ANNEX I-2

ENVIRONMENTAL MANAGEMENT STRATEGY FOR MALAYSIA
(Annex for Strategy Paper)

I. INTRODUCTION

The areas of assessment for Strategic Environmental Assessment with regard to Institutional, policy & regulatory framework, financial initiatives, human capital, infrastructure, innovations and awareness are detailed out in the table below. Table A discussed on the progress of the activities in the 10th. MP and Table B focuses on the program/activities for the 11th. MP.

II. PROGRESS[1] (table A)

	Areas of Assessment[2]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Institutional Framework SEA	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable

III. PROSPECT[3] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Institutional Framework SEA			To establish of a body to regulate and managing SEA. To develop technical guidance on procedural requirements for SEA at plan, policy and program level To develop specific technical guidance on scoping of SEA documents	A body to regulate Technical guidance	A body to regulate Technical guidance

[1] Progress of initiatives under 10th MP
[2] Only those relevant to DOE/ThWG EM
[3] Way forward under 11th MP

II. PROGRESS[4] (table A)- Policy and regulatory frame

	Areas of Assessment[5]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Policy and regulatory framework SEA	Mainstreaming of environmental consideration in policy, plan and programme through Strategic Environmental Assessment (SEA)	Strengthening Policy Framework Implementation of SEA by relevant authorities.	EPU to review the policy note for SEA in Malaysia by EPU-DANIDA study in 2009 which provides preliminary action plan. EPU to review the policy note for SEA in Malaysia by EPU-DANIDA study in 2009 which provides preliminary action plan. This action plan captures and summaries the recommended action and suggest an implementation time frame to be implemented. Eight (8) high-priority topics have been discussed namely on:Decision making and planning processes and SEA; i. SEA policy and institutional framework ii. SEA legal framework; iii. Stakeholders & consultation; iv. SEA models; v. Data & data sharing; vi. Capacity development vii. Financial implications.		

III. PROSPECT[6] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Policy and regulatory framework SEA	Mainstreaming of environmental consideration in policy, plan and programme through Strategic Environmental Assessment (SEA)	Mainstreaming of environmental consideration in policy, plan and programme through Strategic Environmental Assessment (SEA)	Strengthening Policy Framework Implementation of SEA by relevant authorities.	Green development project Protection of environment	SEA Action Plan Document/ Handbook/ Guidance Document

II. PROGRESS[7] (table A)- Financial Initiatives, Human Capital and Infrastructure

[4]Progress of initiatives under 10th MP
[5]Only those relevant to DOE/ThWG EM
[6] Way forward under 11th MP

	Areas of Assessment[8]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Financial Initiatives Human Capital Infrastructure SEA	 NA				

III. PROSPECT[9] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Financial Initiatives SEA	NA				
	Human Capital SEA			To implement capacity building on a regulatory body in managing SEA		
	Infrastructure SEA			To develop new application system relating to SEA To provide ICT infrastructure to accommodate SEA needs		
	Innovations SEA	NA				
	Awareness SEA	NA		To promote SEA to public sector and private initiators, and relevant stakeholders To establish strategic alliances with private sector, NGO's, research institutions and universities in enhancing public awareness and participation in creating insight understanding and pragmatic of SEA		

[7]Progress of initiatives under 10th MP
[8]Only those relevant to DOE/ThWG EM
[9] Way forward under 11th MP

ANNEX I-2

ENVIRONMENTAL MANAGEMENT STRATEGY FOR MALAYSIA
(Annex for Strategy Paper)

I. INTRODUCTION

The areas of assessment for chemical management with regard to Institutional policy & regulatory framework, financial initiatives, human capital, infrastructure, innovations and awareness are detailed out in the table below. Table A discussed on the progress of the activities in the 10th. MP and Table B focuses on the program/activities for the 11th. MP.

