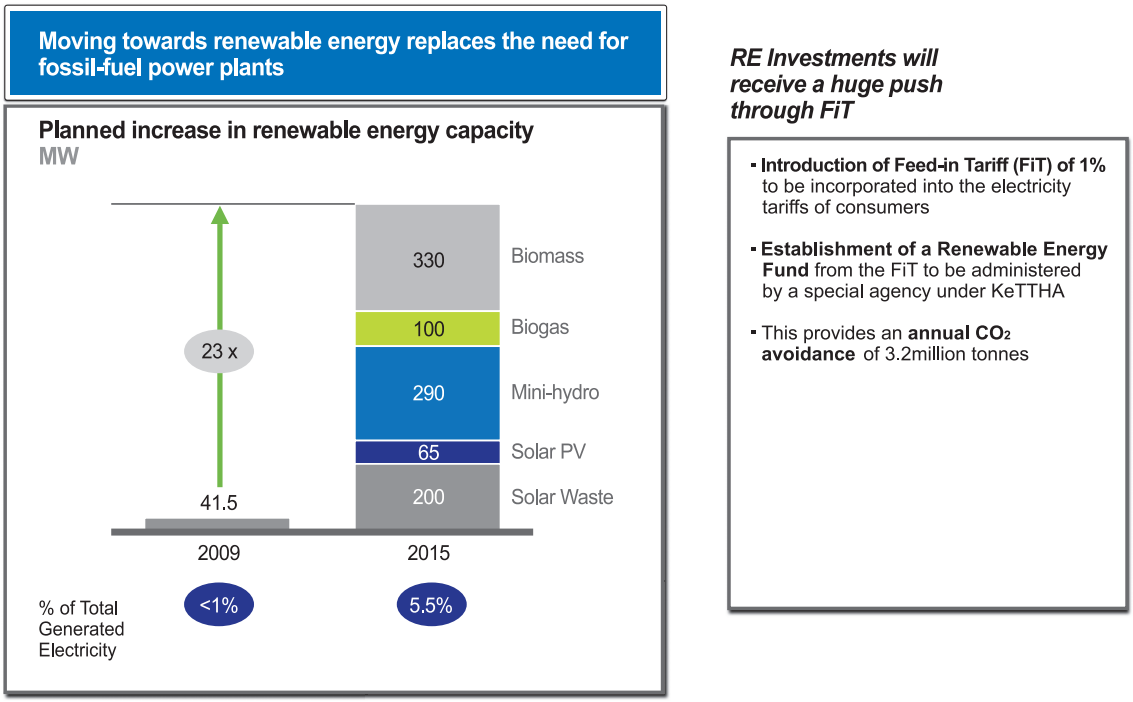
Table 3. National Policy on Green Growth

National Policy on the Environment (2002)	National Green Technology Policy (2009)	National Climate Change Policy (2009)
- Ensure economic, social and cultural progress through environmentally sustainable development - Strategies focus on effective management of natural resources and the environment, prevention and control of pollution, strengthening institutional capacity, education and awareness efforts and formulation of action and implementation plans	- Ensure sustainable development - Develop roadmaps to guide application of green technologies in various sectors, including power generation, transport and construction - Establishment of a Green Technology Financing Scheme (GTFS) with a RM 1.5 billion fund to encourage investments in green technology, construction and innovation	- Streamline and coordinate across existing legislation and policies - Establish inter-ministerial and cross-sectoral committee to drive and facilitate implementation of adaptation and mitigation measures - Identify options and strategies to achieve a low-carbon economy

Source: The Economic Planning Unit, *10th Malaysia Plan*, "Chapter 6: Building an Environment that Enhances Quality of Life", 2010.

Malaysia is endowed with an abundant supply of energy resources, including renewable resources such as biomass, biogas, mini-hydro, and solar energy. To ensure that renewable energy resources are fully exploited, the Tenth Malaysia Plan established an ambitious renewable energy target of 95MW by 2015, contributing 5.5% to Malaysia's total electricity consumption.
This target will be achieved with the introduction of feed-in-tariff (FiT) and renewable energy fund.

Figure 4. Renewable Energy Mix Target by 2015



Source: The Economic Planning Unit, *10th Malaysia Plan*, "Chapter 6: Building an Environment that Enhances Quality of Life", 2010.

