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Initiatives and Market Mechanisms for Climate Change Actions in Malaysia

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ABSTRACT

This study briefly encompasses the current initiatives and alternative market mechanisms such as clean development mechanism, fiscal and financial incentives, regulatory requirements and insurance provision to address climate change actions in Malaysia. The government has taken many initiatives including promoting utilisation of renewable energy, energy efficiency in industry, building and transport sector, restructuring public transport system, cleaner fuel, stringent emission standards and alternative industrial processes technique. There is also a substantial Clean Development Mechanism (CDM) potential in Malaysia of up to 100 million tonnes CO₂ equivalent for the period 2006 to 2012. At market prices between US\$ 3 and 10 per tonne, this corresponds to a total capital inflow to Malaysia from sales of CDM credits (CERs) in the range of RM 1.14 to 3.8 billion. Bilateral and multilateral CDM projects might typically leverage project financing 3 to 4 times this amount, hence contributing substantially to foreign direct investment and technology transfer. Although, the Malaysian government has given much efforts to managing climate change issues, there is still need for improvement includes: integration of programmes in various agencies, adjustment of current sectoral-based approaches, stakeholder's consultation and cooperative actions and expansion of the use of market based instruments as well as carbon taxation and a cap-and-trade programme augmented by regulatory systems. In addition, there is urgent need to address research and development (R and D) for both adaptation and mitigation. This balancing is required to avoid compromise in economic growth and sustainable development of this country.

Key words: Clean development mechanism, adaptation, mitigation, climate change

INTRODUCTION

Malaysia ratified the United Nations Framework Convention on Climate Change (UNFCCC) in July 1994 and Kyoto Protocol in September 2002. The National Focal Point for the country is the Ministry of Natural Resources and Environment (MONRE). The Ministry also hosts the National Steering Committee on Climate Change and coordinates the necessary follow up with respect to the Convention. In response to the obligation to UNFCCC, Malaysia submitted its Initial National Communication (INC) in 2000 with the support from UNDP/GEF. In preparation of the Second National Communication (NC2), the Ministry of Natural Resources and Environment (NRE) has created three main working groups in accordance to three thematic areas, i.e. National Greenhouse Gas (GHG) Inventory, Vulnerability and Adaptation and Mitigation. The preparation of Second

National Communication (NC2) is a continual step towards further implementation of the UNFCCC at national level which aims to generate a comprehensive report on climate change related issues in Malaysia.

Malaysia is experiencing a warming trend for the past few decades. Deni *et al.* (2008) also found that in the southern areas of peninsular Malaysia, the frequency of long dry periods tended to be higher with a significant increase in the mean and variability of the length of the dry spells whereas, all the indices of wet spells in these areas show a decreasing trend. Increasing temperatures and long dry days would result in more extreme weather and climate variability. In Malaysia, the temperature and rainfall are projected to increase between +0.6 to 3.4°C and -1 to +32% in 60 years respectively (INC, 2000). The rise in sea level is about 13-94 cm in 100 years (INC, 2000). These can lead to impacts on water resources, food supply, coastal zone, public health and others and necessitate national and international responses to face climate change.

The primary energy supply and demand have been increasing in tandem with economic growth from 1990 to 2005, showing the economic development and energy consumption have yet to be de-coupled. In addition, the largest contributor to the ecological footprint for each Malaysian is energy consumption (Begum *et al.*, 2009). The escalating consumption of energy over the years that heavily relied on fossil fuels had resultant significant increment in emission of greenhouse gas (mainly carbon dioxide) from the sector (Begum and Pereira, 2009a). Over the years, GHG emissions have been increasing in Malaysia. Per capita emission rose from 4.21 tonnes in 1994 to 6.29 tonnes in 2001 (Tiong *et al.*, 2007). The Ninth Malaysia Plan (2006-2010) expects the overall national energy demand to increase at an average rate of 6.3% annually from 2006 to 2010, with the industrial sector consuming 38.8% of total demand. The plan also identified several energy-intensive industries to remain the major consumers. Unless this demand is provided by using renewable or alternative energy, coupled with energy efficiency efforts, greenhouse gas emissions will continue growing compared to the previous years.

