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**Asia-Pacific  
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# **Malaysia**

# **Environmental Industry 2010**

## **Case Study**

**November 2010**

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## **Asia-Pacific Economic Cooperation Secretariat**

35 Heng Mui Keng Terrace Singapore 11916

Tel: (65) 6891-9600

Fax: (65) 6891-9690

E-mail: [info@apec.org](mailto:info@apec.org)

Website: [www.apec.org](http://www.apec.org)

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# 1. Introduction

APEC has recognized that an open global trade and investment system is necessary for the dissemination and increased utilization of Environmental Goods and Services (EGS). EGS is an industry sector devoted to solving, limiting or preventing environmental problems. EGS companies may be involved in manufacturing goods or providing services related to water or air pollution, waste management, renewable energy, monitoring, analysis and assessment, or a number of other areas. The development of an EGS industry in developing economies is instrumental to eliminating preventable diseases, enhancing quality of life, protecting natural resources and attracting in-bound investment.

This report is the first of an intended series of studies organized and sponsored by APEC Technical Assistance and Training Facility (TATF) on select APEC member economies to increase understanding of EGS in their economies and contribute to enhanced capacity to promote sustainable growth through improved domestic EGS frameworks.

## Definition of EGS Used in the Study

The objective of this report is to characterize the environmental goods and services industry in Malaysia and not necessarily to define it. Research has been focused on companies operating in the market and the segments used in this report reflect more how these companies fall into groups of similar operations than any adherence to national or international industry codes or certifications.

Research methodology was focused on an aggregation and assessment of all available research and data on EGS sectors in Malaysia and the region, followed by direct contact with EGS companies, government officials and experts in the field by telephone interview, email question and answer and a survey instrument sent out to more than 400 EGS companies in Malaysia. Market quantifications in each individual segment were attempted by identifying revenue generation in as many companies as possible in the defined segments, gathering market size estimates from as many industry participants as possible and reconciling these estimates with any spending figures available.

As with any emerging and largely undefined industry sector, figures are essentially nonexistent. This study and its conclusions are conducted on a best-effort basis to help draw a more accurate and comprehensive picture of environmental markets and industries in the APEC region and throughout the world.

## EGS—a RM 7 Billion Industry

The environmental goods and services industry in Malaysia is a relatively well-structured and vibrant industry. Analysis of 11 service and equipment segments reveals an environmental industry generating revenue of RM 7,060 million in 2009 and employing an estimated 29,700 workers in about 2,700 private companies. The revenue generated makes up 1.38 percent of Malaysia's gross domestic product, and growth in the environmental industry was slightly faster than the 5–6 percent annual growth of Malaysia's GDP from 2006 to 2008. Emerging segments (principally export-driven solar energy equipment) accounted for another RM 3,760

million in 2009, bringing the total of EGS and emerging segments to RM 10,790 million in 2009, or 2.1 percent of GDP.

Growth in Malaysian EGS segments before the global recession averaged 6–8 percent per annum from 2004 to 2008, with the total growing from RM 5,500 million to RM 6,900 million. By far the largest contributors to revenue and employment in the Malaysian environmental industry can be described as environmental infrastructure service companies. Three environmental infrastructure segments—water utilities, wastewater treatment and waste management—accounted for 76 percent of total EGS revenue in 2009.

The large and reasonably well-developed water utilities, wastewater treatment and waste management segments have emerged from a cycle of privatization, nationalization, and reprivatization (albeit with government ownership), evolving into competitive regional players. The leading companies in these segments have started to develop business in Southeast Asia and China, and some have taken initiative to leverage their domestic expertise into more international participation in Africa and the Middle East.

## Domestic Competency

Equipment segments accounted for 19 percent of the EGS market in Malaysia in 2009, and although imports are a significant contributor to the domestic market, local manufacturers are gaining in capacity. Export and import statistics provided by Malaysia's Ministry of International Trade and Industry for selected Harmonized System Codes (HS Codes) that most closely match environmental equipment sub-segments indicate that although Malaysia still imports a significant portion of its pollution control equipment, trends in 2006–2008 show that imports are declining and exports are increasing in water treatment equipment, air filtration equipment and waste management equipment (see data tables below).

Environmental companies assert that, although markets can still be improved, more consistent demand in the domestic market has contributed to an increase in manufacturing capacity for local pollution control equipment.

The environmental consulting and engineering (C&E) sector figures prominently in the environmental industry. C&E firms are involved in virtually every client sector and media type (air, water, waste, etc.) as front-end analysis providers, designers and specifiers of solutions and technology, and often as project managers of construction and civil engineering projects. Malaysian environmental C&E firms have evolved rapidly in the past decade, to a high level of competency from a very low level, according to participants in the market, making the RM 300–400 million environmental consulting and engineering sector a business with many local firms and many small and medium enterprises. Even global C&E leaders with offices in Malaysia employ mostly Malaysian staff (many of whom have been educated or trained abroad), when earlier in the decade they used mostly expatriate technical staff.

## Market Drivers

Drivers of the environmental market in Malaysia are principally federal laws and regulations, self-imposed international standards of multinational corporations, and the budgets of federal, state and local government, as well as the demand for and provision of basic environmental infrastructure services. Although Malaysia Department of Environment has been in existence since 1974 and has the authority to enforce a broad suite of regulations and standards

covering all environmental media, many Malaysian companies cite inconsistent or nonexistent enforcement as one of the problems inhibiting development of the EGS industry in Malaysia. Malaysian officials contend that regulations and standards are in place (including guidelines), but that awareness and implementation of these regulations and standards may not be adequately widespread.

Environmental industry analysts have long stated that the best determinant of an economy's environmental industry competitiveness internationally is the consistency and development of its own domestic market, driven mainly by enforcement of environmental laws and regulations. Whereas Malaysian companies do indeed appear to have some justification in complaining about inconsistent enforcement (and this is almost a universal complaint in the developing world), the Malaysian government's efforts to take control of its environmental infrastructure and cede control and responsibility to privately managed companies is notable in its relatively advanced state.

## Trade Issues

Although the scope of this review was not to assess or identify trade barriers, there appears to be no significant barrier to the import of environmental equipment or to the establishment of local service subsidiaries. Some imported environmental equipment attracts taxes and duties of 5–10 percent, according to some reports, depending on the classification of goods under the Harmonized Standard codes. Generally, access to foreign technology, equipment and expertise and a generally friendly policy to business have accelerated the development of both Malaysia's ability to deal with its environmental issues and the evolution of an indigenous environmental industry.

## Sustainability, Climate Change, Green Technology, and Environmentally Preferable Products

Outside the core environmental goods and services market that deals principally with traditional issues of waste, water and air pollution is a host of emerging business segments that already have had an impact on the Malaysian economy.

Developing segments outside the core EGS industry include services and supply related to renewable energy, green building and energy efficiency. (Biofuels are excluded from this EGS analysis as not broadly accepted globally as environmentally preferable, although the Malaysian palm oil industry has made considerable effort to promote biofuel.) Furthermore, environmentally preferable products across all sectors deserve mention, but like clean technology, sustainable manufacturing and green products, are difficult to account for as a distinct and quantifiable segment. Efforts have been made to isolate and even certify products in sustainable agriculture, sustainable forestry and ecotourism, but these are not fully assessed in this review.

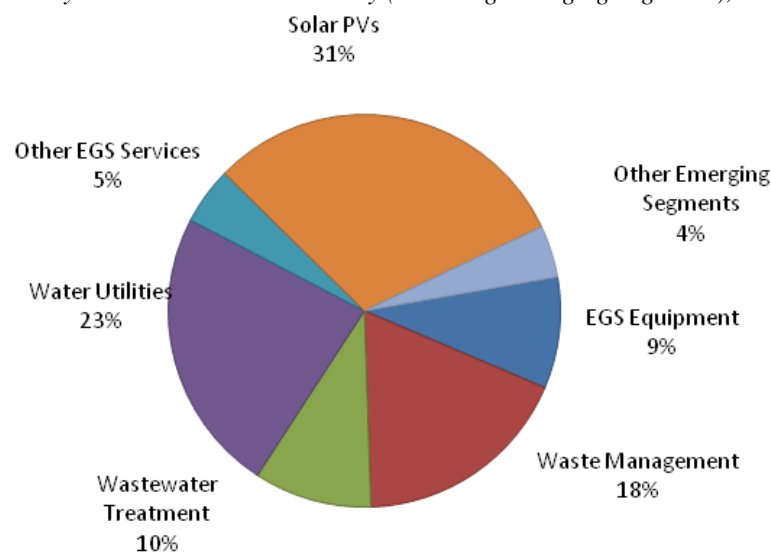
Remarkable in its contribution to the environmental economy or broader green economy in Malaysia is one key product area: photovoltaic cells and panels. Malaysia has the world's second-largest manufacturing complex for photovoltaic cells at 900 MW capacity (second to Suntech in China), run by U.S. company First Solar, now the global leader in production of photovoltaic panels. Former number one producer Q-Cells of Germany also has a 300 MW plant in Malaysia, and top-10 firm, Sunpower, is building a plant. According to United

Nations COMTRADE data, Malaysia exported \$840 million in solar equipment in 2009. Data compiled by Photon International indicate that Malaysia accounted for 8 percent of the global production of photovoltaic products in 2009, and with the new Q-Cells plant accounts for 9 percent of global capacity. Photovoltaic exports accounted for RM2.8 billion, or more than 10 times the estimated value of exports of goods and services in traditional EGS segments.