Malaysia's energy efficiency takes a holistic approach by encouraging energy efficiency not only on the supply-side, but also on the demand-side. According to the Energy Efficiency Master Plan, the government aims to achieve energy savings of 4,000 ktoe by 2015.[7)]
In addition to energy efficiency, the Malaysian government is encouraging the development of innovative green technology under the programs of the Ministry of Energy, Green Technology and Water.

Malaysia's vision to become a high-income economy by 2020 has encouraged the government to embark upon sustainable and climate-resilient development strategies. The government's green growth policies project that development of renewable energy, energy efficiency, and green technology will be crucial focal points for industries in enhancing their green competitiveness.

7) Source: The Economic Planning Unit, *10th Malaysia Plan*, "Chapter 6: Building an Environment that Enhances Quality of Life", 2010.

Eco-Innovation Success Stories

Eco-innovation has primarily been focused on technological changes such as innovation in products and processes, especially in the case of SMEs. However, non-technological changes including marketing, organizations and institutions have become important to eco-innovation as companies begin to explore systematic innovations that aim to change the way of doing business.[8)]

An integrated innovation mechanism was applied in Malaysia, which aimed at improving both technological and non-technological aspects of the participating SMEs.

Success Story 1: Environmental Management & Green Product Development

Eco-Innovation Framework

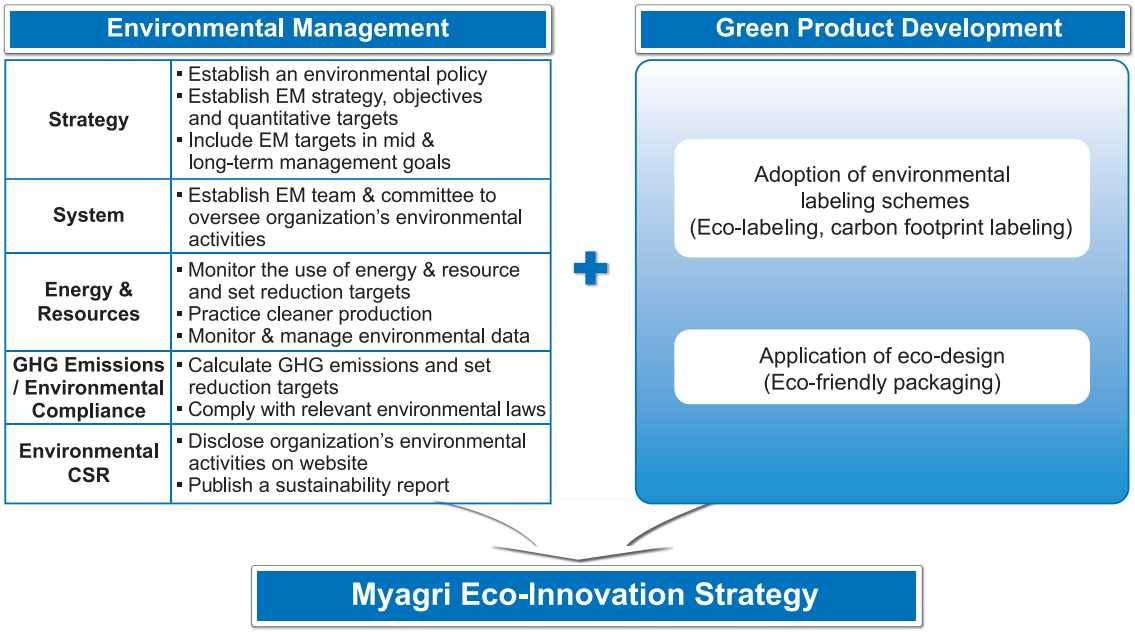
Malaysian Agri Group of Companies (Myagri), a bio-fertilizer and bio-pesticide maker, is a group of biotechnology companies dedicated to providing more efficient, effective and environmentally-friendly solutions to challenges faced by today's agricultural and environmental product companies. Although Myagri is a producer of eco-friendly products, the organization's environmental management system and green business strategies were not fully developed prior to participating in the ASEM Eco-innovation Consulting Project.

Since participating in the project, Myagri has declared climate change mitigation as one of its core missions, committing to strengthening its environmental management system, and adopting environmental labeling and eco-design schemes for global expansion of its bio-fertilizer business.

8) Organization for Economic Co-operation and Development (OECD), "Sustainable Manufacturing and Eco-innovation: Towards a Green Factory", *Policy Brief* (June 2009).