As Malaysia has experienced phenomenal economic growth in the last two decades and has undergone a major structural transformation, moving from a agriculture to manufacturing-based economy, with significant social changes. With a per capita income of US\$6477 in 2007 (EPU, 2008), Malaysia has been classified as a transition economy and there is no longer traditional approaches (donor support) as an option for the development activities. This rapid development has brought about significant impacts to the natural environment (Begum and Joy Jacqueline, 2008). Development, therefore, cannot confer lasting benefits unless environmental considerations and related climate and ecosystem changes are protected as integral parts of development planning and decision making. This can only be done by formulating appropriate policies and programmes to ensure development proceeds hand in hand with sound management of the environment. As there is a sizeable private sector presence (private consumption and investment constitute 68% of GNP in 2007) (EPU, 2007), public-private partnership could play a significant role to the climate action. This partnership allows government to implement policies that will drive the necessary actions and changes and private sectors to respond rapidly to these drivers in a positive way (Jones, 2008). This study briefly encompasses the current initiatives undertaken by the government and private sector as well as other players on adaptation, mitigation and technology issues to climate change. The study also explores the alternative market mechanisms for example, Clean Development Mechanism (CDM), fiscal and financial incentives, regulatory requirements (building by-laws) and insurance provision to address climate change actions in Malaysia.

CLIMATE CHANGE INITIATIVES

A Cabinet Committee on Climate Change has been instituted in January 2008, chaired by the Prime Minister of Malaysia. Establishment of this committee exhibits Malaysia's higher commitment in addressing climate change and is important to integrate the issue of national development planning. The Cabinet Committee will primarily determine the policy directions and strategies in addressing climate change issues. Malaysia like other developing countries is also experiencing adverse effects of climate change on key economic sectors such as energy, industries, transport, forestry, agriculture, water and coastal resources, public health and waste sector. Immediate responses through adaptation and mitigation approaches are necessary to reduce the risks and potential losses and optimise the beneficial opportunities. To reduce the impact of climate change and the emission of GHGs, government has taken various actions and programs in all relevant sectors. To address the climate change issues, Ninth Malaysia Plan (RMK9) initiates and promotes the following mitigation programmes:

- Increase supply and utilisation of alternative fuel such as Renewable Energy (RE)
- By 2010 about 300 MW of RE is expected to be generated and connected to the TNB Grid in Peninsular Malaysia and 50 MW to SESB Grid in Sabah
- For the power generation of RE sources, the government has approved a higher price of 21Sen per kWh for connection to the grid. This price is a premium over other sources of power generators
- RE projects utilising municipal waste will be promoted
- The Clean Development Mechanism (CDM) under the Kyoto Protocol will be utilised to provide support for the implementation of Small Renewable Energy Programme (SREP)
- Supply to 55,000 unit of houses electricity generated from technologies such as hybrid solar system and micro-hidro
- Encourage energy efficiency in industrial, building and transport sectors
- Protect forest areas via sustainable forest management to ensure the forest areas are maintained as sink to greenhouse gas, i.e., carbon dioxide

According to the Economy Report 2007/2008 (ER 2007/2008), Government encourages the use of solar energy as RE and initiated the National SURIA 1000 Programme jointly promoted by the Government, United Nations Development Programme (UNDP) and Global Environment Facility (GEF). This programme enables residential and commercial property owners to enjoy between 40 to 75% rebates on the installation of Building Integrated Photovoltaic (BIPV) equipment and installation cost. The adoption of this programme will create a market for BIPV technology, reduce carbon emissions, improve air quality and reduce dependence on fossil fuels as well as address long-term energy diversification objectives. Oh and Chua (2010) also revealed how energy policies in Malaysia have evolved over the years with concerted efforts from the government to minimize its carbon footprint through numerous energy efficiency implementations. A series of programmes has introduced and implemented to promote the use of renewable energy and improve energy efficiency. These programmes include (KeTTHA, 2010; PTM, 2008):

