

EMISSIONS: SOURCES, POLICIES AND DEVELOPMENT IN MALAYSIA

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ABSTRACT

Countries all over the world have agreed that environment is a subject they cannot refuse to acknowledge. Hence the binding limitations signed by heads of governments such as the Kyoto and Copenhagen Protocol. In Malaysia, the main sources of greenhouse gasses include Carbon Dioxide (CO₂), Nitrogen Dioxide (NO₂), Sulfur Dioxide (SO₂), and Particle Matters. This paper also discusses on the development of the Malaysian government efforts and commitment to the environment in general. Also, The Malaysian government has introduced working papers as well as policies on curbing the effects of greenhouse emissions into its atmosphere and mainly so by concentrating the practical approach of limiting emissions from different sectors in the economy.

Keywords: Greenhouse emissions, Carbon Dioxide (CO₂), Nitrogen Dioxide (NO₂), Sulfur Dioxide (SO₂), and Particle Matters, Malaysia.

1. INTRODUCTION (THE KYOTO PROTOCOL)

In December 1997, more than 160 nations met in Kyoto, Japan, to negotiate binding limitations on greenhouse gases for the developed nations in pursue realizing the Framework Convention on Climate Change of 1992. The outcome of this meeting was the Kyoto protocol which aim is to limit their greenhouse gas emissions relative to the levels emitted in 1990. The protocol was finally set in motion with Russia's ratification on February 16, 2005. This protocol was developed under the UNFCCC (United Nations Framework Convention on Climate Change). While the next obvious question with regard to this protocol is that of the ability of it to actually reduce emissions from

participating countries, the rightful answer is still unclear. The reason being is that emission in the world's atmosphere is in fact actually increasing. The latest data released by the International Energy Agency (2010) showed that Global CO₂ emissions increased by 0.4 Gt CO₂ between 2007 and 2008, which represented a growth rate of 1.5%. If this trend continues, the world will see increased levels of CO₂ released into the atmosphere by a whopping 15-20% in the next decade. However, according to the same report, the culprits of this increasing trend are not actually the developed countries whereby their commitment towards reducing the release of emission were obvious when current date showed that their total released emission were cut by approximately 2% within the same period (IEA,2010). Now, it's the developing countries that are releasing emissions more than ever with an average increase of approximately 6%.

2. SOUTH EAST ASIA & MALAYSIA: EMISSIONS

According to a report by Population Reference Bureau (2009), the total estimated population of South East Asia is 597 million. The most populous country in this region is Indonesia with a count of 243 million and the least populous is Brunei with the count of 0.4 million (2009). It was also estimated that the total released emissions by this region are around 1.6 metric tons per capita (PFR, 2010) as until 2006. This represented more than half of the per capita emission released by the Asia region which stood at 3 million metric tons. Meanwhile, as per total emissions released by this region, according to a report by the United Nations in 2007 (updated 2010), the count stood at 1132.39 million ton metric. As for Malaysia, a country with the population of 28.318 million (UN, 2010), the emission per capita stood at approximately 5.9 million tons which is more than 3 times greater than the levels recorded for the whole South East Asia region (PFR, 2010). As for total emission released, Malaysia recorded 194.48 million tones whereby is the third highest emission released by countries within this block behind Indonesia and Thailand which recorded 397 and 278 millions tones respectively. This worrying number certainly commissioned the government of Malaysia to act on reducing the release of emissions in the country. The government of Malaysia has shown signs of acknowledging this issue and it too had signed then Kyoto Protocol (2005). Although, as a developing country, Malaysia has no quantitative commitments under the Kyoto Protocol at present, however, together with all other countries, Malaysia is already committed under the UNFCCC to formulate, implement, publish and regularly update national and, where appropriate, regional programmes containing measures to mitigate climate change by addressing

anthropogenic emissions by sources and removals by sinks of all greenhouse gases (Selamat & Abidin, 2010).

3. MALAYSIAN EMISSION SOURCES

The Malaysian Department of Environment (MDOE) had stated in its special report on air pollution in the country that industries including power stations, motor vehicles and open burning are the main contributors to the country's ever growing emissions (MDOE, 2010). It was also mentioned that emissions from motor vehicles were of the highest contributors. Figure 1 depicts air pollutant load from all known sources in the country. From the graph, it is clear that CO₂ (Carbon Dioxide) emissions are the main contributors to the air pollutant load identified by the department followed by NO_x (Nitrogen Oxides), SO₂ (Sulphur Dioxide) and PM (Particulate matter).