Figure 1 summarizes Myagri' s eco-innovation framework:

Figure 1. Myagri Eco-Innovation Framework



Commitment to Environmental Management

Environmental management is the first and foremost step toward strengthening an organization's green competitiveness. Myagri has taken its environmental management to the next level by fully incorporating the environmental management system into the company's vision.

Based on the consulting recommendations and guidelines, the organization has committed to consolidating its environmental management system by declaring an environmental policy, and formulating appropriate objectives and targets.

Accordingly, Myagri established an Environmental Management Team and an Environmental Management Committee that would be responsible for improving the organization's environmental management practices.

Accordingly, Myagri established an Environmental Management Team and an Environmental Management Committee that would be responsible for improving the organization's environmental management practices. The EM team will be established under the Strategic Division, and will be composed of two new employees: (1) a business management expert and (2) an environmental engineering expert. The EM team will be in charge of environmental

strategy & target setting, environmental performance monitoring, environmental data management, and sustainability reporting.
To encourage synergy between the new EM team and the existing divisions, the establishment of an environmental management committee was recommended. A representative from the Biomanufacturing & Services Division, Strategic Division, Knowledge Development Division, and the Corporate Finance Services Division, will support the EM team to efficiently implement the company's environmental management and process activities.

In addition, Myagri has committed itself to environmental transparency by disclosing its environmental policy on the company's website, and making preparations to launch its first sustainability report in 2012.

Figure 2. Myagri's Environmental Policy

Myagri® Environmental Policy

For 15 years, Myagri® has been putting in commitments towards ensuring sustainable agriculture, environment and living. Our activities are based on balanced needs of People, Planet and Profit.

We will.

- Develop and commercialize products based on nature's beneficial microbes that would reduce dependence on inorganic and chemical products and supplements;
- Adapt green procurement in our production and manufacturing;
- Monitor and analyze resources for better raw materials and energy efficiency management;
- Develop and manage green waste management programs with stakeholders in oil palm industry;
- Introduce and promote environmental friendly products and services in crops like paddy to reduce air pollution and better management of natural resources;
- Be inovolved in Clean Development Mechanism and Carbon management to support mitigation of climate change;
- Create awareness among employees and clients on environmental responsibilities through communication and training
- Comply with legislation and regulations relevant to environment and also promote equal compliance from our suppliers, partners and customers.

Myagri® Environmental Management Committee
November 2011

Source: Malaysian Agri Group of Companies; available <myagrigroup.com>


MYAGRI GROUP OF COMPAN
NBT 7632

Green Product Development

Currently, Myagri's products are only distributed in the local market. However, the organization is planning to globally export its bio-fertilizer, starting with the European export market, to be one step closer to becoming a world class company in the field of green bioscience technology.

To secure the global fertilizer market, the project suggested the development of green products, providing tools and guidelines for eco-labeling and eco-design.

Eco-labeling in Malaysia is certified by SIRIM (Standard and Industrial Research Institute of Malaysia) QAS International. A total of 31 products are eligible for SIRIM's eco-labeling scheme and Myagri's bio-fertilizer falls under the category of "ECO 13: Organic Fertilizer"[9)]

As a member of the Global Eco labeling Networks (GEN), a non-profit organization that provides international creditability to national eco-labeling programs, SIRIM's eco-label ensures international quality and standards.

SIRIM's eco-labeling scheme encourages organizations to adopt cleaner production since a life-cycle approach is required. Until now, there have not been any cases of eco-labeling of fertilizers in Malaysia - an opportunity for Myagri to enhance the environmentally-friendly aspect of its product and gain competitive edge in the local market.

The green product model is expected to generate both environmental and financial benefits in the long-term. Environmentally, Myagri can improve its overall environmental performance from cleaner production to product optimization. In terms of financial benefits, Myagri will be able to reduce costs in energy and material use, and expect a rise in sales and profit from global expansion.