- Small renewable energy power programme (SREP)
- Malaysian Industrial Energy Efficiency Improvement Project (MIEEIP)

- Biomass generation and cogeneration in Malaysian palm oil mill industry project (BioGen)
- Establishment of renewable energy business fund
- Information for the commercialisation of renewables in ASEAN (ICRA)
- Energy audit program in government buildings
- Malaysian building integrated photovoltaic project (MBIPV)
- Roadmap for solar, hydrogen and fuel cell

The Ninth Malaysia Plan and several existing national programmes that may directly address or indirectly contribute to managing issues on climate change adaptation based on specific sectoral context and needs (Tiong *et al.*, 2009). The following adaptation programmes are also initiated under Ninth Malaysia Plan (2006-2010):

- Conduct Coastal Vulnerability Index (CVI) study
- Implement coastline protection programme
- Develop Integrated Coastal Zone Management
- Implement flood mitigation programme such as the Stormwater Management And Road Tunnel (SMART) Project
- Undertake study to identify the relationship between the impacts of climate change and vector-borne diseases

Ministry of Natural Resources and Environment has taken the following climate change related projects and activities in conjunction with the UNDP/GEF, government agencies, universities, non-government organisations and the private sectors:

- 2nd National Communication (NC2) Project
- National Capacity Self Assessment (NCSA) Project
- GEF: Resource Allocation Framework 4 (GEF-RAF4)
- Policy Study on Climate Change
- Preparation of GHG Inventory
- Comparative Study on Carbon Sequestration
- Development of CDM Secretariat
- Public Awareness and Training Programmes

The Institute for Environment and Development (LESTARI) also initiated a research study entitled economic impacts and vulnerability assessment of climate change on public health in Malaysia with support from the Ministry of Health and Institute of Medical Research (Mia *et al.*, 2009). The above initiatives and its implication to adaptation, mitigation and technology, are the important issues to the climate change actions in Malaysia. The subsequent section discusses the alternative market mechanisms to address climate change actions in Malaysia.

MARKET MECHANISMS IN CLIMATE CHANGE ACTION

The public sector plays a pivotal role in responding to climate change, such as affect country's spending priorities, revenue raising opportunities, insurance markets, investment options and capital markets. This will include ensuring a stable investment climate that encourages private sector efforts to deal with climate change and its consequences; ensuring the domestic rules that

allow the country to take better advantage of international financing opportunities; and managing available policy, economic and financial instruments to integrate climate change adaptation and mitigation into the planning of economic development in a systematic way. The Institute for Environment and Development (LESTARI) conducted a survey on the issue of climate change, business and sustainability through Malaysian Network for Research on Climate, Environment and Development (MyCLIMATE), with support from the Ministry of Natural Resources and Environment. The survey reflected that corporate managers in Malaysia are well concerned about climate change, demonstrating a wide general awareness of the issue. In the context of climate change and its responsibility, a majority of corporate managers perceived that the government should take responsibility while half of them were of the opinion that the business and corporate sector should also take responsibility (Begum and Pereira, 2009b). Therefore, mobilising public-private partnership is required to support actions on adaptation and mitigation in a cost-effective manner (Climate Group, 2007). The Malaysian government designs a set of market based mechanisms which meets the specific conditions in the country, for creating positive and cost-effective market incentives to reduce emissions and finance adaptation. This section explores the alternative market mechanisms for example, Clean Development Mechanism (CDM), fiscal and financial incentives, regulatory requirements (building by-laws) and insurance provision to address climate change actions in Malaysia.

