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Clean Technology Sector

MALAYSIA

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TABLE OF CONTENTS

1. Industry Overview.....	2
1.1 Environment & Water Sector.....	2
1.2 Renewable Energy, Green Building & Energy Efficiency Sector	3
2. Government Position Towards Clean Technology Sector	5
2.1 Institutional Framework	5
2.1.1 Department of Environment.....	5
2.1.2 Ministry of Energy, Green Technology and Water.....	5
2.1.3 Sustainable Energy Development Authority	5
2.1.4 National Green Technology Council.....	5
2.2 Government Initiatives	6
2.2.1 Policy.....	6
2.2.2 Target.....	6
2.2.3 Fiscal Incentives & Investment	7
3. Leading Industry Players.....	9
4. Market Potential & Business Opportunities	12

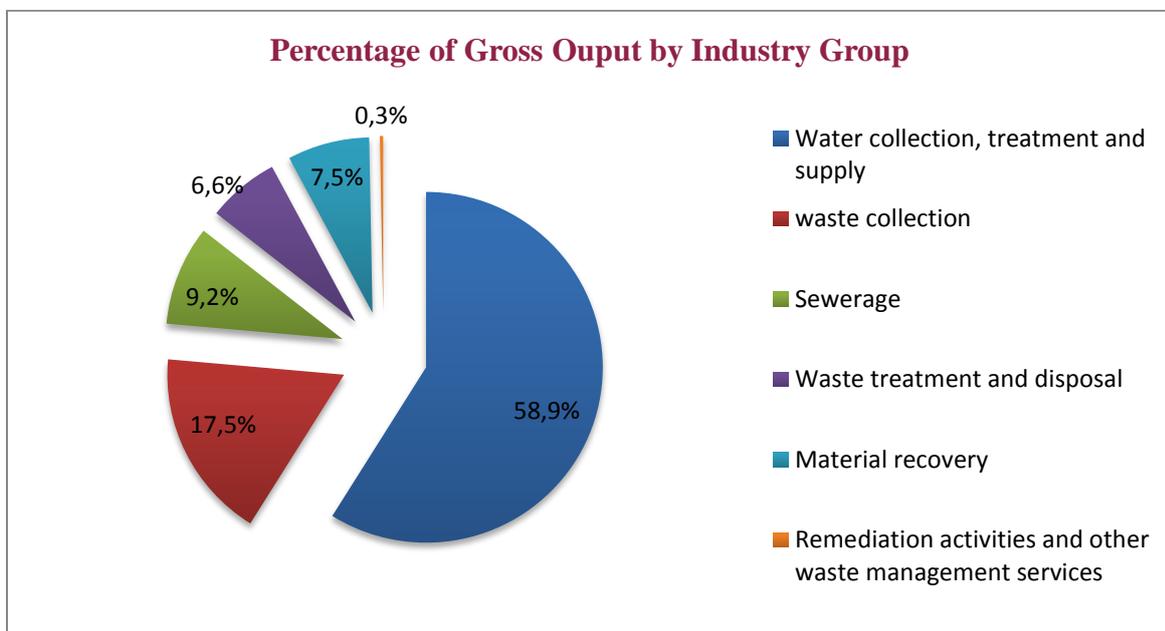
1. INDUSTRY OVERVIEW

Malaysia ranked 51st out of 178 examined countries in the 2014 Environmental Performance Index¹. Its clean technology sector can be divided into: 1) core environment & water segments involved in air pollution & waste management and in water management & water supply; 2) emerging segments related to renewable energy, green building and transportation, as well as energy efficiency.

According to a study co-carried out by USAID² and APEC³ as well as the «Economic Census 2011» published by the Department of statistics of Malaysia, the cleantech sector in Malaysia generated RM 11,61 billion (€2,63 billion) in 2010, accounting for 2,1% of its gross domestic product (GDP).

1.1 ENVIRONMENT & WATER SECTOR

As of the end of 2010, the value of gross output generated by environment and water sector amounted to RM 7,85 billion (€1,78 billion), making up 1,38% of Malaysia's GDP, with water collection, treatment & supply contributing to 58,9%, with waste collection 17%, with sewerage 9,2%, and with waste treatment & disposal, material recovery and remediation activities in total 14,4%. In the meantime, the environment and water sector employs 29.710 persons.