The siting of these photovoltaic plants required the involvement of the Malaysian government. In First Solar's January 2007 announcement of a four-line solar module manufacturing plant, the company stated: "The Malaysian government is providing a 15-year income tax holiday as an incentive for First Solar's investment in Malaysia."<sup>1</sup> The CEO said "We are very pleased to be working with the Malaysian government, the State of Kedah, and the Kulim Hi Tech Park and look forward a strong long-term partnership," and the director general of Malaysian Industrial Development Authority (MIDA) was quoted. The February 2008 announcement of the Q-Cells plant was made by Trade and Industry Minister Rafidah Aziz along with Q-Cell executives; also present were MIDA's deputy director general and the Selangor State Investment Centre chief executive officer.

**Figure 1**

*Malaysian Environmental Industry (Including Emerging Segments), 2009*



Source: Environmental Business International estimates derived from a variety of sources, including company surveys, company interviews, government documents and interviews, trade statistics, economic statistics, and company and government websites

## 2. EGS Industry Statistics

### Statistical Summary and Overview of the Total EGS Market

The following is an estimate of market size, number of companies and employment by segment in the Malaysian environmental industry. Market statistics are presented in two

<sup>1</sup> First Solar was granted a full income tax exemption for the manufacture of thin film solar modules from January 2008 to June 2024 (16.5 years), subject to certain conditions.



groups: (1) traditional or core EGS segments, pertaining mostly to air, water and waste issues; and (2) emerging segments like renewable energy, energy efficiency and other green sectors. This is done because in most economies while all these markets are related, there is a distinction in policy between traditional EGS and emerging green segments. Companies in the traditional EGS and emerging green companies are often different entities.

Figure 2 summarizes market drivers, leading companies, and major trends by segment.

**Figure 2**

*Malaysian Environmental Market, 2009*

|   | Market Size<br>(RM million) | No. of Companies | No. of Employees |
|---|-----------------------------|------------------|------------------|
| <b>EQUIPMENT</b>                                |                             |                  |                  |
| Water equipment and chemicals                   | 950                         | 200              | 1,820            |
| Air pollution control                           | 180                         | 80               | 270              |
| Instruments and monitoring systems              | 170                         | 60               | 320              |
| Waste management equipment                      | 300                         | 140              | 580              |
| <b>SERVICES</b>                                 |                             |                  |                  |
| Solid waste management                          | 1,800                       | 1100             | 14,400           |
| Hazardous waste management (scheduled waste)    | 150                         | 100              | 800              |
| Consulting and engineering                      | 340                         | 290              | 1,550            |
| Remediation/industrial services                 | 70                          | 80               | 280              |
| Analytical services                             | 150                         | 60               | 750              |
| Wastewater treatment (municipal and individual) | 1,130                       | 400              | 4,120            |
| Water utilities                                 | 2,560                       | 200              | 4,820            |
| Core environmental goods and services           | 7,800                       | 2,710            | 29,710           |

Source: *Environmental Business International* estimates derived from a variety of sources, including company surveys, company interviews, government documents and interviews, trade statistics, economic statistics, and company and government websites.

**Figure 3**

*Environmental Market and Environmental Industry, 2009 (RM million)*

|                                    | Market Size | Percent of Market Imported | Percent of Industry Exported | Import | Export | Industry |
|------------------------------------|-------------|----------------------------|------------------------------|--------|--------|----------|
| <b>EQUIPMENT</b>                   |             |                            |                              |        |        |          |
| Water equipment and chemicals      | 950         | 52%                        | 21%                          | 492    | 123    | 580      |
| Air pollution control              | 180         | 62%                        | 31%                          | 111    | 31     | 100      |
| Instruments and monitoring systems | 170         | 46%                        | 20%                          | 78     | 23     | 110      |
| Waste management equipment         | 300         | 35%                        | 3%                           | 105    | 5      | 200      |
| <b>SERVICES</b>                    |             |                            |                              |        |        |          |
| Solid waste management             | 1,800       | 0%                         | 0%                           |        |        | 1,800    |

|  |       |     |    |     |     |       |
|--|-------|-----|----|-----|-----|-------|
| Hazardous waste management ('scheduled waste' in Malaysia) | 150   | 0%  | 0% | -   | -   | 150   |
| Consulting and engineering                                 | 340   | 12% | 2% | 41  | 6   | 310   |
| Remediation, industrial services                           | 70    | 20% | 1% | 14  | 1   | 50    |
| Analytical services  | 150   | 5%  | 3% | 8   | 4   | 150   |
| Wastewater treatment (municipal and industrial)            | 1,130 | 8%  | 1% | 90  | 14  | 1,050 |
| Water utilities  | 2,560 | 1%  | 0% | 26  | 4   | 2,530 |
| EGS Total  | 7,800 | 12% | 3% | 964 | 210 | 7,030 |

*Note: Industry=Market+exports-imports*

*Source: Environmental Business International estimates derived from company surveys and interviews, government documents and interviews, trade statistics, economic statistics, and company and government websites.*

**Figure 4***Small and Medium Enterprises in Environmental Industry, 2009 (RM million)*

|   | Industry Size | SME Revenue Share | SME Revenue |
|---|---------------|-------------------|-------------|
| <b>EQUIPMENT</b>                                |               |                   |             |
| Water equipment and chemicals                   | 580           | 10–20%            | 90          |
| Air pollution control                           | 100           | 10–20%            | 10          |
| Instruments and monitoring systems              | 110           | 20–30%            | 30          |
| Waste management equipment                      | 200           | 20–25%            | 50          |
| <b>SERVICES</b>                                 |               |                   |             |
| Solid waste management                          | 1,800         | 20–30%            | 450         |
| Hazardous waste management (scheduled waste)    | 150           | 10–12%            | 20          |
| Consulting and engineering                      | 310           | 50–60%            | 170         |
| Remediation/industrial services                 | 50            | 30–40%            | 20          |
| Analytical services                             | 150           | 50–60%            | 80          |
| Wastewater treatment (municipal and individual) | 1,050         | 10–20%            | 160         |
| Water utilities                                 | 2,530         | 10–20%            | 380         |
| Total   | 7,030         | 21%               | 1,460       |

Source: Environmental Business International estimates derived from company surveys and interviews, government documents and interviews, trade statistics, economic statistics, and company and government websites

**Figure 5***Emerging Segments in the Environmental Industry, 2009 (RM million)*

| Segment  | Industry Size (RM million) | Number of Companies | Percent Exported | Exports in RM mil |
|--|----------------------------|---------------------|------------------|-------------------|
| Developing segments: services  |                            |                     |                  |                   |
| Renewable energy project development                                       | 10                         | 10                  |                  |                   |
| Green building design/construction   | 100                        | 100                 |                  |                   |
| Energy efficiency services   | 50                         | 200                 |                  |                   |
| Developing segments: goods and supply                                      |                            |                     |                  |                   |
| Solar, wind, biomass and renewable energy equipment manufacturing or sales | 3,300                      | 40                  | 86%              | 2,820             |
| Green building materials supply  | 200                        | 100                 |                  |                   |
| Energy efficiency equipment supply   | 100                        | 200                 |                  |                   |
| Total emerging segments  | 3,760                      | 650                 | 75%              | 2,820             |

Source: Environmental Business International estimates derived from company surveys and interviews, government documents and interviews, trade statistics, economic statistics, and company and government websites.

**Figure 6**

*Size of Environmental Industry and Emerging Segment and Exports, 2009, RM million*

|   | Export | Industry Size * |
|---|--------|-----------------|
| <b>EQUIPMENT</b>                                |        |                 |
| Water equipment and chemicals                   | 123    | 580             |
| Air pollution control                           | 31     | 100             |
| Instruments and monitoring systems              | 23     | 110             |
| Waste management equipment                      | 5      | 200             |
| <b>SERVICES</b>                                 |        |                 |
| Solid waste management                          | –      | 1,800           |
| Hazardous waste management (scheduled waste)    | –      | 150             |
| Consulting and engineering                      | 6      | 310             |
| Remediation/industrial services                 | 1      | 50              |
| Analytical services                             | 4      | 150             |
| Wastewater treatment (municipal and individual) | 14     | 1,050           |
| Water utilities                                 | 4      | 2,530           |
| EGS Total                                       | 210    | 7,030           |
| Renewable energy project development            |        | 10              |
| Green building design/construction              |        | 100             |
| Energy efficiency services                      |        | 50              |
| <b>DEVELOPING SEGMENTS: GOODS AND SUPPLY</b>    |        |                 |
| Renewable energy equipment manufacturing        | 2,820  | 3,300           |
| Green building materials supply                 |        | 200             |
| Energy efficiency equipment supply              |        | 100             |
| Emerging segment total                          | 2,820  | 3,760           |
| EGS and emerging segments total                 | 3,030  | 10,790          |

*Source: Environmental Business International estimates derived from company surveys and interviews, government documents and interviews, trade statistics, economic statistics, and company and government websites. \* Note: Industry size indicates revenues generated by Malaysian companies in total, bot from domestic markets and exports.*

## Export Statistics

The following group of tables presents compiled statistics for selected Harmonized System Codes (HS Codes) that most closely match environmental equipment sub-segments in air pollution, waste and waste management equipment. Exact matches of HS Codes to EGS segments do not exist and tracking trade in environmental equipment has historically been challenging. These are actual figures taken from trade databases and not modified or estimated and are presented more to indicate trends in gains or declines rather than absolute values.