II. PROGRESS[10] (table A)

	Areas of Assessment[11]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Institutional Framework Chemical Management	The growing concerns over the adverse effects on human health and environment due to unsatisfactory management of chemicals as a result of overlapping legislations will be addressed by several initiatives including the formulation of a new Chemicals Management Act, setting up of chemical management commission or board, and the strengthening of the chemical notification and registration scheme.	An assessment of the existing state of chemicals management in Malaysia have been done, identification of the needs to have a sound chemical managements and the gaps that exist in the management of chemicals in the country.	Conduct a study and report of the existing chemicals management in Malaysia with technical expert assistant by Danish International Development Agency (DANIDA).	A study on 'Strategy and Action Plan for Chemicals management in Malaysia' was conducted by Danish International Development Agency (DANIDA) in collaboration with Ministry of Natural Resources and Environment (NRE) and Department of Environment (DOE) in 2009.	Lack of coordination of efforts and activities and cooperation from relevant agencies.
						No specific regulation or legislation on chemicals management
						Insufficient financial capacity and lack of personnel to manage chemicals.
						Lack of comprehensive and systematic information database on chemicals.
						Lack of comprehensive risk assessment and reduction measures as a key element in pursuing management chemicals throughout their life cycle.
						Lack of understanding on the need to manage chemicals holistically

[10] Progress of initiatives under 10th MP

[11] Only those relevant to DOE/ThWG EM

III. PROSPECT[12] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Institutional Framework Chemical Management	Enhance the institutional framework of integrated chemical management in Malaysia.	Appropriate collaboration and information sharing among agencies and relevant stakeholders.	To carry out a feasibility study for the establishment of National Chemical Management Board/Commission.	Enhance the ability of integrated institutional framework for decision making and implementation in chemical management in Malaysia.	One (1) feasibility study will be done on proposed establishment of National Chemical Management Board/ Commission.

II. PROGRESS[13] (table A)- Policy and regulatory framework

Areas of Assessment[14]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
Policy and regulatory framework Chemical Management	The growing concerns over the adverse effects on human health and environment due to unsatisfactory management of chemicals as a result of overlapping legislations will be addressed by several initiatives including the formulation of a new Chemicals Management Act, setting up of chemical management commission or board, and the strengthening of the chemical notification and registration scheme.	An assessment of the existing state of chemicals management in Malaysia have been done, identification of the needs to have a sound chemical managements and the gaps that exist in the management of chemicals in the country.	Conduct a study and report of the existing chemicals management in Malaysia with technical expert assistant by Danish International Development Agency (DANIDA).	A study on 'Strategy and Action Plan for Chemicals management in Malaysia' was conducted by Danish International Development Agency (DANIDA) in collaboration with Ministry of Natural Resources and Environment (NRE) and Department of Environment (DOE) in 2009.	Lack of coordination of efforts and activities and cooperation from relevant agencies. Does not have specific regulation or legislation for sound management of chemicals in the full life cycle. Insufficient of financial capacity to manage chemicals. Lack of personnel capacity to manage chemicals. Lack of comprehensive and systematic information database on chemicals. Lack of comprehensive risk assessment and risk reduction measures as a key element in pursuing the sound management

[12] Way forward under 11th MP
[13] Progress of initiatives under 10th MP
[14] Only those relevant to DOE/ThWG EM

	Areas of Assessment[14]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
						of chemicals throughout their life cycle.
						Lack of understanding on the need to manage chemicals holistically.

III. PROSPECT[15] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Policy and regulatory framework Chemical Management	Establishing an integrated and holistic chemical management system in Malaysia.	To formulate an integrated legal framework to manage chemicals, including transportation of hazardous chemicals, transposing international convention to national legislation, managing chemical in consumer products.	To draft a new Chemicals Management Act to fill out the gaps in Malaysian chemical management. The Act shall establish link to legislation from relevant agencies that involved in chemical management.	Established an integrated and holistic chemical management system in Malaysia.	Formulate one (1) Chemical Management Act.