Source: Department of Statistics, Malaysia, «Economic Census 2011: Water Supply, Sewerage, Waste Management and Remediation»

¹ Source: <http://epi.yale.edu/epi/country-profile/malaysia>

² U.S. Agency for International Development

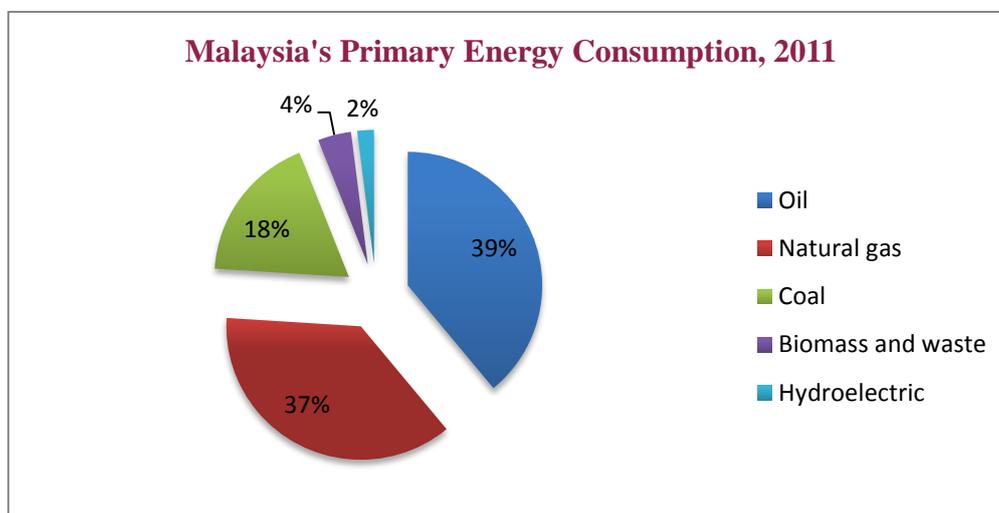
³ Asia-Pacific Economic Cooperation

In particular, Malaysian environmental consulting and engineering firms have evolved rapidly in the past decade, giving rise to a RM 300-400 million (€68-90,7 million) market with nearly 300 companies involved.

1.2 RENEWABLE ENERGY, GREEN BUILDING & ENERGY EFFICIENCY SECTOR

With RM 3,76 billion (€854,29 million) value of gross output, the renewable energy, green building and energy efficiency sector contributed to 0,72% of Malaysia's GDP as of the end of 2010.

By 2011, 4,7% of Malaysia's total energy consumption could be attributable to biomass, biogas and waste ⁴, with biomass and waste alone accounting for 4% ⁵.



Source: U.S. Energy Information Administration

It is estimated that by 2020 the renewable energy sector will generate at least RM 70 billion (€15,88 billion) worth of revenue for the private sector that will translate into tax revenue of at least RM 1,76 billion (€399,14 million) for the government, creating over 50.000 jobs from the construction, operation and maintenance of renewable energy plants. ⁶

Renewable Energy Sector Outlook by 2020

Industry Revenue	At least RM 70 billion (€15,88bn)
Tax Revenue	At least RM 1,76 billion (€399,14bn)
Employment	At least 50.000 Jobs

⁴ Source: World Bank, "Combustible renewables and waste (% of total energy)"

⁵ Source: U.S. Energy Information Administration, Country Analysis, Malaysia, 2013

⁶ Source: The German Chamber Network, «Market Watch 2012-The Environmental Sector »

In addition, according to the Ministry of Energy, Green Technology & Water of Malaysia, the Green Township Guideline was announced in 2009 for the development of Putrajaya and Cyberjaya as green cities serving as a showcase for other green townships in the country, involving programs such as green gas reduction as well as energy and water usage saving in public buildings.

Furthermore, an infrastructure roadmap for the use of electric vehicles has been established in Malaysia, starting with projects such as vehicle Fleet Test conducted in Putrajaya by PROTON, a Malaysian automobile manufacturer.

2. GOVERNMENT POSITION TOWARDS CLEAN TECHNOLOGY SECTOR

2.1 INSTITUTIONAL FRAMEWORK

2.1.1 DEPARTMENT OF ENVIRONMENT

Malaysia's Department of Environment was institutionalized in 1975 as the enforcement agency of the Environment Quality Act.