**Figure 7***Exports of Environmental Goods by HS Code, 2006–2008 (RM)*

| Segment and HS code                       | 2008               | 2007               | 2006               |
|---|--------------------|--------------------|--------------------|
| <b>WATER TREATMENT EQUIPMENT</b>          |                    |                    |                    |
| 842121000                                 | 56,211,177         | 28,107,193         | 32,685,322         |
| 842129900                                 | 32,857,648         | 13,218,203         | 5,873,355          |
| 842199900                                 | 48,199,379         | 34,099,734         | 21,993,360         |
| Total                                     | 137,268,204        | 75,425,130         | 60,552,037         |
| Growth                                    | 82%                | 25%                |                    |
| <b>AIR POLLUTION CONTROL EQUIPMENT</b>    |                    |                    |                    |
| 842139100                                 | 14,177,208         | 22,150,080         | 12,674,168         |
| 842139900                                 | 61,116,012         | 56,872,298         | 47,576,462         |
| 870892100                                 | 9,500              | 57,222             | –                  |
| 870892900                                 | 5,423,476          | 1,183,777          | 4,955,037          |
| Total                                     | 80,726,196         | 80,263,377         | 65,205,667         |
| Growth                                    | 1%                 | 23%                |                    |
| <b>WASTE MANAGEMENT EQUIPMENT</b>         |                    |                    |                    |
| 841780000                                 | 4,063,199          | 5,470,171          | 1,853,813          |
| 841790000                                 | 1,826,353          | 4,089,923          | 10,684,769         |
| Total                                     | 5,889,552          | 9,560,094          | 12,538,582         |
| Growth                                    | –38%               | –24%               |                    |
| <b>Total Pollution Equipment Segments</b> | <b>223,883,952</b> | <b>165,248,601</b> | <b>138,296,286</b> |
| Annual Growth                             | 35%                | 19%                |                    |

Source: Trade data by HS code provided by Ministry of International Trade and Industry.

HS Code key:

842121 Filtering or purifying machinery & apparatus for water

842129 Filtering or purifying machinery & apparatus for other liquids

842199 Parts of filtering or purifying machinery & apparatus, for liquid or gases

842139 Other filtering or purifying machinery & apparatus for gases

870892 Mufflers & exhaust pipes of motor vehicles

841780 Other industrial or laboratory furnaces & ovens, non-electric; incinerators

841790 Parts for industrial or laboratory furnaces & ovens, non-electric; incinerators

**Figure 8**

*Share Percentage of Malaysian EGS Exports by Partner Economy; Aggregated Total from 2005–2009*

| Partner Economy                        |     |
|--|-----|
| <b>WATER TREATMENT EQUIPMENT</b>       |     |
| Singapore                              | 19% |
| Thailand                               | 11% |
| Indonesia                              | 11% |
| United States                          | 6%  |
| Vietnam                                | 6%  |
| Australia                              | 5%  |
| China                                  | 5%  |
| United Arab Emirates                   | 4%  |
| Japan                                  | 2%  |
| Bangladesh                             | 1%  |
| All other                              | 32% |
| <b>AIR POLLUTION CONTROL EQUIPMENT</b> |     |
| Singapore                              | 18% |
| Thailand                               | 14% |
| Taiwan                                 | 8%  |
| Japan                                  | 7%  |
| Indonesia                              | 5%  |
| United States                          | 4%  |
| Italy                                  | 3%  |
| Australia                              | 3%  |
| Germany                                | 2%  |
| United Arab Emirates                   | 1%  |
| All other                              | 35% |

*Source: Trade data by HS code provided by U.S. Department of Commerce*

**Figure 9**  
Imports of Environmental Goods by HS Code, 2006–2008 (RM)

|  | 2008               | 2007               | 2006               |
|--|--------------------|--------------------|--------------------|
| <b>WATER TREATMENT EQUIPMENT</b>       |                    |                    |                    |
| 842121000                              | 223,556,251        | 209,247,759        | 191,524,455        |
| 842129900                              | 68,333,246         | 74,152,700         | 69,795,823         |
| 842199900                              | 200,108,039        | 243,200,147        | 267,534,058        |
| Total                                  | 491,997,536        | 526,600,606        | 528,854,336        |
| Growth                                 | -7%                | 0%                 |                    |
| <b>AIR POLLUTION CONTROL EQUIPMENT</b> |                    |                    |                    |
| 842139100                              | 30,370,498         | 35,654,383         | 39,525,210         |
| 842139900                              | 147,770,210        | 149,502,527        | 227,557,541        |
| 870892100                              | 979,906            | 140,046            | 499,761            |
| 870892900                              | 16,410,084         | 13,452,057         | 12,506,197         |
| Total                                  | 195,530,698        | 198,749,013        | 280,088,709        |
| Growth                                 | -2%                | -29%               |                    |
| <b>WASTE MANAGEMENT EQUIPMENT</b>      |                    |                    |                    |
| 841780000                              | 47,813,306         | 44,789,743         | 39,774,194         |
| 841790000                              | 68,855,616         | 66,775,758         | 58,275,624         |
| Total                                  | 116,668,922        | 111,565,501        | 98,049,818         |
| Growth                                 | 5%                 | 14%                |                    |
| <b>Total pollution equipment</b>       | <b>804,197,156</b> | <b>836,915,120</b> | <b>906,992,863</b> |
| <b>Annual Growth</b>                   | <b>-4%</b>         | <b>-8%</b>         |                    |

Note: For the three pollution equipment segments, exports as a percentage of imports grew from 15% in 2006, to 20% in 2007 to 28% in 2008.

Source: Trade data by HS codes provided by Ministry of International Trade and Industry.

HS Code key:

842121 Filtering or purifying machinery & apparatus for water

842129 Filtering or purifying machinery & apparatus for other liquids

842199 Parts of filtering or purifying machinery & apparatus, for liquid or gases

842139 Other filtering or purifying machinery & apparatus for gases

870892 Mufflers & exhaust pipes of motor vehicles

841780 Other industrial or laboratory furnaces & ovens, non-electric; incinerators

841790 Parts for industrial or laboratory furnaces & ovens, non-electric; incinerators

**Figure 10**

*Share Percentage of Malaysian EGS Imports by Partner Economy; Aggregated Total from 2005–2009*

| Economy                                | Share |
|--|-------|
| <b>WATER TREATMENT EQUIPMENT</b>       |       |
| United States                          | 22%   |
| China                                  | 15%   |
| Japan                                  | 11%   |
| Germany                                | 10%   |
| Singapore                              | 9%    |
| Taiwan                                 | 8%    |
| United Kingdom                         | 4%    |
| Netherlands                            | 2%    |
| India                                  | 2%    |
| Italy                                  | 1%    |
| All other                              | 16%   |
| <b>AIR POLLUTION CONTROL EQUIPMENT</b> |       |
| Japan                                  | 23%   |
| United States                          | 17%   |
| Thailand                               | 15%   |
| China                                  | 12%   |
| Germany                                | 6%    |
| Singapore                              | 6%    |
| Indonesia                              | 3%    |
| United Kingdom                         | 3%    |
| France                                 | 2%    |
| Italy                                  | 1%    |
| All other                              | 12%   |

*Source: Trade data by HS code provided by U.S. Department of Commerce*



**Figure 11***Exports of Photovoltaic Cells or Panels (HS Code 854140), 2009 (\$US)*

| Region/Nation                       | Trade Value    |
|-------------------------------------|----------------|
| EU-27                               | 1,750,096,938  |
| Rep. of Korea                       | 1,307,281,297  |
| Malaysia                            | 835,520,924    |
| United Kingdom                      | 721,490,036    |
| Singapore                           | 673,660,312    |
| Other reporters (inside selection)  | 5,046,191,571  |
| Other reporters (outside selection) | 21,371,064,861 |
| Sum of exports:                     | 31,705,305,939 |

Source: COMTRADE:

### 3. Segment Review: Environmental Consulting and Engineering

Central to any economy's environmental industry is the environmental consulting and engineering sector. C&E firms are involved in both the public and private sectors at all levels and in every industrial sector. Firms may be consultants providing advisory services or engineers providing design services and project management, or both.

Firms focused on consulting provide most of the front-end analysis such as environmental auditing, environmental impact assessments, continuous emissions monitoring, and other services required by Malaysia's Department of the Environment. On its website, Department of the Environment lists 41 registered environmental auditors, 50 companies providing services related to continuous emissions monitoring systems, and 229 individuals registered to perform EIAs. Almost all of these firms are local businesses and many are SMEs.

Malaysian environmental C&E firms have evolved rapidly in the past decade from a very low level to a level of competency, according to participants in the market. The RM 300–400 million environmental C&E sector offers many local firms and small and medium enterprises. Even global C&E leaders with offices in Malaysia employ mostly Malaysians (although many were educated or trained abroad), when earlier in the decade they used mostly expatriate technical staff.

Private sector multinationals like prominent electronic or chemical manufacturers or oil and gas companies use international environmental C&E firms more frequently to maintain their standards of environmental performance, often for their own liability protection rather than to follow local regulations. Work typically involves both engineering and consulting as characterized in the tables below.

Universities often have consulting bureaus that perform services and are not insignificant players in the market. Consultants in the business also report that in pollution control

categories like air and water, engineering services are typically “given away” by foreign technology providers or are part of the equipment purchase.