[15] Way forward under 11th MP

II. PROGRESS[16] (table A)- Financial Initiatives

Areas of Assessment[17]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
Financial Initiatives Chemical Management	The growing concerns over the adverse effects on human health and environment due to unsatisfactory management of chemicals as a result of overlapping legislations will be addressed by several initiatives including the formulation of a new Chemicals Management Act, setting up of chemical management commission or board, and the strengthening of the chemical notification and registration scheme.	An assessment of the existing state of chemicals management in Malaysia have been done, identification of the needs to have a sound chemical managements and the gaps that exist in the management of chemicals in the country.	Conduct a study and report of the existing chemicals management in Malaysia with technical expert assistant by Danish International Development Agency (DANIDA).	A study on 'Strategy and Action Plan for Chemicals management in Malaysia' was conducted by Danish International Development Agency (DANIDA) in collaboration with Ministry of Natural Resources and Environment (NRE) and Department of Environment (DOE) in 2009.	Lack of coordination of efforts and activities and cooperation from relevant agencies. Does not have specific regulation or legislation for sound management of chemicals in the full life cycle. Insufficient of financial capacity to manage chemicals. Lack of personnel capacity to manage chemicals. Lack of comprehensive and systematic information database on chemicals.

[16] Progress of initiatives under 10th MP

[17] Only those relevant to DOE/ThWG EM

III. PROSPECT[18] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Financial Initiatives Chemical Management	Adequate financial is essential for a sound chemical management to be in place.	Consequently there is a need to allocate budget and additional funding to ensure that the strategies and action plan are implemented effectively.			

III. PROGRESS[19] (table A)- Human Capital

Areas of Assessment[20]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
Human Capital Chemical Management	The growing concerns over the adverse effects on human health and environment due to unsatisfactory management of chemicals as a result of overlapping legislations will be addressed by several initiatives including the formulation of a new Chemicals Management Act, setting up of chemical management commission or board, and the strengthening of the chemical notification and registration scheme.	An assessment of the existing state of chemicals management in Malaysia have been done, identification of the needs to have a sound chemical managements and the gaps that exist in the management of chemicals in the country.	Conduct a study and report of the existing chemicals management in Malaysia with technical expert assistant by Danish International Development Agency (DANIDA).	A study on 'Strategy and Action Plan for Chemicals management in Malaysia' was conducted by Danish International Development Agency (DANIDA) in collaboration with Ministry of Natural Resources and Environment (NRE) and Department of Environment (DOE) in 2009.	Lack of coordination of efforts and activities and cooperation from relevant agencies. Does not have specific regulation or legislation for sound management of chemicals in the full life cycle. Insufficient of financial capacity to manage chemicals. Lack of personnel capacity to manage chemicals. Lack of comprehensive and systematic information database on

[18] Way forward under 11th MP
[19] Progress of initiatives under 10th MP
[20] Only those relevant to DOE/ThWG EM

	Areas of Assessment[20]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
						chemicals.
						Lack of comprehensive risk assessment and risk reduction measures as a key element in pursuing the sound management of chemicals throughout their life cycle.
						Lack of understanding on the need to manage chemicals holistically.

III. PROSPECT[21] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Human Capital Chemical Management	Developing technical experts in chemical management.	Strengthening national capacity building to manage chemicals in an environmentally sound manner and improving international cooperation for Basel, Rotterdam, Stockholm and Minamata Convention.	Develop training modules on life cycle management of chemicals for stakeholders to improve management effiency . Conduct training, workshops and seminars to built capacity on topics include toxicology, hazard assessment, exposure assessment and risk assessment. Collaborate and request international organization for technical assistance in relation to chemical management e.gGlobally Harmonised System of Classification and Labelling of Chemicals (GHS) and Risk Assessment. To share knowledge and	Develop and enhance the ability of technical experts in chemical management.	2 modules at NIOSH and EiMAS. 2 programs per year. 2 programs per year. 2 programs per year.

[21] Way forward under 11th MP

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
				experience in chemicals management in international and regional setting. To identify, enhance and expand the scope of the existing testing facilities. In preparation and ratification of Stockholm and Minamata Convention.		Upgrading the existing facilities e.g Department of Chemical facility. Develop one (1) National Implementation Plan for implementation and obligation of the conventions.