2.1.2 MINISTRY OF ENERGY, GREEN TECHNOLOGY AND WATER

Ministry established in April 2009 during the cabinet reshuffle in an effort to develop Malaysia's green technology sector.

2.1.3 SUSTAINABLE ENERGY DEVELOPMENT AUTHORITY

Its primary work is to oversee the Feed in Tariff (FiT)⁷ system that guarantees a higher long-term purchase price for power generated from renewable sources.

2.1.4 NATIONAL GREEN TECHNOLOGY COUNCIL

The Council is a high level coordination forum for government ministries, agencies, as well as private sectors chaired by the Prime Minister and has working committees that undertake specific tasks in the promotion and development of green technology.

⁷ It is a system that allows solar system home owners to sell back generated electricity to Tenaga Nasional Berhad (TNB) at higher rate/tariff. This generates additional monthly income to the user which in return makes solar system in Malaysia a great return on investment.

2.2 GOVERNMENT INITIATIVES

2.2.1 POLICY

Policy statement: “Green Technology shall be a driver to accelerate the national economy and promote sustainable development.”

Four pillar sectors identified by Malaysian government are:

- **Energy sector:** *Application of Green Technology in power generation and in the energy supply management by the industrial and commercial sectors; Application of Green Technology in all energy utilization sectors and in demand side management programs*
- **Building sector:** *Adoption of Green Technology in the construction, management, maintenance and demolition of buildings*
- **Water & Waste management sectors:** *Adoption of Green Technology in the management and utilization of water resources, waste water treatment, solid waste and sanitary landfill*
- **Transportation sector:** *Incorporation of Green Technology in the transportation infrastructure and vehicles, in particular, biofuels and public road transport*

National Green Technology Policy launched by the Prime Minister of Malaysia in 2009 includes:

1. Strengthen the institutional framework
2. Provide a conducive environment for green technology development
3. Intensify human capital development in green technology
4. Intensify green technology research and innovations
5. Promotion and public awareness

2.2.2 TARGET

During the 2009 Copenhagen Climate Change Conference, the Prime Minister of Malaysia announced its target to reduce carbon emission up to 40% in terms of emission intensity of GDP by 2020 compared with its 2005 level.

Specifically, for renewable energy sector, the government approved the Renewable Energy Policy and Action Plan in April 2010, followed by the Renewable Energy Act and Sustainable Energy Development Authority Act approved by parliament in 2011.

As set out under such policies, Malaysia envisions renewable capacity excluding that of large hydroelectric plants to grow from 219 MW in 2011 to 985 MW by 2015, accounting for 5,5% of electricity capacity compared to its 1% in 2012, to 2.080 MW by 2020, as well as to about 3.000 MW by 2030.

Renewable sources electricity generation capacity:



In addition, the government aims to increase the recycling quota from 5% in 2011 to 40% in 2020, as the Solid Waste and Public Cleansing Act 2007 came in force fully and the privatization of waste management was finalized in 2011. This process was accompanied by numerous liberalization initiatives, such as that 100% foreign equity is allowed for incineration services since 2012 and that foreign equity not exceeding 51% is allowed for other sectors such as waste water management and solid waste disposal services.

2.2.3 FISCAL INCENTIVES & INVESTMENT

According to the Ministry of Energy, Green Technology and Water, the government of Malaysia offers attractive fiscal incentives to encourage the generation of renewable energy and the adoption of energy efficiency initiatives amongst energy producers and users in Malaysia, incorporating four major guidelines: 1) Tax incentives for energy generation activities using renewable energy resources; 2) Tax incentives for companies providing energy conservation services; 3) Tax incentives for companies investing to conserve own energy use; 4) Tax incentives for building obtaining green building index certificate.

For instance, in green transportation sector, incentives including reduction of road tax and of import duty (100% exemption on import duty for franchise holders of hybrid) as well as sales tax exemption on kits and necessary components have been adopted in order to increase the amount of gas driven vehicles and hybrid cars.

Notably, the **Green Technology Financing Scheme (GTFS)** for 2011-2015 launched by the Prime Minister of Malaysia signifies its effort to improve the supply and utilization of Green Technology. The scheme could benefit companies who are producers of green technology with an amount no more than RM 50 million (€11,34 million) and users with an amount not exceeding RM 10 million (€2,27 million).