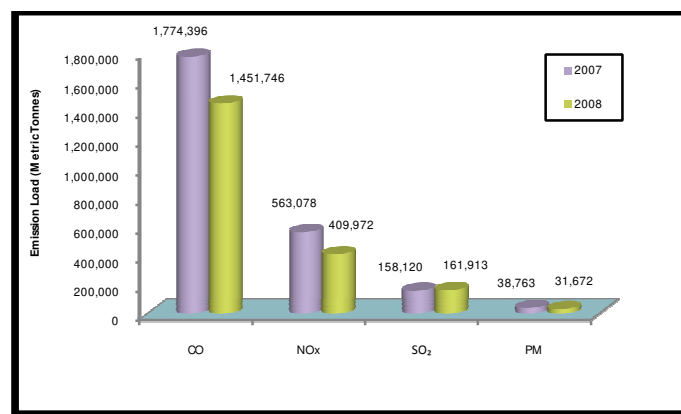


Figure 1: Malaysian Air Pollutant Emission Load from All Sources, 2007-2008

(Sources: From National Energy Balance 2008)

3.1 Emissions: CO₂

According to a report released by the Malaysian Department of Environment (2010), Malaysian CO₂ emissions are mainly caused by transportation activities (97.1%). Sources include emissions from motor vehicles both individually owned vehicles as well as businesses owned vehicles. There are over 19 million registered vehicles in the country with the total estimation of emission released of over 1.4 million metric tonnes in 2008 (MDOE, 2010). The breakdowns of vehicles in the country are as follows:

Types	Passenger Cars	8940230
	Motorcycles	8506080
	Bus	66581
	Taxi	16579
	Hired Cars	79149
	Goods Transporter	936222
	Others	471941
Total		19020000

Table 1: Total Motor Vehicles by Type, Malaysia, 2009 (RTD, 2009)

The country will expect increased number of registered motor vehicles in years to come and with this will certainly come with increased emissions of CO₂ released into the country’s atmosphere. This is supported by the news released by the Malaysia Automotive Association, whereby the number of consumer vehicles sales increased by 19.8% in the first half of 2010 and there is a steady increase of total vehicles sales of estimated 10-20% per year for the past five years (MAA, 2010). Although the increase numbers are seen as good for the economy but it certainly add up to the total CO₂ emissions produced by road vehicles in Malaysia.

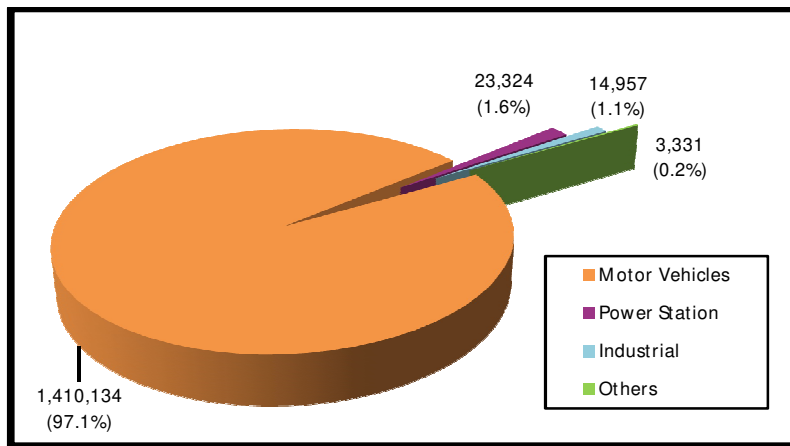


Figure 3.1 Malaysia: CO₂ Emission by Sources (Metric Tonnes) 2008

3.2 Emissions: NO₂

Nitrogen dioxide is formed in most combustion processes using air as the oxidant. At elevated temperatures nitrogen combines with oxygen to form nitric oxide. The process then concludes when Nitric oxide is oxidized in air to form nitrogen dioxide (NO₂). In Malaysia, More than 49% of NO₂ released into the atmosphere are caused by motor vehicles. The total NO₂ emissions released by motor vehicles in the country in 2008 are estimated around the figure of 203,235 metric tonnes (MDOE, 2010). Meanwhile power stations in the country contributes somewhat 27% of total NO₂ emissions with the total estimated NO₂ released at 111,858 metric tonnes (2008). Not far behind, the industrial sector contributed 21% of total NO released (2008). Figure 3.10 depicts the breakdown of NO₂ contributors.