**Figure 12**

*Environmental Consulting and Engineering Segment*

| Environmental Consulting and Engineering                                    | Firms | RM million | Total Employees |
|---|-------|------------|-----------------|
| Environmental consulting (EIAs, audits, air and water compliance, planning) | 150   | 176        | 740             |
| Environmental engineering (water/wastewater, air, waste, remediation)       | 138   | 169        | 810             |
| Total   | 288   | 344        | 1550            |

**Figure 13**

*Environmental Consulting Firms (EIAs, Audits, Air and Water Compliance, Planning)*

| Environmental Consulting Firms          | Firms | Employees | RM millions |
|---|-------|-----------|-------------|
| Leaders (10–50 people)                  | 10    | 350       | 105         |
| Small firms (3–10 people); Universities | 40    | 240       | 48          |
| Independents                            | 100   | 150       | 23          |
| Total                                   | 150   | 740       | 176         |

## Leaders in Environmental Consulting

- International: ERM, CH2M Hill, ENVIRON
- Local: ASMA, Chemsains, ERE, Europe–Asia, Green Edge Consult, Enviro Business Asia Sdn Bhd, Environmental Science (M) Sdn. Bhd., Alam Sekitar Malaysia Sdn Bhd
- Universities: UKM, UTM, USM, UM

**Figure 14**

*Environmental Engineering Firms (Water/Wastewater, Air, Waste, Remediation)*

|   | Firms | Employees | RM millions |
|---|-------|-----------|-------------|
| Leaders (10–100 people)                 | 8     | 480       | 110         |
| Small firms (3–10 people); Universities | 30    | 180       | 36          |
| Independents                            | 100   | 150       | 23          |
| Total                                   | 138   | 810       | 169         |

## Local Leaders in Environmental Engineering

- SMHB Sdn Bhd
- HSS Integrated Sdn Bhd
- Ranhill Bersekutu
- Miconsult
- Europasia Engineering Services Sdn.Bhd.

## Local Leaders in Civil and Environmental Construction and Engineering

- Pilecon Engineering
- PPB Group (Chemquest subsidiary Chemical Waste Management Sdn Bhd (CWM))
- Puncak Niaga Holdings Berhad (PNHB) Group

## 4. Segment Review: Air Pollution Control Equipment

Economic development in Malaysia has led to significant losses in air quality. Factories, open burning, and an estimated 16 million registered vehicles have contributed to the degradation of air quality. Haze was so bad in 1997 and 2005 that the government of Malaysia declared a state of emergency, schools closed, and citizens were advised to stay indoors.

Haze that occurs during dry seasons is attributed largely to open burning for site clearing, but also to industrial air pollution, forest fires, vehicle fumes, emissions from power stations, boilers, furnaces, and incinerators. Open burning for site clearing remains the biggest problem and is still routinely carried out at 200 waste disposal sites throughout Malaysia.

The government is also taking steps to regulate vehicular emissions through changes to its Motor Vehicle Regulations. Regulations to mandate the use of catalytic converters in new vehicles were approved by the Malaysian Government in 2007. The regulations also call for the establishment of vehicular monitoring stations operated by licensed firms like Puspakom which is a wholly-owned subsidiary of DRB-HICOM.

Stationary source air pollution control equipment markets are dominated by power utilities and vendors report their business swaying dramatically depending on investment cycles. Leaders in APC technology are European or Japanese companies that typically are integrated power services and equipment vendors as well.

The air pollution control equipment segment is led by the following companies:

- ALSTOM Asia Pacific Sdn Bhd
- Lurgi (Malaysia) Sdn Bhd
- Hitachi Asia (Malaysia) Sdn Bhd
- Mitsubishi Heavy Industries.

## 5. Segment Review: Solid Waste Management

As standards of living have risen in Malaysia, the generation of solid waste has increased. For example, solid waste generated in Peninsular Malaysia went up from 17,000 tons per day in 2002 to 19,100 tons in 2005, an average of 0.8 kilogram per capita per day. The generation of solid waste is expected to reach 30,000 tons per day in 2020, and modern waste contains a higher proportion of nondegradable materials such as plastics. Malaysian waste reportedly

consists of about 45 percent food waste, 24 percent plastic, 7 percent paper and 6 percent iron. About 96 percent of waste collected is taken to landfills for disposal, and the remaining waste is sent to small incineration plants. Only 5 percent of collected waste is recycled, but the government aims to have 22 percent recycled by 2020.

The government has adopted a National Strategic Plan for Solid Waste Management emphasizing the upgrading of “unsanitary landfills” as well as the construction of new sanitary landfills and transfer stations with integrated material recovery facilities. A Solid Waste Management Bill was adopted by Parliament in June 2007. The bill changed the structure of solid waste management in Malaysia with new concessions on domestic waste management and recycling. The Solid Waste and Public Cleansing Management Act 2007 was gazetted in August 2007: Previously, solid waste was under the purview of the Department of Local Government and Local Authorities, and subsequently has been under the National Solid Waste Management Department and Solid Waste and Public Cleansing Management Corporation.

Malaysian investors are reportedly looking into the solid waste business, with many looking for foreign partners. Solid waste management is one of the priority areas under the Ninth Malaysian Plan, as can be seen by the government’s setting up of a Solid Waste Department, which is entrusted to enforce the Solid Waste Management Bill.

As of April 2007, Malaysia had 291 landfill sites nationwide with about 112 of these sites not in operation and 179 still operating (10 are reported “sanitary” or meeting standards).

**Figure 15**

*Solid Waste Industry in Malaysia*

|                         | Est. Revenue         | Employees     |
|-------------------------|----------------------|---------------|
| Alam Flora Sdn Bhd      | 500–600 million      | 3,400         |
| SWM Environment Sdn Bhd | 500–600 million      | 5,000         |
| 1,000+ Others           | 600–800 million      | 6,000         |
| <b>Total</b>            | <b>1,800 million</b> | <b>14,400</b> |

Source: EBI estimates, employee figures from company websites

## Profiles of Top Two Solid Waste Firms

ALAM Flora Sdn Bhd, a subsidiary of DRB–HICOM Berhad, is the largest Solid Waste Management Company in Malaysia operating in the Central and Eastern Regions of Peninsular Malaysia, covering the states of Selangor, Pahang, Terengganu, Kelantan and Federal Territory of Putrajaya and Federal Territory of Kuala Lumpur. ALAM Flora has a total workforce of more than 3,400 full-time employees and has been operational since 1997. Alam Flora via its MBM–Alam Flora joint venture initiative based in Bahrain commenced operations on February 1, 2003. Providing cleansing and waste collection services to the Island of Golden Smiles, the endeavor simultaneously placed Alam Flora on the world map for being a major player in solid waste management in the region.

SWM Environment Sdn Bhd (Formerly known as Southern Waste Management Sdn Bhd (SWM) was established to manage the storage, collection, transfer, haulage, intermediate processing and disposal of solid waste in the Southern Region of Peninsular Malaysia in 1996

in line with the Malaysian government's decision on the National Privatisation of Solid Waste Management. SWM has grown into an established solid waste collection and management services concessionaire with a workforce of more than 5,000 full-time employees serving 25 local councils throughout the states of Johore, Malacca, and Negeri Sembilan. With the passing of the Solid Waste and Public Cleansing Management Act 2007, SWM claims to be poised to be a major solid waste collection and management services provider in the states of Johore, Malacca and Negeri Sembilan providing an integrated waste management service.

## Scheduled Waste

Under the Environment Quality (Scheduled Wastes) Regulations 2005, Malaysia's Department of Environment maintains a list of scheduled wastes or hazardous wastes and carries out the legislative requirement of Malaysia's government in issues such as notification, treatment, disposal, recovery, inventory record, labeling and storage of scheduled wastes.

**Figure 16**

*Disposition of Scheduled Wastes Generated by Industry, 2007*

| Facility                             | Tons      |
|--------------------------------------|-----------|
| On-site treatment                    | 579,652   |
| Local off-site recovery facilities   | 355,471   |
| Kualiti Alam Sdn. Bhd                | 117,982   |
| On-site storage                      | 55,075    |
| Off-site clinical waste incinerators | 12,534    |
| Trinekens (Sarawak) Sdn. Bhd.        | 11,017    |
| Foreign facilities (import/export)   | 7,108     |
| Total                                | 1,138,839 |

Source: Department of Environment.

The scheduled waste segment is led by the following companies:

- Kualiti Alam Sdn. Bhd (UEM Group)
- Trinekens (Sarawak) Sdn. Bhd.
- Meridian World Sdn. Bhd.

## Medical Waste

In 1997, Malaysia introduced a new business model for public health care support services in a bid to contain rising medical costs and maintain affordability. The new concept was to corporatize the services by outsourcing to the private sector with the hope that for-profit governance would help manage resources more economically and efficiently. For this exercise, three companies were selected to provide seven types of support services, among them medical waste management.

- Faber Medi-Serve Sdn Bhd serves 79 government-owned hospitals and 500 smaller clinics in the states of Perlis, Kedah, Penang, Perak, Sarawak and Sabah.

- Radicare Sdn Bhd serves 47 other hospitals in Kuala Lumpur, Putrajaya, Kelantan, Pahang and Terengganu.
- Pantai Medivest Sdn Bhd, a subsidiary of Pantai Holdings Berhad, manages the clinical waste from 22 hospitals in the remaining three states of Johor, Negeri Sembilan and Melaka.