As a sign of commitment, the Government will bear 2% of the total interest/profit rate and will provide a guarantee of 60% on the financing amount via Credit Guarantee Corporation Malaysia Berhad (CGC), with the remaining 40% financing risk to be borne by participating financial institutions (PFIs). The scheme is expected to provide benefits to more than 140 companies of which the application will be open starting from 1st January 2010.

Green Technology Financing Scheme of Malaysia for 2011-2015:

- RM1,5 billion (€340 million) soft loan
- Up to RM50.0 million (€11,34 m) for producers and RM10.0 million (€2,27 m) for users of green technology
- 2% interest subsidy by the government
- 60% government guarantee
- 140 companies are expected to benefit from the scheme

By the end of April 2014, 308 company projects ranging from clean energy, water & waste management, green building to green vehicles have been certified by GTFS, with an approved value of RM 1,89 billion (€423,39 million).⁸

For instance, to address water shortages in the Kuala Lumpur region, the government is investing in programs for the purpose of water resources protection, rainwater harvesting and groundwater development. In 2012, the government plans to invest RM50 million (€11,34 m) to expand rainwater harvesting program to Sabah⁹ and RM 400 million (€90,75 m) to upgrade water supply infrastructure in selected Felda¹⁰ areas.

Furthermore, under the Renewable Energy Act issued during the 10th Malaysian Plan (2011-2015), Malaysia introduced a Feed-in Tariff for solar, biomass, biogas, and mini-hydro projects, which was implemented in December 2011 with an aim to ensure long-term clean energy supply by ensuring that the electricity produced by renewable energy generators can be sold and profitable.

⁸ Source: Ministry of Energy, Green Technology and Water, Malaysia

⁹ Easternmost state of Malaysia

¹⁰ Malaysia's largest agro-based company and the largest plantation operator

3. LEADING INDUSTRY PLAYERS

Leading players in environment industry are as follows:

ENVIRONMENT INDUSTRY	LEADING COMPANIES
Environmental consulting	<ul style="list-style-type: none"> - ERM (U.S.), CH2M Hill (U.S.), ENVIRON (U.S.) - ERE, Green Edge Consult, Enviro Asia Sdn Bhd, Environmental Science Sdn. Bhd., Alam Sekitar Malaysia Sdn Bhd, Europasia Engineering Services Sdn Bhd (Malaysia)
Environmental engineering	<ul style="list-style-type: none"> - SMHB Sdn Bhd, HSS Integrated Sdn Bhd, Ranhill Bersekutu, Miconsult, SP Multitech Sdn Bhd (Malaysia)
Air pollution control equipment	<ul style="list-style-type: none"> - ALSTOM Asia Pacific Sdn Bhd (France), Mitsubishi Heavy Industries (Japan) - Lurgi Sdn Bhd, Hitachi Asia Sdn Bhd (Malaysia)
Solid waste management	<ul style="list-style-type: none"> - ALAM Flora Sdn Bhd¹¹, SWM Environment Sdn Bhd¹² (Malaysia)
Scheduled or hazardous waste management	<ul style="list-style-type: none"> - Kualiti Alam Sdn Bhd, Trinekens Sdn Bhd, Meridian World Sdn Bhd (Malaysia)
Medical waste management	<ul style="list-style-type: none"> - Faber Medi–Serve Sdn Bhd¹³, Radicare Sdn Bhd¹⁴, Pantai Medinvest Sdn Bhd¹⁵ (Malaysia)
Chemical waste management	<ul style="list-style-type: none"> - Chemquest Group (Malaysia)

¹¹ ALAM Flora Sdn Bhd is the largest solid waste management company in Malaysia operating in the Central and Eastern Regions of Peninsular Malaysia

¹² SWM Environment Sdn Bhd is a major solid waste collection and management services provider in the states of Johore, Malacca and Negeri Sembilan providing an integrated waste management service

¹³ Serves hospitals and clinics in the states of Perlis, Kedah, Penang, Perak, Sarawak and Sabah

¹⁴ Mostly active in Kuala Lumpur, Putrajaya, Kelantan, Pahang and Terengganu

¹⁵ A subsidiary of Pantai Holdings Berhad, mainly active in the states of Johor, Negeri Sembilan and Melaka.