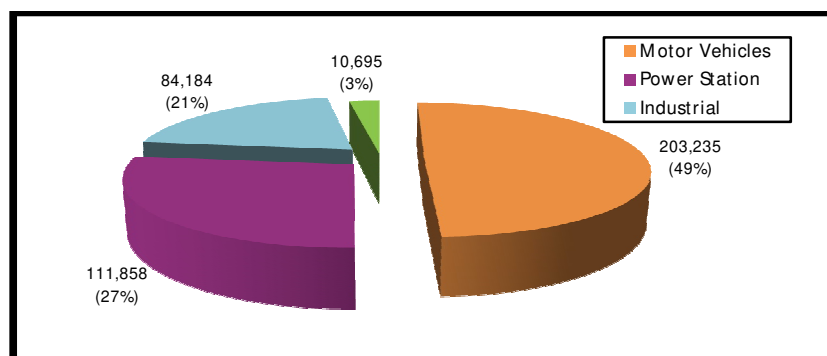


Figure 3.2 Malaysian NO₂ Emission by Sources (Metric Tonnes) 2008

3.3 Emissions: SO₂

Sulfur dioxide (also sulphur dioxide) is the chemical compound with the formula SO₂. It is produced by volcanoes and in various industrial processes. Since Malaysia has no volcanic activities, coal and petroleum combustion from vehicles and power stations generates sulfur dioxide (SO₂). In Malaysia, 48% of total SO₂ emissions are produced by power stations in and around the country. This amounted to a staggering 78,416 metric tonnes of SO₂ released into the atmosphere. Malaysia has 41 power stations with various resources used as main combustors. Resources used in these stations energy production include coal, oil, gas, steam, water (hydro) and biomass. Tenaga Nasional Berhad (TNB) is the main operator of many of these power stations which are linked to the national grid (electricity supply). Another significant contributor to the released of SO₂ into the atmosphere is the industrial processes in the many Malaysian industrial sectors which include the

manufacturing and services sectors. These industrial processes contributed 23% or 36,938 metric tonnes of SO₂ released. Not far behind are the combustion engines found in motor vehicles. Motor vehicles contributed 8% or 12,865 metric tonnes of SO₂ released. With the further increasing of future energy demands in the country in line with expected growth of the economy, Malaysia can expect more SO₂ released in the future by either the existing combustion power stations or even new ones developed. Like many developing countries, Malaysia relies heavily on the energy sector to drive its economic growth. The demand for energy in Malaysia has increased in the past years and is expected to continue increasing in years to come. It was estimated that the energy demand for the country had increased from 1,244 Petajoule (PJ) in 2000 to an estimated 2,218 PJ in 2010 (Selamat & Abidin, 2010). This increase in demand warrants the assumption of more SO₂ released into the atmosphere in the future. Figure 3.30 depicts the release of SO₂ by various means.

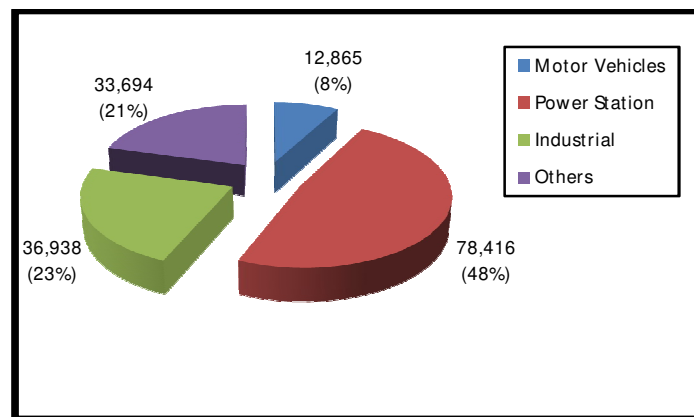


Figure 3.3 Malaysian SO₂ Emission by Sources (Metric Tonnes) 2008

3.4 Emissions: PM (Particulate Matter)

Particulate Matter (PM) is one of the six criteria pollutants, and the most important in terms of adverse effects on human health (Fierro, 2000). Fierro (2000) also stated that Particulate matter (PM) is the term used for a mixture of solid particles and liquid droplets suspended in the air. These particles originate from a variety of sources, such as power plants, industrial processes, and diesel trucks, and they are formed in the atmosphere by transformation of gaseous emissions. Their chemical and physical compositions depend on location, time of year, and weather. In Malaysia,