III. PROGRESS[22] (table A)- Infrastructure

Areas of Assessment[23]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
Infrastructure Chemical Management	growing concerns over the adverse effects on human health and environment due to unsatisfactory management of chemicals as a result of overlapping legislations will be addressed by several initiatives including the formulation of a new Chemicals Management Act, setting up of chemical management commission or board, and the strengthening of the chemical notification and registration scheme.	An assessment of the existing state of chemicals management in Malaysia have been done, identification of the needs to have a sound chemical managements and the gaps that exist in the management of chemicals in the country.	Conduct a study and report of the existing chemicals management in Malaysia with technical expert assistant by Danish International Development Agency (DANIDA).	A study on 'Strategy and Action Plan for Chemicals management in Malaysia' was conducted by Danish International Development Agency (DANIDA) in collaboration with Ministry of Natural Resources and Environment (NRE) and Department of Environment (DOE) in 2009.	Lack of coordination of efforts and activities and cooperation from relevant agencies. Does not have specific regulation or legislation for sound management of chemicals in the full life cycle. Insufficient of financial capacity to manage chemicals. Lack of personnel capacity to manage chemicals. Lack of comprehensive and systematic information database on chemicals. Lack of comprehensive risk assessment and risk reduction measures as a

[22] Progress of initiatives under 10th MP
[23] Only those relevant to DOE/ThWG EM

	Areas of Assessment[23]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
						key element in pursuing the sound management of chemicals throughout their life cycle.
						Lack of understanding on the need to manage chemicals holistically.

III. PROSPECT[24] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Infrastructure Chemical Management	Establishing an integrated and systematic database on chemicals.	Strengthening information and knowledge base and also access to difference type information.	To establish National Chemical Inventory e.g the quantity and the usage of chemicals. Streamline existing agencies database system infrastructure (interface link). To develop a clearing house mechanism for chemical information depository.	Established an integrated and systematic database on chemicals.	Develop one (1) National Chemical Inventory. Develop one (1) interface link notification and registration system between DOE and DOSH. Develop one (1) interface link notification and registration system between DOE and all chemical stakeholders.

II. PROGRESS[25] (table A)- Innovations

	Areas of Assessment[26]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Innovation Chemical Management	The growing concerns over the adverse effects on human health and environment due to unsatisfactory management	An assessment of the existing state of chemicals management in Malaysia have been done, identification of the needs	Conduct a study and report of the existing chemicals management in Malaysia with technical expert assistant by	A study on 'Strategy and Action Plan for Chemicals management in Malaysia' was conducted by Danish International Development Agency (DANIDA) in collaboration with Ministry of Natural	Lack of coordination of efforts and activities and cooperation from relevant agencies.
						Does not have specific regulation or legislation

[24] Way forward under 11th MP
[25] Progress of initiatives under 10th MP
[26] Only those relevant to DOE/ThWG EM

	Areas of Assessment[26]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
		of chemicals as a result of overlapping legislations will be addressed by several initiatives including the formulation of a new Chemicals Management Act, setting up of chemical management commission or board, and the strengthening of the chemical notification and registration scheme.	to have a sound chemical managements and the gaps that exist in the management of chemicals in the country.	Danish International Development Agency (DANIDA).	Resources and Environment (NRE) and Department of Environment (DOE) in 2009.	for sound management of chemicals in the full life cycle. Insufficient of financial capacity to manage chemicals. Lack of personnel capacity to manage chemicals. Lack of comprehensive and systematic information database on chemicals. Lack of comprehensive risk assessment and risk reduction measures as a key element in pursuing the sound management of chemicals throughout their life cycle Lack of understanding on the need to manage chemicals holistically.

III. PROSPECT[27] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
.	Innovations Chemical Management	Establishing Good Chemicals Management Practices at national level.	Strengthening of measures to reduce risk and manage exposures of chemicals.	Conduct and report on risk assessment of priority chemicals based on targeted volumes, risks and use related information. Develop risk management measures to mitigate risk of	Established Good Chemicals Management Practices at national level.	Develop one (1) chemicals risk assessment guidelines. Develop one (1) roadmap for risk management measures including phase

[27] Way forward under 11th MP

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
				exposure including the phase out of hazardous substances.		out planning for hazardous substances.