In 2009, the three concessionaires generated nearly RM 200 million in revenue by managing 15,952 tons of discarded needles and syringes, scalpels, surgical instruments, contaminated bandages, human tissues and body parts, and much other potentially infectious waste, turning it into inert and less-harmful ash, as stipulated by the Ministry of Health and the Department of Environment. This often overlooked sector in the health care industry is expected to grow at an average 12.8 percent annually, to reach RM 670 million by 2015, according to research firm Frost and Sullivan.

## 6. Segment Review: Water and Wastewater

The large and reasonably well-developed segments of water utilities and wastewater treatment have evolved and emerged from a cycle of privatization, nationalization and reprivatization (albeit with government ownership), and now the leading companies have aspirations to be competitive regional players.

Some water and wastewater systems were privatized to foreign firms in the late 1980s and 1990s, and some locals issued operations contracts to foreign firms, but subsequently almost all have gone back to local management. Indah Water Konsortium, a wholly-owned company of the Ministry of Finance, is Malaysia's national sewerage company and has been entrusted with the task of developing and maintaining a modern and efficient sewerage system for all Malaysians. In 1994, the federal government awarded the company the concession for nationwide sewerage services, which prior to that, was under the responsibility of local authorities. Indah Water has taken over sewerage services from local authorities in all areas except the States of Kelantan, Sabah, Sarawak the Majlis Perbandaran Johor Bahru, Pasir Gudang, KEJORA and Ketengah.

In water utilities, eight regional private companies manage water utility operations generating an estimated RM 2.5 billion in annual revenues. Water privatization is generally seen as having mixed results, because some areas have efficient systems and some do not, with many consumer complaints and financial problems. The process of privatization, however, has created a more competitive industry, and most observers believe more efficient service in the long run. The UK's Public Services International Research Unit concluded: "Because of the country's privatization policies, Malaysia is one country in Asia which has created a number of national water companies active in water supply or distribution. Some have become active outside Malaysia, almost entirely in China; some remain active only on the Malaysian market."

### Water Market Drivers

As Malaysia grows, so does the problem of providing sufficient clean water to the population. Malaysia's 28 million people generate about six million tons of sewage every year, most of

which is treated and released into rivers. Proper treatment is paramount, because about 98 percent of Malaysia's fresh water supply comes from surface water.

Great emphasis has been placed on the conservation and preservation of water. The enactment and enforcement of the Suruhanjaya Perkhidmatan Air Negara (SPAN) Act in 2007 aimed to address all previous deficiencies and to provide a holistic approach to the planning and development, operation, maintenance, and provision of water supply; the management, ownership and control of rivers and raw water sources; the provision, operation and maintenance of sewerage services; planning and development of new utility infrastructure for rural and urban areas; the coordination and integration of all such related services; and the regulation and licensing of water services operator and providers.

The Ninth Malaysia Plan 2006–2010 took effect in March 2006 and continues until 2010. Under the plan a total of RM 12 billion has been allocated to the water-related sector, representing a 39 percent increase over the RM 8 billion allocated under the Eighth Malaysia Plan.

Five strategies are the main focus under the Ninth Plan:

- Rehabilitation of water supply systems
- Modernization of water supply systems
- Water resources development
- Water treatment and distribution
- Interstate raw water transfer

Water was placed under the purview of the Ministry of Energy, Water and Communications in March 2004. The government restructured the Malaysian water industry with the Water Service Industry Bill 2006 and National Water Services Commission Bill 2006, both passed in May 2006. The bills transferred control of water from the states to a federal-level regulatory authority, and a new national water assets management company Pengurusan Aset Air Berhad (PAAB) was set up to buy all existing water infrastructure. The PAAB mission has been to raise low-interest funds to finance the acquisition and building of infrastructure, which will then be leased to water service providers.

The National Water Services Commission Bill established the commission Suruhanjaya Perkhidmatan Air Negara (SPAN) with powers to supervise and regulate the water supply services and sewerage services and to enforce the water supply and sewerage services laws. SPAN oversees, regulates, monitors, and maintains uniformity in the country's water sector, addressing issues such as poor water quality, no supply, a loss in earnings due to nonrevenue water through leaks, water theft and unpaid bills, the disparity in tariffs among states, and poor enforcement. The National Water Service Commission Bill Act was put into force in February 2007.

### Figure 17

*Development Expenditure and Allocation for Water Infrastructure and Utilities, 2001–2010 (US\$ million)*

| Sector       | 2001–2005 | 2006–2010 |
|--------------|-----------|-----------|
| Water supply | 1,177     | 2,486     |
| Sewerage     | 408       | 949       |

|             |       |       |
|-------------|-------|-------|
| Rural water | 222   | 366   |
| Total       | 1,807 | 3,801 |

Source: Malaysia Economic Planning Unit

The wastewater treatment segment is led by the following companies:

- Indah Water Konsortium Sdn Bhd
- Taliworks Corporation Berhad
- Veolia Water Malaysia (VWS Industrial Services)
- 200–300+ others

## Profile of IWK

Indah Water Konsortium Sdn Bhd (IWK), a national sewerage company, wholly owned by the government of Malaysia, is responsible for providing sewerage services, operating and maintaining 5,479 public sewage treatment plants and 14,297 km of sewerage pipelines, serving a population of 18 million out a total of about 28 million in Malaysia.

IWK provides 90 percent of sewerage services in Kuala Lumpur (up from 85 percent in 1998), while independent private treatment plants and individual septic tanks that have yet to be linked to the IWK system provide the remaining 10 percent. In 2008, the wastewater treatment capacity of IWK was estimated at 91 percent of the total wastewater generated in Kuala Lumpur, indicating that capacity still needs to be increased to match the volume of wastewater generated in the city.

Under a renewed mandate and with access to federal funds, IWK continues to upgrade and improve its treatment and sewerage services and to develop new treatment plants, with four new plants initiated in 2006 for Kuala Lumpur. However, recovery of costs from fees charged to consumers is still a major impediment, with collection rates reaching close to 80 percent of the total billed amount with recent new efforts.

Moving forward, IWK must expand the public sewer network and replace aging sewer pipes, which requires considerable capital investment. Eventually, IWK wants to concentrate all sewerage services in Kuala Lumpur into a centralized system to improve wastewater management and address river pollution, while increasing operational efficiency and reducing operational costs.

IWK has stated its desire to develop international business in the region. A 2010 presentation by the CEO at an Asia Development Bank meeting stated the following:

IWK's unique profile as national sewerage company where it had overseen the development from primary on-site systems to large scale centralized facilities had given IWK a broader view and ability to provide invaluable advisory and peer to peer exchange that matches the recipient country needs.

- IWK's strategic location supports sewerage development in the Asia Region.
- IWK's multicultural setting enables easy communication with other South East Asian countries.

The water utilities segment is led by the following companies, which are state corporatized and privatized water management companies



- SAJ Holdings Sdn. Bhd.
- Air Kelantan Sdn. Bhd.
- Laku Management Sdn. Bhd.
- Perbadanan Bekalan Air Pulau Pinang Sdn. Bhd.
- Syarikat Bekalan Air Selangor Sdn Bhd (SYABAS)
- Syarikat Air Terengganu Sdn. Bhd.
- Syarikat Air Melaka Berhad
- Konsortium ABASS Sdn Bhd (KPS).

## Water and Wastewater Treatment Equipment

In the wastewater equipment segment, leadership appears to be divided by European, Japanese and American providers in specialty treatment, with significant contribution by Malaysian companies (both independents and conglomerates) in pipes, pumps and filters.

According to the U.S. Commercial Service, until recently, foreign original equipment manufacturers were the major suppliers of water and wastewater treatment equipment in Malaysia, but the effective transfer and assimilation of technology as well as the strengthening of infrastructure are helping to promote local manufacturing. The government's inclination toward central sewage plants is offering better opportunities for suppliers of wastewater treatment equipment of all types. Disinfection and secondary wastewater treatment and sludge-dewatering equipment were key growing market categories identified by USCS. Its report also stated,

“To encourage local participation, local distributors, suppliers, contractors and locally produced equipment and technologies for wastewater treatment are given preferential advantages by the local government... The replacement market is another growing market, as there is a constant requirement for replacement parts and services.... Regulations pertaining to water treatment are likely to translate into more stringent and efficient plant monitoring for performance-related aspects.”

The water equipment and chemicals segment is led by the following companies:

- Nalco Industrial Services Malaysia Sdn Bhd
- Biwater (Malaysia) Sdn Bhd
- Kurita Water
- Organo Asia
- Ionics Technology Sdn. Bhd
- Envirogard Sdn. Bhd.
- Water Engineering Technology Sdn Bhd
- Universal Environmental Resources Sdn Bhd
- KIJ Ultra Supreme Filtration Sdn. Bhd.
- Tsurumi Pump (M) Sdn Bhd
- Sime Group
- Berjaya Group
- YTL Group.

## 7. Review of Key EGS Segments for Future Growth

### Key EGS Segments Identified by Malaysian Environmental Companies

As part of the Malaysia Environmental Industry Survey 2010 conducted for this report, environmental companies were asked the following question: “What do you see as the key sectors for growth in the environmental industry in Malaysia in 2010–2015? Please comment on the domestic market and opportunities for export.” Figure 18 lists selected responses.