Clean Development Mechanism (CDM): The purpose of the CDM is to assist non-annex 1 parties in achieving sustainable development (e.g., transfer of GHG reducing technologies) and to assist annex 1 parties to achieve their emission reduction targets by resulting in real, measurable and additional emission reductions. The following projects that have the potential to reduce GHG emissions in Malaysia (CDM Malaysia, 2005):

- Renewable energy projects, including PV, hydro and biomass
- Industrial energy efficiency
- Supply and demand side energy efficiency in domestic and commercial sector
- Landfill management (flaring or landfill gas to energy)
- Combined heat and power projects
- Fuel switch to less carbon intensive fuels (e.g., from coal to gas or biomass)
- Biogas to energy (from POME or other sources)
- Reduced flaring and venting in the oil and gas sector
- Land-use, land-use change and forestry (LULUCF) projects (afforestation, reforestation, forest management, cropland management, grazing land management and re-vegetation)

Projects in the energy sector especially Renewable Energy (RE) and Energy Efficiency (EE) have been given priority for CDM implementation in Malaysia. Besides financial contribution to projects reducing GHG emissions, these projects are in line with the sustainable development strategies in the energy sector. Figure 1 provides an overview of the percentage of CDM projects registered with CDM Executive Board (EB). As of 30th April 2010, a total of 2,172 CDM projects registered in UNFCCC, among them, 81 projects are registered from Malaysia. Table 1 shows the current status of Certified Emission Reductions (CERs) issued from CDM projects in Malaysia.

First CERs from Malaysia were issued in October 2006 and until now, 708,028 CERs have been issued. There is a substantial CDM potential in Malaysia of up to 100 million tonnes CO₂ equivalent

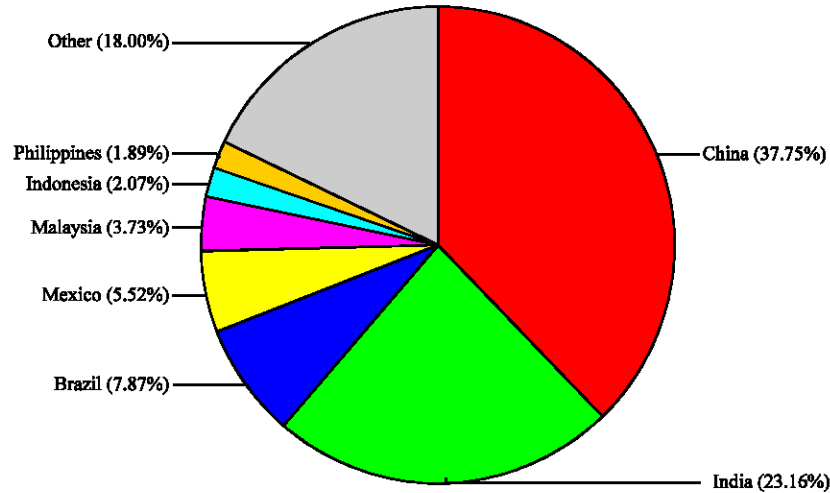


Fig. 1: Percentage of registered project by host countries (as of 30th April 2010). Source: UNFCCC (2010)

Table 1: CERs issued from CDM projects in Malaysia (as of 29th April 2010)

Title (Host parties: Malaysia)	Date of Issuance	CERs Issued	Verified period	Other parties
0249: Biomass Energy Plant-Lumut.	06 Jan. 2010	34,171	01 May. 2007-31 Dec. 2008	Denmark
0288: Sahabat Empty Fruit Bunch Biomass Project	27 Aug. 2009	25,139	01 Feb. 2007-29 Feb. 2008	Switzerland, UK and Northern Ireland
0395: LDEO biomass steam and power plant in Malaysia	09 Oct. 2008	34,245	1 Jul. 2007-31 Dec. 2007	Canada, Switzerland Germany
0402: SEO biomass steam and power plant in Malaysia	6 Oct. 2008	43,977	1 Jul. 2007-31 Dec. 2007	Canada, Germany
0395: LDEO Biomass steam and power plant	09 Apr. 2008	31,049	01 Jan. 2007-30 Jun. 2007	Canada, Switzerland Germany
0288: Sahabat empty fruit bunch biomass project	17 Mar. 2008	12,775	01 Jan. 2006-31 Jan. 2007	Switzerland UK Northern Ireland
0249: Biomass energy plant-lumut	07 Mar. 2008	21,845	01 May. 2006-30 Apr. 2007	Denmark
0402: SEO biomass steam and power plant in Malaysia	18 Feb. 2008	41,091	01 Jan. 2007-30 Jun. 2007	Canada, Germany
0402: SEO biomass steam and power plant in Malaysia	26 Oct. 2007	20,932	10 Jun. 2006-30 Sep. 2006	Canada, Germany
0395: LDEO Biomass steam and power plant	26 Oct. 2007	14,759	10 Jun. 2006-30 Sep. 2006	Canada, Switzerland, Germany
0402: SEO biomass steam and power plant in Malaysia	8 Aug. 2007	24,079	01 Oct. 2006-31 Dec. 2006	Canada, Germany
0395: LDEO biomass steam and power plant	02 Aug. 2007	17,006	01 Oct. 2006-31 Dec. 2006	Canada, Germany
0247: Replacement of fossil fuel by palm kernel shell Biomass in the production of portland cement	22 Dec. 2006	366,260	01 May. 2000- 31 Dec. 2005	France
0249: Biomass energy plant-lumut	05 Oct. 2006	20,700	01 Feb. 2005-30 Apr. 2006	Denmark
Total		708,028		

