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Strategic environmental assessment policy integration model for solid waste management in Malaysia

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ABSTRACT

This paper examines the strategic environmental assessment (SEA) systemic policy drivers for solid waste management (SWM) policies, plans and programmes (PPP) in Malaysia. Solid waste generation in Malaysia has been increasing drastically from 9.0 million tonnes in 2000 to an expected 15.6 million tonnes in 2020. This projected rate of solid waste generation is expected to burden the country's environmental and water quality resources. The key problem the study frames is the lack of environmental integration in the SWM process which is only conducted during the environmental impact assessments (EIA) stage of SWM facilities. The purpose of this study is to expand the SEA subject knowledge by validating a behaviour based theoretical framework and identifying key policy drivers that influence the integration of SEA in SWM policy planning. The study methodology utilized a confirmatory covariance based structural equation modelling approach to validate the proposed theoretical model based on the policy makers/implementers interview questionnaire data collection. The study findings indicate five latent SEA policy drivers which were named policy knowledge, environmental attitude, perceived benefits, perceived barriers and perceived enablers. The study has conceptualized and tested a SEA policy model which indicates that SEA integration behaviour is influenced directly by three main drivers (perception of benefits, perception of barriers and perception of enablers) and influenced indirectly by two sub-drivers environmental attitude and environmental knowledge. Furthermore, the findings also suggest that the enabler driver may be the most influential in predicting SEA integration behaviour followed by barrier driver and finally the benefit driver. In conclusion, the general study implication is that it provides an empirical based framework for environmental policy integration initiatives among policy actors while the specific study proposition is that the optimal SEA policy integration pathway may require the establishment of SEA enablers such as public participation and capacity building for the formulation of a long-term sustainable strategy for SWM.

1. Introduction

Solid waste generation in Malaysia has been increasing drastically where solid waste generation was projected to increase from about 9.0 million tonnes in 2000 to about 10.9 million tonnes in 2010 and finally to about 15.6 million tonnes in 2020 while the national recycling rate is estimated to be only about 3–5% (Agamuthu and Dennis, 2011a). The projected waste generation rates for Malaysia for 2010–2020 are about

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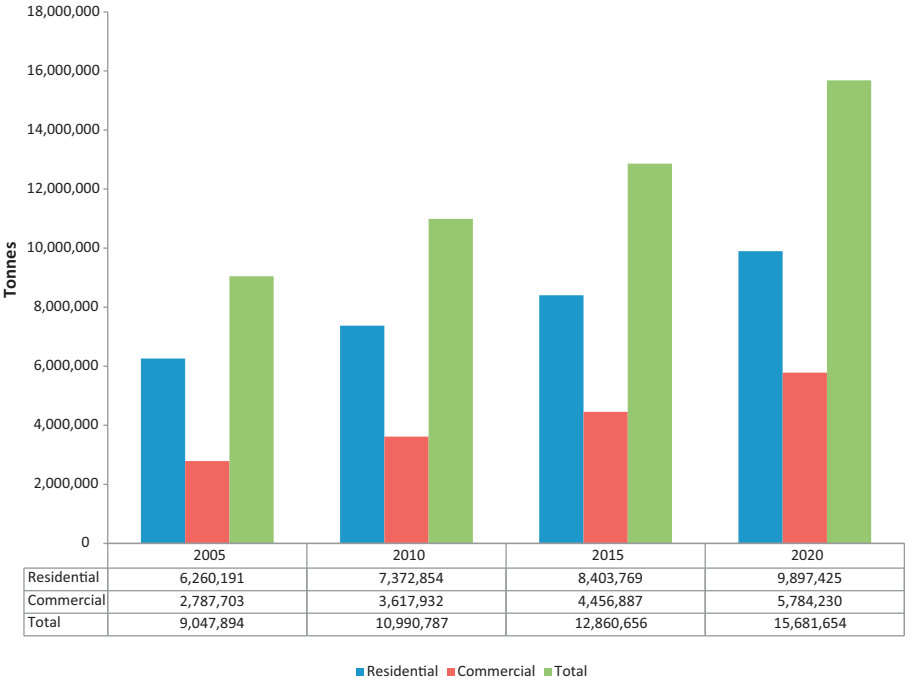

	2005	2010	2015	2020
Residential	6,260,191	7,372,854	8,403,769	9,897,425
Commercial	2,787,703	3,617,932	4,456,887	5,784,230
Total	9,047,894	10,990,787	12,860,656	15,681,654

Fig. 1 – Estimated solid waste generation 2005–2020.
Source: (Ministry of Housing and Local Government, 2006).

4.3% per annum (Ministry of Housing and Local Government, 2006) (Fig. 1). This projected increasing rate of solid waste generation is expected to burden the country's environmental and water resources as evidenced by the contamination of water catchments areas by landfill leachate (Agamuthu and Fauziah, 2010). Furthermore, river water quality trends indicate that the number of clean rivers had decreased while the number of landfills and illegal dumpsites had increased in Malaysia (Department of Solid Waste Management, 2012).

Environmental and solid waste management (SWM) policies in Malaysia have evolved from simple informal policies to national level strategies and legislation (Agamuthu and Dennis, 2011b). Nevertheless, environmental considerations in the existing solid waste management (SWM) process in Malaysia is usually integrated only during the environmental impact assessments (EIA) of SWM Projects such as landfills or incinerators. However at this stage a large portion of the decision making process had been completed including the justification for the need of the SWM project, its location and the technologies to be adopted. This often leads to sub-optimal options for decision makers in integrating environmental considerations at the project levels which in turn may lead to public dissatisfaction and non-optimal environmental management measures (Sutton, 1999). This was demonstrated in Malaysia when a 0.5 billion USD SWM incinerator project initiated in 2001 was revoked by the government in 2007 in response to public protest and residents' lawsuit against the project (Loong et al., 2007).

The challenges of integrating environmental concerns/objectives/issues in the existing Malaysian SWM planning are mainly due to existing top–down policy formulation and the project based EIA centric environmental management framework in Malaysia (Hezri, 2004). This policy formulation process has often been perceived as highly bureaucratic, lacking public participation with minimal cross-sectoral horizontal environmental policy integration (EPI) (Hezri and Nordin Hasan, 2006). Horizontal EPI enables governments to integrate environmental and sectoral policy objectives with a higher priority for environmental objectives (Lafferty and Hovden, 2003). Furthermore, environmental considerations are increasingly perceived as a significant driver for sustainable waste management policies (Agamuthu et al., 2009). As such there is potentially a growing need for environmental considerations to be integrated at a more strategic level than the project level which is at the policy and planning level which is then expected to prevent or mitigate potential environmental issues at the project level (Roberts, 2004, pp. 139–166).

Consequently, strategic environmental assessment (SEA) has been promoted as a system of incorporating environmental considerations into policies, plans and programmes (PPP) (Fig. 2). The United Nations Economic Commission for Europe (UNECE) describes SEA as the evaluation of the likely environmental effects of PPP which comprises the preparation of an environmental report and the carrying out of public participation and consultations (United Nations, 2012). SEA was initially promoted as an extension of EIA principles and practice to PPP where it added value by analyzing PPP at an early stage, thus setting the context and framework for EIAs at the Project level (OECD, 2006). This was mainly due to the inability of EIA to address environmental integration at the strategic levels especially during policy and plan-making process which may have precluded or modified the need and setting at the Project level since EIA was limited in its ability to