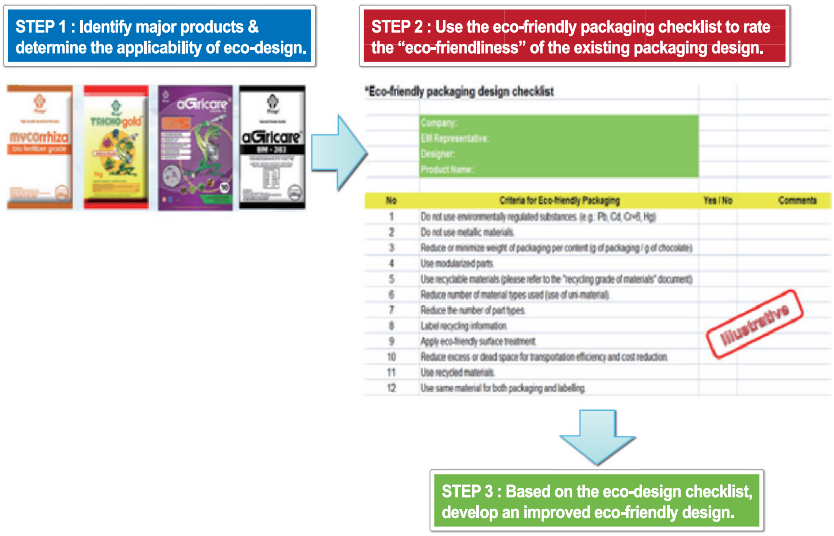
Myagri's main raw materials consist of wastes and residue from palm oil production; therefore, raw materials reduction is not an appropriate option for the organization. Nonetheless, Myagri could explore the option of optimizing its packaging to reduce both material use and waste generation.

To facilitate implementation, the project provided an eco-design tool and guidelines that could easily be applied to Myagri's packaging criteria.

9) SIRIM, "List of Companies with Eco-labeling Certification"; Available at <http://www.sirim-qas.com>.

The following is an illustrative of the eco-design guidelines:

Figure 3. Eco-Design Guidelines for Myagri



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Success Story 2: Green Factory

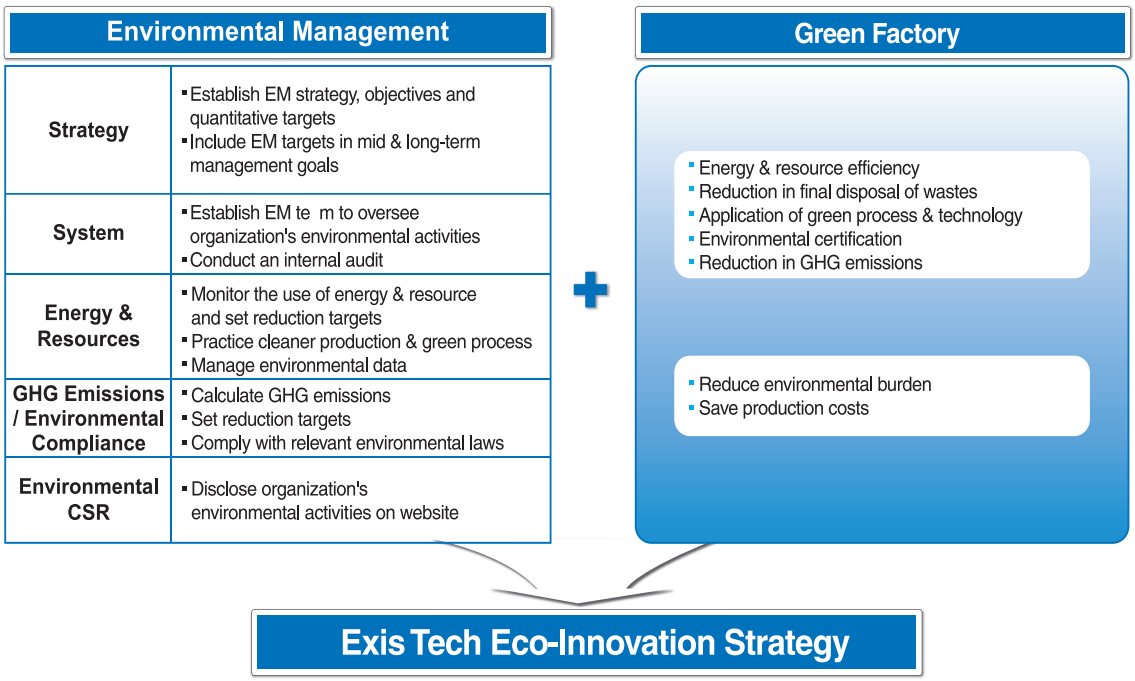
Eco-Innovation Framework

Established as an original equipment manufacturer (OEM) testing segments for semiconductors and automation industries, Exis Tech Sdn. Bhd. (Exis Tech) strives to gradually develop custom-made equipment in a state-of-the-art manufacturing facility.