Source: UNFCCC (2010)

for the period 2006 to 2012 (CDM Malaysia, 2005). At market prices between US\$ 3 and 10 per tonne, this corresponds to a total capital inflow to Malaysia from sales of CDM credits (CERs) in the range of RM 1.14 to 3.8 billion. Bilateral and multilateral CDM projects might typically leverage project financing 3 to 4 times this amount, hence contributing substantially to foreign direct investment and technology transfer. Thus, CDM projects in Malaysia show an example of Public Private Partnership (PPP) where the private sector engages to work with the governments and other stakeholders that meet the objectives of the Framework Convention on Climate Change and

Kyoto Protocol. As a non-annex 1 party to the UNFCCC, Malaysia is not subjected to any commitments towards reducing greenhouse gases (GHGs) emission under the Kyoto Protocol. However, through participation in the CDM activities under the Protocol, Malaysia already began to benefit from the investments in the GHG emission reduction projects, that also contribute towards the overall improvement of the environment and to some extent bring additional economic benefits.

Fiscal and financial incentives: In addressing climate change issues, Malaysian government encourages to initiate public-private partnership that leads to the private sector's cost savings. The following fiscal and financial incentives are given to encourage companies to invest in the reduction of greenhouse gas emissions to undertake energy efficiency and the use of renewable energy (Malaysia, 2007; UNEP, 2006):

- Income derived from trading of CERs certificates be given tax exemption
- Tax incentives for companies generating renewable energy (RE) as follows: Pioneer Status (PS) with tax exemption of 100% of statutory income (10 years) or investment tax allowance (ITA) of 100% on the Qualifying Capital Expenditure (QCE) incurred to be set-off against 100% of statutory income (SI) for each year of assessment (5 years) and import duty and sales tax exemption on equipment used to generate energy that are not produced locally and sales tax exemption on equipment purchased from local manufacturers
- Tax incentives for companies providing energy conservation/ energy efficiency services as follows: PS with tax exemption of 100% of SI (10 years) or ITA of 100% on the QCE incurred to be set-off against 100% of SI for each year of assessment (5 years) and import duty and sales tax exemption on energy conservation that are not locally and sales tax exemption on the purchase of from locally produced equipment

Malaysia spends US\$14 billion for subsidising petrol, diesel and gas every year. Recently, the Malaysian government increased petrol prices by 41% to RM2.70 or US\$0.83 a litre (old price: RM1.92 or US\$0.59 L⁻¹) and diesel prices 63% to RM2.58 or US\$0.79 a litre (old price: RM1.58 or US\$0.48 L⁻¹) (Associated Press, 2008). With the reduction in subsidies of petrol and diesel prices, the government is encouraging use of public transportation which contributes less pollution and better allocation of resources, as inaccurate pricing of resources lead to wastage and inefficiencies. This is another example of how economic instruments influence human behaviours and contribute to a better environment. The government acknowledges that an efficient, safe and integrated network of transport systems is necessary to meet the transportation needs of the public, reduce congestion and emissions as well as increase productivity (Economic Report, 2007). The government has taken the following initiatives and incentives to improve the efficiency of the transportation, system in partnership with private sector (EPU, 2000, 2006):