PM emissions are mainly by the industrial sector which represents 40% (12,664 metric tonnes) of total PM released (MDOE, 2010). Manufacturing and production of various industrial products using various chemical processes (often used in steel mills, chemical plant etc) are seen as the main contributing factor. Also, power stations in the country generated 7,784 metric tonnes or 25% of total PM emissions in the country through their combustions process to turn various sources to energy (electricity).

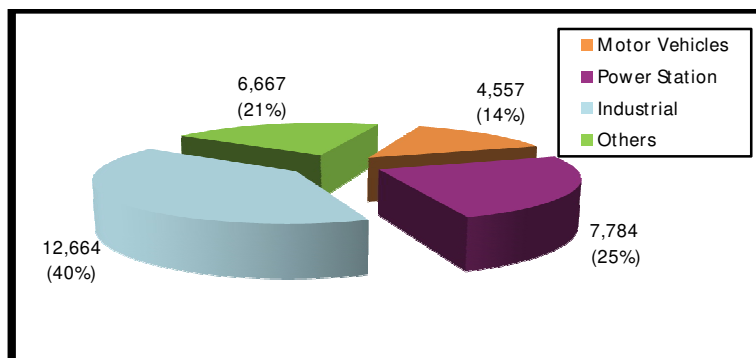


Figure 3.4 Malaysian PM Emission by Sources (Metric Tonnes) 2008

4. GOVERNMENT POLICIES & INTERVENTIONS

The objective of the United Nations Framework Convention on Climate Change (UNFCCC) is to stabilize greenhouse gas (GHG) concentrations in the atmosphere at a level that would prevent and reduce dangerous human-induced interference with the climate system (UNFCCC, 2010). Governments that have signed the Kyoto protocol are certainly obliged to this objective. Well many of the efforts on preserving the environment by these governments had started; the hardest efforts to help the governments achieve this objective had come from their emissions released. The reason being is that much of the emissions released were the direct byproduct of the industrial sectors and transportation sectors. These two sectors are seen as the major contributors of their individual economic growth and this seems to be the case. As what was highlighted in the earlier parts of this article, it is clear that Malaysia is facing the same dilemma. However, as all the other governments around the world that had signed the climate change treaty, it is without a doubt that Malaysia is crafting means to adhere to the UNFCCC's objectives.

In line with UNFCCC's objective, the government of Malaysia through its Prime Minister Datuk Seri Najib Tun Razak, has pledge to reduce carbon emission intensity of gross domestic product (GDP) up to 40% by 2020 (Gruber, 2011). This pledge is seen as a major step by the government to achieve continuous economic growth without ignoring the environment. This pledge by the Prime Minister is supported by various government link policies that were developed in order to make that pledge a reality. The government since has introduced a short term roadmap to guide the voluntary reduction in emissions intensity of GDP by up to 40% based on 2005 levels by 2020 conditional on technology transfer and financing from developed countries. This roadmap has identified that activities from three different sectors will contribute in achieving the target set. The three key sectors are energy efficiency, renewable energy and solid waste management. The reason on the concentration of efforts on these three sectors is due to the fact that these three sectors were considered the easiest and cheapest implementation cost to the country. According to a statement made by the Minister of Natural Resources and Environment of Malaysia, the country can expect some nine million tonnes of carbon dioxide reduction annually from the energy efficiency sector, another 11 million tonnes in the energy sector and 25 million tonnes reduction from the solid waste management sector, all by the year 2020.