Moving into a brand new factory early this year, Exis Tech is dedicated to incorporating green process activities for production as well as management practices that aim at ensuring the sustainability of the company.

Figure 1 illustrates Exis Tech's eco-innovation framework:

Figure 1. Exis Tech Eco-Innovation Framework



Establishment of Environmental Management System

The presence of an environmental management system in the organization is crucial for the implementation of the company's environmental commitments as well as for systematic evaluation of environmental performance. Based on the recommendations of the project, Exis Tech designed an environmental management system that includes the development of environmental objectives and targets, management of environmental data and establishment of an environmental management organization.

Figure 2. Exis Tech's Environmental Management Objectives & Targets

EM Objectives	Targets by 2015 (Year 2010 baseline)
Transparency in environmental management	▪ Post environmental management policy on the company's website ▪ Set up an internal bulletin board that discloses the company's environmental management status
Increase energy & resource efficiency	▪ Increase the use of recyclable & recycled packaging materials by 5% ▪ Install energy-efficient equipments for major processes ▪ Reduce energy use by 20% ▪ Conduct an internal energy audit every 6 months
Increase green procurement	▪ Increase purchase of recycled materials ▪ Develop green procurement guideline for offices supplies
Reduce GHG emissions	▪ Reduce GHG emissions (scope 1& 2) by 10%

Resources and tools are required to evaluate the environmental performance of an organization. Prior to the project, there was no systematic management of environmental data, making it difficult for the company to implement energy saving activities.

The project provided Exis Tech with an environmental data management tool - an essential instrument for controlling environmental management data.[10] The environmental data management tool describes a company's environmental performance in a quantifiable way using environmental indicators. The quantifiable data is used to compare monthly and yearly environmental performance and targets of the company.

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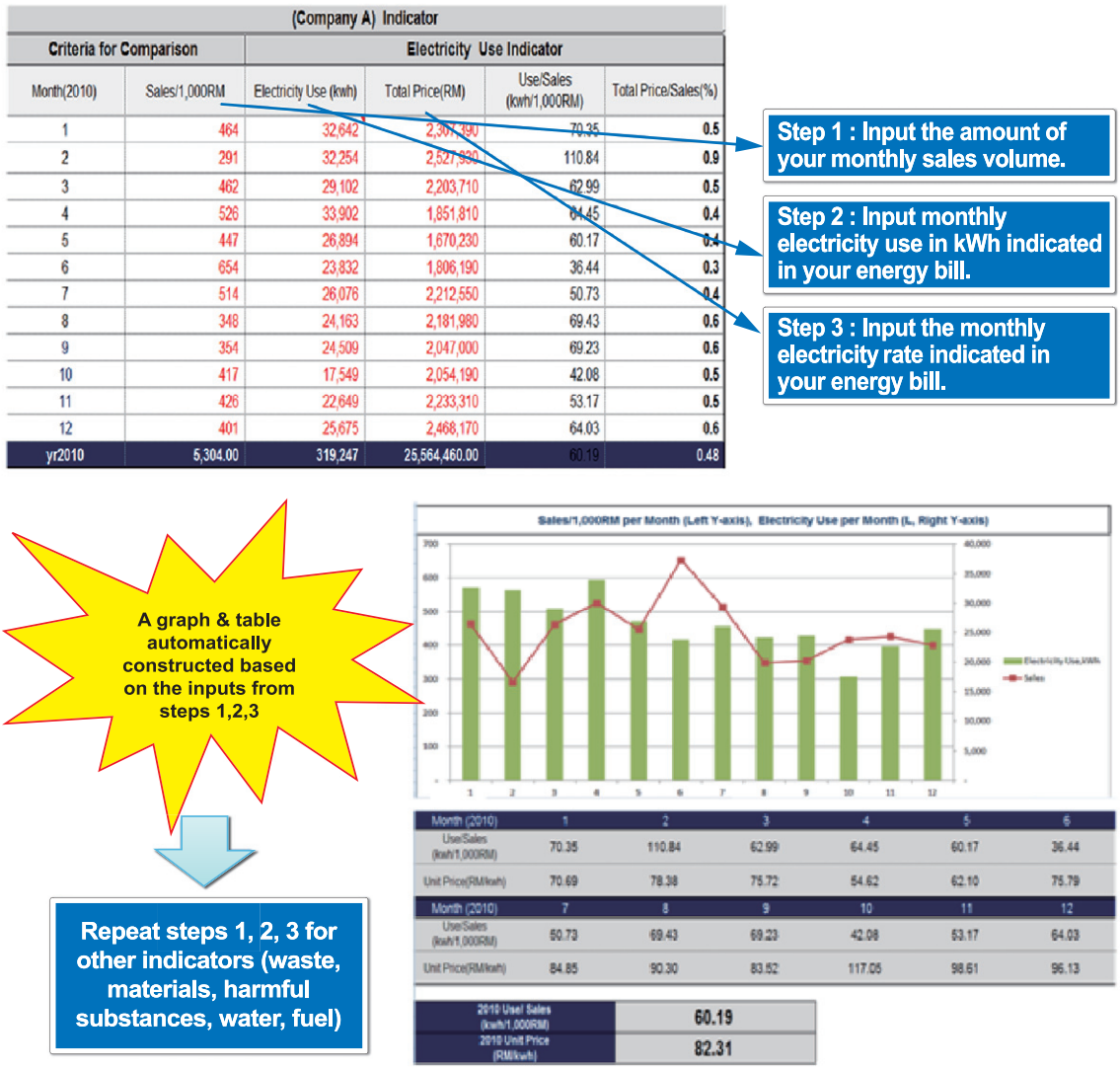
10) The environmental data management tool was developed by Eco-Frontier Co., the main consulting firm for Malaysia and Indonesia. The tool is available on ASEIC's website. www.aseic.org