- Privatisation in public transportation of rail services such as Monorail System in Kuala Lumpur, Express Rail Link (ERL) from Kuala Lumpur to Kuala Lumpur International Airport (KLIA), Light Rail Transit System I (LRT-STAR) and LRT-System II (LRT-PUTRA) provided a fast and efficient alternative transportation system and contributed to alleviate the urban traffic congestion and reduce the travelling time

- Allocation RM 1 billion for environmental preservation programmes and announced to establish Bio-diesel fund of RM500 million
- Provision of a grant of RM25000 each to existing buses which convert to natural gas vehicles (NGV) by the end of 2008

Regulatory requirements (Building by-laws): In terms of private financing, governments set the rules for the markets in which investors seek profits. If current market rules are failing to attract private investors into low carbon and climate-proof alternatives, governments can introduce policies or incentives to address these market failures. This includes regulations and standards to overcome policy-based barriers to entry; taxes and charges to make the polluter pay; as well as subsidies and incentives to pay the innovator. Particularly in developing countries, shifting financing to climate change related investments has to be taken economic and social development priorities into account. In Malaysia, initiatives that are currently being persuade for increasing energy efficiency include the preparation of a legislative framework that will provide regulations on the efficient management of electrical energy, energy efficiency elements for the inclusion in Uniform Building Bylaws and guidelines for energy efficiency-related equipment. The following specific sectoral legislations could contribute a significant role to the mitigation and adaptation of climate change issues in Malaysia.

- Electricity Supply Act 1990 regulates electricity generation and utilisation
- Petroleum Mining Act 1972 covers management of all oil and gas reserves
- Road Transport Act 1987 controls the use of different types of motor vehicles
- Occupational Safety and health Act 1994 regulates the use of all equipment in working areas and among others
- National Forestry Act 1984 (amended 1993) regulates management of forestry and other natural resources

Insurance provision: Due to more intense and greater severity of extreme weather events that occurred locally and globally, the insurance industry is now preparing for an increase in catastrophic risk through several measures, which may contribute the country's policy responses to climate change. These include development of new risk models that take into account climate change, adequate pricing, substantial deductibles based on the respective exposure, accumulation control, loss prevention, improved claims settlement, liability limits, exclusion of certain hazards, exclusion of particularly exposed areas, reinsurance and retrocession as well as public-private partnership.

Insurance provision for climate change is also an opportunity to be positioned in public-private partnership initiatives to share losses and promote adaptation, monitor loss trends, improve catastrophe modeling, address the causes of climate change and prepare for and adapt to the climate change impacts. Insurance and financial institutions need to work closely with other stakeholders to achieve integrated adaptation programmes. In this regards, Malaysian insurance industry should also be taken into account when planning and financing adaptation measures.

CONCLUSIONS

The above initiatives and market responses could play a significant role to the climate change actions and its implication to adaptation, mitigation and technology in Malaysia. To foster the

public-private partnerships, rigorous consultation with the private players on the policy initiatives and responses on climate change is essential. While ensuring awareness of the private sector of the potential implications of such initiatives and responses to their activities, it allows the government to leverage on the expertise, knowledge and experience of the private sector. These partnership efforts are an invaluable contribution to provide many efforts in financing climate actions, formulating climate policy and strategies, participating in and monitoring international negotiations, strengthening networks, building capacity and raising of awareness.

Although, the Malaysian government has given much efforts to managing climate change issues, there is still need for improvement includes: integration of programmes in various agencies, adjustment of current sectoral-based approaches, stakeholder's consultation and cooperative actions and expansion of the use of market based instruments as well as carbon taxation and a cap-and-trade programme augmented by regulatory systems. In addition, there is urgent need to address research and development (R and D) for both adaptation and mitigation. This balancing is required to avoid compromise in economic growth and sustainable development of this country.

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