Leading players in water industry include:

WATER INDUSTRY	LEADING COMPANIES
Waste water treatment	<ul style="list-style-type: none"> - Veolia Water (France) - Indah Water Konsortium Sdn Bhd¹⁶, Taliworks Corporation Berhad (Malaysia)
Water utilities and management	<ul style="list-style-type: none"> - 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, Syarikat Air Terengganu Sdn Bhd, Syarikat Air Melaka Berhad, Konsortium ABASS Sdn Bhd (Malaysia)
Water and wastewater treatment equipment	<ul style="list-style-type: none"> - Kurita Water (Japan), Organo Asia (Japan) - Nalco Industrial Services Malaysia Sdn Bhd, Biwater Sdn Bhd, 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 Sdn Bhd, Sime Group, Berjaya Group, YTL Group (Malaysia)

¹⁶ IWK is wholly owned by the government of Malaysia and is responsible for providing sewerage services, operating and maintaining 5.594 public sewage treatment plants and 14.295 km of sewerage pipelines, serving a population of 18.7 million out a total of about 28 million in Malaysia

Leading players in renewable energy industry comprises:

RENEWABLE ENERGY	LEADING COMPANIES
Solar energy	<ul style="list-style-type: none"> - Phoenix Solar Group (Germany)¹⁷ - Yingli Green Energy Holding Company Limited (China) - First Solar Inc, DitrollicSolar¹⁸, Green Innotech Sdn Bhd (Malaysia)
Biomass	<ul style="list-style-type: none"> - TSH Bio Energy Sdn Bhd, Builders Biomass Sdn Bhd (Malaysia)
Biogas	<ul style="list-style-type: none"> - SP Multitech Renewable Energy Sdn Bhd (Malaysia)

¹⁷ Phoenix Solar AG Germany headquartered in Sulzemoos is the parent company of Phoenix Solar Sdn Bhd

¹⁸ DitrollicSolar is Malaysia's leading full-service solar provider for residential, commercial, industrial and large scale project owner

4. MARKET POTENTIAL & BUSINESS OPPORTUNITIES

According to the Ministry of Energy, Green Technology and Water of Malaysia, its renewable energy potential lies in numerous resources, consisting of forest residues, palm oil biomass, solar thermal, solar PV, mill residues, municipal waste, rice husk as well as landfill gas.

The four most suitable and available renewable energy resources to be implemented in Malaysia are considered to be solar, biomass, wind and tidal wave. For one thing, solar energy is the most potential renewable source in Malaysia, considering its average solar radiation of 400-600 MJ/m². For another, technical biomass potential in Malaysia is estimated at 29.000 MW, particularly due to the size of the country's palm oil industry, with each of its 400 palm oil mills possessing the potential to generate an average 1MW of renewable energy from its liquid waste stream¹⁹.

On the other hand, wastewater treatment plants are emerging in Malaysia as a response to the increasing demands for better and more effective sanitation services resulting from the country's economic growth. Proper water treatment is paramount in Malaysia, for about 98% of Malaysia's fresh water supply comes from surface water. Malaysia's inhabitants are generating about 6 million tons of sewage every year, most of which is treated and released into the rivers. Moreover, the domestic and industrial water demand in Malaysia is expected to triple over the next 50 years²⁰, while its per capita water consumption is estimated to double by 2020.

The following sectors in Malaysia offer significant opportunities for growth²¹:

- Recycling of agricultural waste and agricultural byproducts, chemicals, and reconstituted wood-based panel boards or products
- 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.

¹⁹ Source: Australian Institute of Commercialization

²⁰ From the year 2010 on

²¹ Based on a study on Malaysia Environmental Industry carried out by U.S. Agency for International Development and APEC as well as Belgian Foreign Trade Agency research

- 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 impact assessments. Risk analysis, a new requirement for environmental impact assessment associated with petroleum and chemical industries.
- 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.
- Energy saving equipment and technology for increasing efficiencies and cost effectiveness



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Date of publication : June 2014

Responsible editor : Marc Bogaerts

Text writer : Mao Yuling

Printed on  **FSC** &  **PEFC** paper.