#### Figure 18

*EGS Segments Identified as Key by Malaysian Environmental Companies*

- 
- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• Exporting manufactured products for pollution control</li> <li>• Green energy and wastewater treatment</li> <li>• Green technology and energy efficiency for domestic market.... The opportunities for export: are waste management and energy efficiency.</li> <li>• Waste management</li> <li>• Water and air quality monitoring</li> <li>• Waste management and renewable energy</li> <li>• Solid waste and renewable energy. With government assistance, Malaysian environmental companies will be in a strong position to export.</li> </ul> | <ul style="list-style-type: none"> <li>• LED lighting, Photovoltaic and BioMass for export ... Malaysia may not be ready as it lacks international accreditations in these fields.</li> <li>• In equipment, Chinese imports are replacing expensive local products. China is cheaper in the development of green technologies in the manufacturing sector and verification of such green technologies. Currently the domestic market is small but there is good potential to export to developed APEC countries as capacity, resources and quality management are available and accessible in Malaysia.</li> <li>• Local Markets: Enforce of used of the Green or Recycling products in all local development specially Government projects. Export Markets Export incentive to the buyer/seller on the GREEN and Recycled products.</li> </ul> |
|--|---|
- 

### Recycling

Malaysia, like most developing countries, is facing an increase in the generation of waste and in related problems with the disposal of waste. Recycling is still at an infant stage in Malaysia, but awareness of the environment is growing and the government has decided to promote companies that undertake waste recycling activities that are high value-added and use high technology. These activities include recycling of agricultural waste and agricultural byproducts, chemicals, and reconstituted wood-based panel boards or products.

### Renewable Energy

There are approximately 50 renewable energy businesses in Malaysia that manufacture, sell or service products in the sectors of solar, wind and hydroenergy and related to utilization of biomass resources.

Whereas the potential for large-scale wind farms is considered limited in Malaysia, potential for biomass for heating and energy production is considered favorable. The obvious biomass resource is waste products from the palm oil and wood industries as well as rice husks.

To promote the use of renewable energy, the Malaysian electricity utility has formally announced that it will buy electricity at a higher price from smaller independent power producers that generate power from renewable energy sources. Providing further incentive for the use of renewable energy is the possibility for establishing projects generating Certified Emissions Rights (so-called Clean Development Mechanism projects) that can be sold to countries with emission reduction obligations in accordance with the Kyoto Protocol (see below)

Local governments also pursue small-scale solutions for decentralized electricity supply for longhouses, villages and schools, , primarily solar, diesel generation, battery storage and wind turbines. In the Eighth Malaysia Plan, the government wanted to introduce renewable energy as the fifth fuel (adding to oil, natural gas, hydropower and coal), in particular biomass, biogas, municipal waste, solar, minihydro, and wind, with the objective that 5 percent of the electricity supply in 2005 come from renewable energy (compared to less than 1 percent in 2000). The Ninth Malaysia Plan has a target of 350 MW of electricity being generated from the renewable energy.

## Energy Efficiency

In the previous five-year plan (2001–2005) the government decided that the promotion of energy efficiency should be done through targeted programs on industrial and commercial sectors, enforcement of energy efficiency regulations, extension of financial and fiscal incentives, demonstration projects and energy-efficient management of integrated complexes. The government has in addition to this implemented a program to improve energy efficiency in eight industrial manufacturing subsectors: wood, pulp and paper, iron and steel, cement, rubber, glass, ceramic, and food.

Driving energy efficiency in future—renewable energy in particular—will be Malaysia's aspirations to reduce greenhouse gas emissions. The prime minister agreed at the December 2009 Copenhagen Climate Change meetings to reduce per capita greenhouse gas emissions by 40 percent. Officials point out that the commitment of reducing greenhouse gases in Malaysia is conditional on receiving adequate financing and transfer of technology from developed countries, because Malaysian officials believe Malaysia does not possess the appropriate technology. According to Ministry of International Trade and Industry, the commitments have not had an impact on the local economy yet but they will soon. In practice, the energy efficiency business is emerging mostly as a consulting business in its initial phase in Malaysia.

## Clean Development Mechanism

According to the United Nations Framework Convention on Climate Change (UNFCCC) secretariat project database, 93 Clean Development Mechanism (CDM) projects have been filed in Malaysia as of July 2010, for a total of 6,320,000 Certified Emission Reductions (CERs) in metric tonnes of CO<sub>2</sub> equivalent per annum (as stated by the project participants). In addition, as of July 2010, a total of 83 energy efficiency projects in Malaysia were registered with CDM Executive Board. Five energy efficiency projects were issued with CERs, totaling 723,916 tonnes of carbon dioxide equivalent through four palm industry projects and one cement industry project. Typical CDM projects involve a foreign sponsor or engineering consulting firm that identifies a potential emission reduction, arranges financing,

design and construction of a project, and then benefits from the sale of the emission credits on the European market. Most common CDM projects in Malaysia have been biomass energy, biogas, composting and methane recovery in wastewater. Most common investor nations have been Denmark, Netherlands, Japan, United Kingdom, Switzerland and Germany.

## Other Growth Sectors

The government of Australia and Austrade have identified the following sectors in Malaysia as offering the best opportunities for growth:

- Supply of wastewater treatment systems, monitoring equipment, wastewater recycling equipment, sludge dryers and industrial purification systems.
- Supply of municipal sewerage treatment plant and equipment to Indah Water Konsortium and developers that IWK contracts with. Demand by IWK is for new sewerage treatment parts such as pumps, aerators, mixers, filters, screens and water monitoring equipment.
- Waste minimization technologies, hazardous waste recycling and disposal (toxic metal and low radioactive sludge, medical waste) and bioremediation technologies.
- Oil reclamation technology to recover used oil from industries and ship-based sludge.
- In air quality, vehicle emission monitoring equipment, industrial air scrubbers, stack emission analyzers and control equipment, dust collectors, indoor air pollution control systems and air monitoring equipment on power generation stations and boiler plants.
- Environmental auditing, management systems and, to a lesser degree, impact assessments. Risk analysis, a new requirement for environmental impact assessment associated with petroleum and chemical industries, is being undertaken by foreign firms because of the scarcity of skilled personnel in country.
- Privatization of solid waste management should provide opportunities to supply leading-edge technologies, equipment and landfill services. Opportunities also exist for small and medium-sized municipal waste incinerators, waste recycling and composting, landfill design and landfill leachate treatment services.

## 8. Environmental Market Drivers

Environmental companies were asked: “Please rate the impact of the following market drivers in 2010 on your company's ability to generate revenues in the environmental business in Malaysia.” during the environmental industry survey conducted for this report. Figure 19 shows the ranking of the responses.

### Figure 19

*Top Environmental Market Drivers in Malaysia in 2010*

| Market Driver   | Most Important | Very Significant | Significant | Not Significant | Meaningless |
|---|----------------|------------------|-------------|-----------------|-------------|
| Enforcement of federal environmental laws and regulations         | 56%            | 19%              | 13%         | 0%              | 13%         |
| The state of the economy  | 35%            | 24%              | 35%         | 6%              | 0%          |
| Federal government budgets  | 25%            | 50%              | 13%         | 13%             | 0%          |
| International standards of multinational corporations             | 19%            | 38%              | 31%         | 6%              | 6%          |
| Municipal and state budgets                                       | 19%            | 31%              | 31%         | 6%              | 13%         |
| New programs to develop green technology                          | 13%            | 13%              | 56%         | 19%             | 0%          |
| Media coverage of environmental issues                            | 7%             | 20%              | 60%         | 13%             | 0%          |
| International development funds or bank funding                   | 13%            | 19%              | 31%         | 38%             | 0%          |
| CDM projects or generation of CERs                                | 6%             | 31%              | 25%         | 19%             | 19%         |
| International pressure relating to environment and climate change | 0%             | 47%              | 18%         | 18%             | 18%         |
| Domestic public pressure and environmental NGO activity           | 0%             | 19%              | 63%         | 19%             | 0%          |
| Partnership with foreign environmental firms                      | 6%             | 19%              | 31%         | 38%             | 6%          |
| Regional agreements through APEC, ASEAN, etc.                     | 0%             | 13%              | 44%         | 31%             | 13%         |

Source: Malaysia Environmental Industry Survey 2010.

Enforcement of federal environmental laws and regulations ranked as by far the most important market driver for environmental companies and, as seen in the comments below, many companies believe this is still inadequate.

## Department of Environment

The Environmental Quality Act (EQA) was passed in 1974 and the enforcement agency now known as Department of Environment was institutionalized in 1975. In 2010, the Department of the Environment has 1,568 full-time staff members, extending its operation through 15 state offices and 26 branch offices. The department's main role is to prevent, control and abate pollution through the enforcement of the EQA and its 34 subsidiary legislative acts.

## Ministry of Energy, Green Technology and Water

In the middle of 2010 the new Green Technology Sector program under the Ministry of Energy, Green Technology and Water had 32 staff members. The ministry itself had 783 staff members divided into the three areas—energy, green technology, and water.

The Energy office is divided into energy supply and sustainable energy, which is divided into renewable energy and energy efficiency. Green technology is divided into policy and development and regulations. Technical and regulating bodies oversee each sector for

example, the national energy supply company TNB (Tenaga Nasional Berhad), the Energy Commission (the regulator), the Malaysian Green Technology Center (the technical arm of the ministry in green technology) and the Water Commission (regulators of the water industry in Peninsular Malaysia).

The cabinet recently approved a new body, the Sustainable Energy Development Authority (SEDA), whose primary task is to oversee the upcoming Feed in Tariff (FiT) system that guarantees a higher long-term purchase price for power generated from renewable sources. Besides monitoring the FiT system, SEDA has the following functions:

- Promote and implement national policy objectives for renewable energy
- Promote private sector investment in sustainable energy sector; and
- Act as a focal point on matters relating to energy.