4.1 Malaysia National Policy on Climate Change

In November 2009, the cabinet of Malaysia had endorsed the Malaysian Policy on Climate change (Ministry of Natural Resources and Environment, 2010). The fundamental policy statement that was agreed upon by the government with regards to the environment especially for climate preservations is that Malaysia will and committed to 'Ensure climate resilient development to fulfill national aspirations for sustainability (MONRE, 2010). Additionally, it was highlighted within the context of the national policy that collective responsibility is needed to adapt and mitigate climate change to ensure the nation's sustainability both in the short and long run. The government of Malaysia recognizes that climate change will have adverse effects on human wellbeing, threatened the sustainability of natural resources and would further undermine the development including the security of the country.

4.1.1 The Objectives & Principles of the National Policy on Climate Change (Malaysia)

The government of Malaysia had underlined three major objectives and five major principles with regards to this climate change policy.

Objectives

- Mainstreaming climate change through wise management of resources and enhanced environmental conservation resulting in strengthened economic competitiveness and improved quality of life
- Integration of responses into national policies, plans and programs to strengthen the resilience of development from arising and potential impacts of climate change
- Strengthening of institutional and implementation capacity to better harness opportunities to reduce negative impacts of climate change.

(Adopted from MONRE report) 2010

Principles

- Development on a sustainable Path – Integrate climate change responses into national development plans to fulfill the country’s aspiration for sustainable development.
- Conservation of environmental and natural resources – Strengthen implementation of climate change actions that contribute to environmental conservation and sustainable use of natural resources.
- Coordinated Implementation – Incorporate climate change considerations into implementation of climate change responses.
- Effective Participation – Improve participation of stakeholders and major groups for effective implementation of climate change responses
- Common but differentiated Responsibilities and Respective Capabilities – International involvement on climate change will be based on the principle of common but differentiated responsibilities and respective capabilities.

In this same national climate change policy, strategic thrusts were developed to facilitate the integration of climate change considerations into planning and implementation of development programs and decision making processes which mainly fosters environmental conservations. Ten

thrusts were then developed based on the five guiding principles of the policy which mainly discusses on actions and programs that compliment the earlier mentioned principles. All in, there were 43 key action plans outlined in this policy to transform this document into practical actions whereby some of these 43 key action plans include setting up environmental committee and watchdog groups, development of laws that regulate environmental aspects of the country, allocate financial assistance, greenhouse gas emission reports, increase collaborations of NGOs in the said matter, promoting renewable resources, increase research and development, adaption of greener technologies and promoting regional corporations with regards to combating climate change. With the approval of the Malaysian Cabinet in November of 2009, these objectives and guiding principles will be the basis for further practical actions taken by the country with regards to the environment and the acknowledgement of the importance of climate change.

5. CONCLUSION

Malaysian government is actively engaged with several international accord which is Montreal protocol 1987 and Kyoto protocol in 1997 (shing Chyi Chua 2010) as well as climate summit in Copenhagen Denmark, 2009 (Gruber, 2009) in order to mitigate the emissions. Recently Malaysian government launched the National Green Technology Policy (NGTP) on 24th July 2009 where they develop 5 strategic trusts including public awareness in the tenth of Malaysian plan. In addition National Green Technology Policy (NGTP) also has the initiative to implement green technology, which may able to reached a zero or low green house gas (GHG) emission

Additionally, there is no doubt of what the Malaysian government has shown so far with regards to its efforts in complying with the Copenhagen and Kyoto protocol; however, there are still few roles that the Malaysian Government can play in reducing greenhouse emissions. Many important questions arise when discussing the Malaysian Government effort in reducing the carbon emission in the country such as is it enough to deliver what the country had promised in Copenhagen 2010 alone? Are Malaysians aware about the initiative in reducing the carbon emission? If they are aware about it, do they really care and committed in achieving the emissions objectives? This is why this research calls for more researchers to look into micro areas such as awareness of the people, best civilian practices for the environment and from the macro and most importantly, the effects of

government policies on the wellbeing of the environment itself. Hence, data should also be made available and be taken from time to time. It is not enough just by having a 5 year report and rely on the data provided in those reports. Data should be updated periodically so that researchers are able to look at these data and extract meaningful information from them.

On another note of long-term development of reduction in greenhouse emission, for instance, is to incorporate environment studies in the country's education system and preferably this must start as early as when civilians enrolled for their primary education and must continue to secondary and ultimately to the tertiary levels. This in turn, will be able to create a national culture on respecting the environment thus reducing greenhouse emissions from Malaysian atmosphere.

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