II. PROGRESS[28] (table A)- Awareness

Areas of Assessment[29]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
Awareness Chemical Management	The growing concerns over the adverse effects on human health and environment due to unsatisfactory management of chemicals as a result of overlapping legislations will be addressed by several initiatives including the formulation of a new Chemicals Management Act, setting up of chemical management commission or board, and the strengthening of the chemical notification and registration scheme.	An assessment of the existing state of chemicals management in Malaysia have been done, identification of the needs to have a sound chemical managements and the gaps that exist in the management of chemicals in the country.	Conduct a study and report of the existing chemicals management in Malaysia with technical expert assistant by Danish International Development Agency (DANIDA).	A study on 'Strategy and Action Plan for Chemicals management in Malaysia' was conducted by Danish International Development Agency (DANIDA) in collaboration with Ministry of Natural Resources and Environment (NRE) and Department of Environment (DOE) in 2009.	Lack of coordination of efforts and activities and cooperation from relevant agencies.
					Does not have specific regulation or legislation for sound management of chemicals in the full life cycle.
					Insufficient of financial capacity to manage chemicals.
					Lack of personnel capacity to manage chemicals.
					Lack of comprehensive and systematic information database on chemicals.
					Lack of comprehensive risk assessment and risk reduction measures as a key element in pursuing the sound management of chemicals throughout their life cycle.
					Lack of understanding on the need to manage chemicals holistically.

III. PROSPECT[30] (table B)

[28] Progress of initiatives under 10th MP

[29] Only those relevant to DOE/ThWG EM

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Awareness Chemical Management	Increasing awareness level among stakeholders and public.	Promote public awareness and education and also enhance industries awareness and encourage their participation and cooperation.	Develop plan for cross sectoral training, workshops and seminar in good chemical management. Conduct an active dialogues between chemical industries and government regulatory bodies to create awareness. Develop syllabus for education in school and universities on chemical management. Organize events such as seminars and exhibitions to promote awareness and education on hazardous substances. Develop incentives and economic packages to encourage industry's participation.	Increase awareness level among stakeholders and public on the hazards and risks associated with chemicals.	2 programs per year. 2 programs per year. 1 syllabus per year 2 programs per year. 1 program per year.

[30] Way forward under 11th MP

ANNEX I-2

ENVIRONMENTAL MANAGEMENT STRATEGY FOR MALAYSIA
(Annex for Strategy Paper)

I. INTRODUCTION

The areas of assessment for contaminated land with regard to Institutional policy & regulatory framework, financial initiatives, human capital, infrastructure, innovations and awareness are detailed out in the table below. Table A discussed on the progress of the activities in the 10th. MP and Table B focuses on the program/activities for the 11th. MP.

II. PROGRESS (table A)

	Areas of Assessment	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Institutional Framework Contaminated Land	There is no institutional framework establish.	Sharing/using existing man power together with multitasking assessment.	Three (3) existing man power consist Director, assistant director and environmental officer to handling contaminated land issue.	Handling the contaminated land issue base on the existing capacity of man power.	There is no special unit/task force in Department of Environment handling contaminated land issue.

III. PROSPECT (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Institutional Framework Contaminated Land	A special unit/task force in Department of Environment handling contaminated land issues.	i. Establishing a structured task force supported with structured function and role on handling contaminated land management issues in Malaysia; ii. Enhance the implementation of computerise Contaminated Land Inventory System (e-CLIS).	A special unit/task force in Department of Environment handling contaminated land issues.	Efficient delivery system.	Targeting to establish the special unit/task force in Department of Environment handling contaminated land issues within five (5) years.

II. PROGRESS (table A)- Policy and regulatory framework

	Areas of Assessment	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Policy and regulatory framework Contaminated Land	There is no policy and regulatory framework formulate.	Using or referring to others provision in Environmental Quality Act 1974 in handling contaminated land issue.	Process or handling the contaminated land issue in accordance of best practise manner.	Issues relating to contaminated land in Malaysia being referred to Department of Environment in voluntarily basis.	i. There is no specific regulation addressing soil and groundwater contamination in Malaysia which reflect to the absent of the requirement of Section 21 to enable the enforcement of section 24 Environmental Quality Act 1974; ii. There is no enforcement conducted related to contaminated land issues.