Figure 3. Environmental Management Data Tool



Finally, the project recommended that Exis Tech integrates environmental management into the existing organizational structure by establishing an environmental management committee. Based on this recommendation, Exis Tech established an environmental committee composed of four employees, allocating specific roles and tasks. The Finance Executive has been appointed as the Environmental Management Representative, responsible for managing and evaluating the organization's overall environmental performance. The Purchasing Executive will be responsible for eco-friendly purchasing. The General Manger and the Production Engineer will serve as advisory members to the environmental management committee.

Green Factory

Green factory is designed to reduce the environmental burden imposed by the use of raw materials and energy in factories and business activities. To foster green industrial processes, the project recommended that Exis Tech incorporates the "green factory" concept for its new facility.

The figure below summarizes the recommendations for the establishment of green factories:

Figure 2. Green Factory Criteria

Green Factory Criteria	
Energy efficiency	▪ Install high-efficiency production equipments ▪ Energy-saving facilities. ▪ Application of green technology
Resource efficiency	▪ 100% waste separation & recycling ▪ Reduce use of raw materials ▪ Increase use of recycled materials
GHG emissions reduction	▪ Manage & reduce GHG emissions
Renewable energy use	▪ Use solar panels, etc.
Environmental certificates	▪ ISO 14001 ▪ Environmental labeling (carbon footprint labeling) ▪ Green building certificate
Other	▪ Comply with environmental regulations ▪ Conduct in-house training ▪ Participate in cleaner production & environmental management training courses

Reduce environmental burden

+

Reduce production costs

Sustainability and green processes are vital aspects of innovation and growth for every industry. Green processes will be applied to Exis Tech's new facility, expected to be in operation by May of this year, reflecting the organization's commitment to greener industrial processes.

Figure 3 Exis Tech's New Factory (under construction)

Table 1 describes the green processes that are expected to be applied in Exis Tech's new facility:

Table 1. Application of Green Processes

Before	After	Result
Fluorescent lights (40W/ 85lumens/watt) for production	LED lights (22W/ 90 lumens/watt) for both production and street lighting	- Energy efficiency - Expected annual cost reduction of approximately 4,300 USD (only from lights used for production)
Independent air-conditioning unit	100% VRF inverter system	- Energy efficiency - Expected cost reduction of approximately 3,700 USD
Piston type compressor	Lead screw type compressor	- Energy efficiency - Noise reduction
Vacuum pump	Vacuum ejector pump (Venturi system)	- Heat reduction - Noise reduction - 5-10% reduction in electricity consumption
Water resources	Rainwater harvesting	- Conserve water use - Reduce water costs

The application of green process activities is expected to reduce annual electricity consumption up to 114,411kWh, saving the company approximately 10,297 USD.
As for GHG emissions level, based on the current emission factor of Malaysia, Exis Tech is expected to have a reduction of 79tCO_2.

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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 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 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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