The sector program that oversees renewable energy and energy efficiency has identified several areas for development: solar panels, biomass, building efficiency, and water and waste management systems. The contribution of the various sectors of green technology to gross national income (GNI) is expected to reach RM 2.3 billion in 2020. The government also acknowledges that energy-efficiency programs will create significant savings.

The new National Green Technology and Climate Change Council is chaired by the prime minister. The council has working committees that undertake specific tasks in the promotion and development of green technology. There is also a Green Technology Financing Scheme (GTFS), which provides soft loans to producers and users of green technology. Producers may apply for no more than RM 50 million and users no more than RM 10 million. As of July 29, 2010, 43 projects of a total of 60 applications have been approved in four sectors: energy, water and waste management, building and transportation. The total cost of projects eligible for GTFS is RM 1.1 billion. The number of projects [that have](#) applied to date is 60 exceeding the annual target of 40, which shows industries' keen interest in participating.

## General Investment Environment and Trade Barriers

The Malaysian government has a generally favorable attitude toward foreign investment, especially regarding projects that facilitate technology transfers, create high-skilled jobs and contribute capital to the economy. New ventures in the manufacturing sector may be 100 percent foreign-owned, the services and financial sector is being liberalized and capital controls on overseas investments have been relaxed. However, the government's commitment to opening the economy, which has been accelerated under current leadership, is applied unevenly according to trade analysts at Industry Canada. Any FDI that seeks to acquire assets in Malaysia including ownership of businesses without giving clear benefit to Malaysians will be actively discouraged. Moreover, all industrial projects must be approved by the Malaysian Industrial Development Agency (MIDA) which has lately stopped granting approvals in what it views as low-productivity industries.

According to the U.S. Commercial Service, depending on how it is defined in the product description, environmental equipment can attract taxes and duties of between 0 – 10 percent depending on classifications of goods under the Harmonized Standard codes. They acknowledge that present HS classification makes it tricky to give a trade preference to 'relatively' friendlier products especially if product remains the same except for when the embedded technology changes.

There are no significant trade barriers to the import of environment-related equipment and accessories to Malaysia, according to Austrade. Most goods can be imported under an open general license, although some may require specific import licenses. Import duties and tariff rates are in accordance with the Malaysian Trade Classification and Custom Duties Order. The ASEAN–Australia–NZ FTA implemented on 1 January 2010, has also resulted in the reduction of tariffs on a number of environmental merchandise items for the parties to the agreement.

The World Bank lists the following data for Malaysian Trade:

**Figure 20**

*World Bank List Imports*

|   |               |
|---|---------------|
| Average bound tariff:                     | 18.7%         |
| Average applied tariff:                   | 11.07%        |
| 2009 domestic imports                     | \$1.6 billion |
| 2005–009 % import growth                  | 24%           |
| Average annual import growth (since 2005) | 4%            |

Source: World Bank

**Figure 21**

*MFN Applied Average Tariffs on Renewable Energy Equipment*

| HS Code   | Tariff |
|---|--------|
| 853710—Photovoltaic system controller   | 7.5%   |
| 854140—Photovoltaic cells, modules and panels   | 0%     |
| 900190—Solar concentrator systems   | 0%     |
| 841950—Heat exchangers for use in renewable energy systems; Heat exchange units, whether or not electrically heated | 12.5%  |
| 848340—Gearboxes for wind turbines  | 5%     |

Source: World Bank

## 9. Investment and R&D Summary

This section offers a characterization of domestic investment in technology and human resources in the EGS industry in Malaysia.

Environmental R&D in Malaysia has only recently been elevated in priority by the Malaysian government. In general, environmental companies believe there has not been much in the way of support or specific programs to assist them. The government is taking measures to assist industries in moving toward green industry. Industry associations are invited to workshops, seminars, exhibition and forums organized by NRE, KeTTHA and other relevant ministries and agencies. The objective of the programs is to enhance the awareness of industries in promoting low-carbon power sources and resource efficiency in all industrial sectors.



Independent companies in more traditional EGS segments feel that responsibility for R&D is left entirely to them, although some acknowledge an awareness of government programs like Sirim, or universities. Government policy to establish sizable companies in water, wastewater treatment and waste management and allowing these companies operational freedom to invest for their future has created R&D initiatives of some substance in some of these companies.

For the Malaysia Environmental Industry Survey 2010 conducted for this report, environmental companies were asked: “How do you view the state of domestic research and development in environmental technology or any specific subsectors? Who is leading this effort and is the level of priority, effort and investment increasing notably?”. The open-ended question allowed respondents to comment openly on the state of environmental R&D, and few comments were positive. Figure 22 presents selected responses.

### Figure 22

#### *Opinions on Environmental R&D by Malaysian Environmental Companies*

- 
- “Most R&D in environmental technology are not well coordinated. R&D on energy efficiency and green technology sub-sector will be prioritized under the new national economy plan. R&D effort has been primarily led by local research institutions with minimum private involvement.”
  - “Domestic development is all given to copies of old technologies. New technology in Malaysia is run privately or abandoned through lack of funds for NEW research.”
  - Environmental R&D “is still lacking. Universities should lead.”
  - “R&D has been lagging. The New Economic Model and Tenth Malaysia Plan aim to tackle this issue and promote R&D.”
  - Environmental R&D is “VERY VERY slow. Most development is done by private companies with their own funds.”
  - “There does not seem to be any real leaders, and effort seems to come from enlightened individuals who start to build up their business themselves with help of relatives and friends. When of sufficient size (SME) they may start to work with local universities or research institutes like SIRIM. Government agencies like MIDA have been found to be helpful. Recently with creation of Ministry of Energy, Green Technology and Water, there has been more effort and investments geared towards green technologies, but still not significant yet.”
- 

## Profile of SIRIM

SIRIM Berhad is wholly owned by the Malaysian government under the Ministry of Finance and has over 40 years of experience as the government’s mandated machinery for research and technology development. SIRIM focuses on discovering and developing new technologies to help businesses compete better through quality and innovation.

One SIRIM program focuses on industrial wastewater. About 90 to 95 percent of the volume of industrial wastewater originates from food and beverage processing, industrial chemicals and products, and textile plants or dye mills. The major polluters are small- to medium-scale industries (SMIs). The SMIs have been encouraged to adopt cleaner technologies in their production processes. To increase general environmental awareness among SMIs, SIRIM is intensifying efforts to collect and disseminate information on cleaner technologies. Training



programs such as environmental costing, auditing, reporting, lifecycle assessments and ISO 14001 will be conducted to encourage firms to adopt companywide environmental management practices.

SIRIM's Environmental Technology Research Centre offers a new management process for minimizing the ecological impacts of economic production while enhancing the competitiveness of firms. The center works with the Renewable Energy Research Centre to develop renewable energy sources and recyclables as feedstock materials for use in biomass boilers. Focus areas are environmental management technology; green label schemes development; and waste management.

## **R&D Efforts of Malaysian Palm Oil Board**

Palm oil is a significant export from Malaysia, and its environmental footprint has increasingly come under scrutiny. The Malaysian Palm Oil Board has undertaken several upstream research projects for studying greenhouse gas emissions from oil palms cultivated on peat. These projects involve measuring CO<sub>2</sub> emissions from soil surface using chamber techniques and palm canopies using an eddy covariance system. The Tropical Peat Research Institute (TROPI) was established in 2008 to undertake and supervise these projects. Local staff were recruited and trained to collect the measurements using internationally accepted methodologies. Some of these projects involve long-term measurements up to five years in duration for investigating seasonal, annual, and interannual variations in CO<sub>2</sub> emissions. Information from these studies will help the oil palm industry and Malaysian government to rebut NGO allegations, mitigate issues involving CO<sub>2</sub> emissions, conserve biodiversity and encourage responsible production of palm oil from peat and mineral soils.

## **R&D Statement by CEO of Indah Water Konsortium**

The following are comments from the CEO of Malaysia's largest wastewater services provider.

“We have strategies to turnaround IWK into a long-term entity that is less dependent on Government's financial assistance and to transform the business from a utility to resource base. IWK is also in the process of using microbes to optimise our sewage treatment processes... We will soon embark on bio-technology and nano-technology. Efforts have been put in place to utilise the three key by-products from our sewage treatment plants – bio effluent, bio gas and bio solids – and convert them into environmentally safe products... This is in line with the Government's green technology and zero waste management initiatives. IWK will also patent its products for the sewerage industry and offer expertise and services abroad. IWK aims to be a leading regional water entity within the next five years.”

*Abdul Kadir Mohd Din, CEO of Indah Water Konsortium Sdn Bhd*

## **U.S. Commercial Service Opinion on R&D and Competitiveness of Malaysian Water Equipment Firms**

The following are comments from a U.S. Commercial Service Officer. “The small size of the Malaysian firms restricts their ability to invest in Research and Development (R&D) and develop a large marketing network. Being relatively new firms, they are at a disadvantage in competing with mature multinationals or in winning contracts for large projects. However local manufacturers can offer

equipment at a lower price thanks to drastic cuts in terms of overheads such as insurance, shipping costs, and overseas handling fee. The deployment of innovative strategies such as fast product delivery, onsite maintenance, inventory management and most critically the ability to provide fast on-site trouble shooting and problem solving to their clients”

*U.S. Commercial Service*

## Opinions on Domestic Education and Training for Environmental Industry Personnel

As part of the Malaysia Environmental Industry Survey 2010 conducted for this report, environmental companies were asked, “What percentage of your technical staff were educated abroad and do you believe domestic educational institutions are producing an adequate supply of engineers, scientists and trained officials to [do] environmental jobs in government and the private sector today?” Responses to this question varied considerably, most notably by segment. Manufacturing companies in general hired mostly locally educated technical staff. In addition environmental testing labs and monitoring services firms used almost all local technical talent. In consulting & engineering and energy development, the majority of technical staff was educated overseas. Figure 23 gives some selected responses (the percentages indicate technical staff educated or trained abroad):

- 
- Figure 23  
*Opinions on Domestic Education and Training for Environmental Industry Personnel*
- “<1 percent of our staff is educated abroad. The domestic universities and colleges do provide staff with sufficient technical skills.”
  - “10 percent. Domestic training is not adequate in terms of quality, however.”
  - “30 percent of our staff has an overseas degree. The quality of graduate engineer/scientist produced by domestic educational institutions is not consistent.... A good local hire is hard to come by.”
  - “80 percent are trained abroad. Local institutions are not producing enough capable graduates in the field.”
  - “Our engineers educated abroad number about 66 percent... domestic educational institutions are not really producing what we need as the institutions lack the expertise.”
  - “50 percent. Malaysia has a very good education system, but the culture of work is lazy. We have lots of graduates trained in information, equipments and research, but no energy in working with industries.... From my work in Taiwan, we saw companies work with an institute or university and have it help by industries sharing their knowledge, equipment and manpower. As the result, both the industries grow and the institute learned.”
  - “None for basic education, but I spent 3 months attached to Singapore Air Pollution Unit early when in government service, and have traveled abroad for meetings, conferences, etc. So I believe domestic educational institutions can provide an adequate basic supply, but it is important that there is exposure to foreign technologies/ideas brought in by expatriate teachers/trainers contracted to these local institutions, and/or that there are opportunities for oversea training/ attachment or overseas assignments for the same purpose.”
- 

“<1 percent of our staff is educated abroad. The domestic universities and colleges do provide staff with sufficient technical skills.”

“10 percent. Domestic training is not adequate in terms of quality, however.”

“30 percent of our staff has an overseas degree. The quality of graduate engineer/scientist produced by domestic educational institutions is not consistent.... A good local hire is hard to come by.”

“80 percent are trained abroad. Local institutions are not producing enough capable graduates in the field.”

“Our engineers educated abroad number about 66 percent... domestic educational institutions are not really producing what we need as the institutions lack the expertise.”

“50 percent. Malaysia has a very good education system, but the culture of work is lazy. We have lots of graduates trained in information, equipments and research, but no energy in working with industries.... From my work in Taiwan, we saw companies work with an institute or university and have it help by industries sharing their knowledge, equipment and manpower. As the result, both the industries grow and the institute learned.”

“None for basic education, but I spent 3 months attached to Singapore Air Pollution Unit early when in government service, and have traveled abroad for meetings, conferences, etc. So I believe domestic educational institutions can provide an adequate basic supply, but it is important that there is exposure to foreign technologies/ideas brought in by expatriate teachers/ trainers contracted to these local institutions, and/or that there are opportunities for oversea training/ attachment or overseas assignments for the same purpose.”

*Source: Malaysia Environmental Industry Survey 2010: Selected responses provided to illustrate key issues. What percentage of your technical staff were educated abroad and do you believe domestic educational institutions are producing an adequate supply of engineers, scientists and trained officials to environmental jobs in government and the private sector today?*

## **10. Conclusion and Malaysian Companies’ Suggestions of Initiatives for EGS Industry Support by Malaysian Companies**

As part of the Malaysia Environmental Industry Survey 2010 conducted for this report, environmental companies were also asked, “What could the Malaysian government, international organizations or domestic trade organization do to make business better for you or make the Malaysian environmental industry more competitive?” In fairness to existing and future government programs, these comments were collected from private companies. It bears keeping in mind that because responses were given to a question asking what could be done better, they are unlikely to emphasize the positive.

After reviewing the private company responses, Malaysian government officials were given the opportunity to provide information on specific government programs that are underway and these are included below and are listed specifically in reference to some of the noted comments from the survey.

Figure 24 gives selected responses to the survey question

## Survey Responses

### Figure 24

*Selected Responses to Survey Question on What Can Be Done to Make Business Better or the Malaysian Environmental Industry More Competitive*

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|  |   |
|--|---|
| <ul style="list-style-type: none"> <li>1) Effective enforcement 2) Subsidies/grants to export services overseas 3) Transparent bidding process</li> <li>• Local government MUST encourage/enforce local user industries, development projects, automotives, end users to use “Malaysia Made” and “GREEN” products as the way to positively create local demand. 2. Malaysia GREEN standard to enhance products acceptant to local and export market. 3. Incentive rebate or Tax exempted to Exporter/Importer as products promotion. 4. Profit rebate on waste raw material purchase to reduce the end products cost for better market competition.</li> <li>• The expedite Revision of Clean Air Regulations and increase enforcement 2. Have specific plans to achieve 40 percent CO2 reduction target 3. Remove subsidy on price of gas to industry and power generation</li> <li>• Assist local companies to make local Renewable energy products at lower cost and increase tax on Chinese imported goods of the same type made locally.</li> <li>• Ensure policy are executed as planned not just WORDS and WORDS....too much talk and very little action or implementation</li> <li>• Environmental laws enforcement and tax incentive for investment on environmental projects *</li> <li>• More grants and incentives for SMEs</li> </ul> <p>More transparency in awarding projects based on merit, not merely on cost alone.</p> | <ul style="list-style-type: none"> <li>• New laws and enforcement on existing laws</li> <li>• Practice open tender rather than direct award</li> <li>• Provide more user-friendly financial support, technology support and infrastructure to enable SMEs to develop more capacity for generating green goods and services for both local markets and for export.</li> <li>• Streamline requirements for environmental compliance and disseminate the information of new laws and regulations effectively.</li> <li>• Stronger/stricter enforcement of regulations. Tax rebates for installing waste plants. Promote exports by Malaysian environmental companies.</li> <li>• 1. Revision of Clean Air Regulations expected to impose stricter limits 2. High level focus on Green Technology 3. Political “openness” will encourage NGOs to highlight environmental issues 4. Commitment made by PM on reduction of CO2 by 40 percent to GDP intensity.</li> <li>• Government active participation in reducing emission and enforcement of laws and new strict laws governing building emission reduction.</li> <li>• Bio waste is one of the best potential businesses, but there is not a very clear policy or plan. In building, there is no effective enforcement on GBI products. For exporting, there should be a Malaysia GREEN label to support green products, Bio composite and timber products. ****</li> </ul> |
|--|---|

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## Malaysian Government Programs

Malaysian Government Programs related to Figure 24 are detailed in the following section.

### Financial Incentives

The government has provided the following fiscal incentives to promote environmental management:

- Energy conservation
- Energy generation activities using renewable energy resources
- Generation of renewable energy for own consumption
- Forest plantation projects
- Waste recycling activities

- Storage, treatment and disposal of toxic and hazardous wastes
- Accelerated capital allowance for environmental management
- Exemption from import duty and excise duty on hybrid cars
- Natural gas for vehicles.
- Green Technology Financing Scheme: A foreign equity limit has been imposed to ensure that local industries benefit from the GTFS for capacity development.

### **Small and Medium Enterprises (SMEs)**

The Government has taken several initiatives to enable SMEs to develop capacity for generating green goods and services. The National Green Technology Policy includes the following goals:

- Increase production of local green technology products
- Expand SMEs on green technology into the global market
- Expand green technology applications to most economic sectors
- Malaysia becomes a major producer of green technology in the global market.

### **Green Business**

The agreed objectives or “Terms of Reference” for Malaysia’s Working Committee on Green Technology and Climate Change (Industry) chaired by Ministry of International Trade and Industry are as follows:

- Enhance the awareness of industries in promoting low carbon and resource–efficiency in all industrial sectors
- Promote investments and financing in low-carbon and resource-efficient industries, including services sector through specific incentives
- Foster greater market access of ecofriendly products and services from Malaysia through export promotions
- Encourage the adoption of strategies and plans to promote green technology
- Intensify international cooperation in the development and transfer of green technology
- Conduct monitoring and evaluation of the strategies and plans on green technology and climate change.

### **Green Labeling**

Budget has been allocated under the Ministry of Energy, Green Technology and Water for the development of green technology labeling, rating and standards. A pilot program is targeting the establishment of a National Green Procurement Policy (GPP), to establish the infrastructure and to contribute to the capacity building required to support GPP and an ecolabeling program. SIRIM has a scheme on ecolabeling and has been developing ecolabel criteria documents and providing certification to companies.

### **GHG Programs in the Palm Oil Industry**

The Malaysian Palm Oil Board has undertaken several upstream research projects for studying greenhouse gas (GHG) emissions from oil palms cultivated on peat. These involve measuring CO<sub>2</sub> emissions from soil surface using chamber techniques and palm canopies

using Eddy Covariance System. The Tropical Peat Research Institute (TROPI) was established in 2008 to undertake and supervise these projects. Local staff were recruited and trained to collect the measurements using internationally accepted methodologies. Some of these projects involve long term measurements up to 5 years in duration for investigating seasonal, annual and interannual variations in CO<sub>2</sub> emissions. Information from these studies will help the oil palm industry and Malaysian Government to rebut NGO allegations, mitigate issues involving CO<sub>2</sub> emissions, conservation of biodiversities and responsible production of palm oil from peat and mineral soils.