III. PROSPECT (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Policy and regulatory framework Contaminated Land	Recognising the seriousness of contaminated land management issues facing the nation, there is a need to formulate specific legislation, standards and protocols to handle this issue in an environmental friendly manner to control soil pollution, and ensuring public safety and prevent further environmental degradation to land resources. The comprehensive nature of such legislations, standards, policies and protocols are essential to demonstrate good	To formulate a specific regulations and technical guidance documents on management of contaminated land in Malaysia and to be gazetted and enforce before 2020.	i. Drafting new regulation on management of contaminated land in Malaysia; ii. Reviewing appropriate economic instrument for addressing contaminated land management issues in a propose regulation. iii. Studying appropriate assisting standard on contaminated land issues that has practises in various country and to recommending for proposes Malaysian	A set of gazetted new regulations on contaminated land management in Malaysia.	i. A new Regulation on Contaminated Land Management in Malaysia will be formulated and operationalised; ii. A new technical guidance document on managing contaminated land in Malaysia to be developed and operationalised.

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
		governance of contaminated land management in Malaysia as stipulated in the Environmental Quality Act 1974 (Act 127)		Standard; iv. Completing stakeholders engagement and consultation process for strengthening the propose regulation; v. Table the propose regulation for endorsement and gazettement.		

II. PROGRESS (table A)- Financial Initiatives and Human Capital

	Areas of Assessment	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Financial Initiatives Contaminated Land	There is no financial initiative given for this project.				
	Human Capital Contaminated Land	Limited number of: i. DOE's officers who carry out the process work related to the management and control of contaminated land in Malaysia; ii. Stakeholders, consultants and auditor with sufficient experience to review contaminated land output	Increase the practices and research in related to contaminated land issues among DOE's Officers.	Implement/ practices of using the three (3) series of Contaminated Land Management and Control Guidelines in managing contaminated land issues	Ten (10) training modules were developed and being deliver to DOE's officers from time to time.	i. Limited number of the expertise in the management of contaminated land; ii. Limited number of personnel/ human resources to implement/ manage contaminated land management in Malaysia; iii. There is a need to built technical expertise in managing the contaminated land in Malaysia; iv. Officers are trained been transfer and doing others job description.

III. PROSPECT (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Financial Initiatives Contaminated Land	Government Fund				
	Human Capital Contaminated Land	Establish capacity building on subject matter expert (SME) and competent persons for relevant stakeholders dealing	Develop training modules and carry out training to DOE's officers, subject matter expert (SME),	Establish certification program to qualify those eligible to be competent in land management.	Produce well train personnel and subject matter expert (SME) in area of contaminated land management in Malaysia.	i. At least 225 Department of Environment technical personnel to be train

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
		with contaminated land management issues in Malaysia.	relevant stakeholders, land owner, practitioners and mainstreaming government agencies.			within five (5) years; ii. At least 500 stakeholders to be train within five (5) years.

II. PROGRESS (table A)- Infrastructure

	Areas of Assessment	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Infrastructure Contaminated Land	Experience from many parts of the world has shown that acquiring, cleaning and redeveloping contaminated land can be very expensive and time consuming. Many industrial sites such as motor workshops, petrol stations, fuel depots, railway yards, landfills, industrial sites and ex-mining land can be potential contaminated sites as a result of industrial development over the past 25 years. Severe land contamination will have significant impacts on human health and the environment	i. To identify a contaminated land, manage and remediate for beneficial uses of the sites; ii. To perform the remediation work using appropriate technology and cost-effective.	Implementing the contaminated land management framework in accordance to three (3) series of Contaminated Land Management and Control Guidelines published in June 2009	i. Department of Environment (DOE) had published three (3) series of Contaminated Land Management and Control Guidelines in June 2009, that are:- a. Contaminated Land Management and Control Guidelines No. 1: Malaysian Recommended Site Screening Levels for Contaminated Land; b. Contaminated Land Management and Control Guidelines No. 2: Assessing and Reporting Contaminated Sites; and c. Contaminated Land Management and Control Guidelines No. 3: Remediation of Contaminated Sites.	i. Insufficient work carried out in identifying contaminated sites; ii. Currently in Malaysia, soil quality is not been monitored; iii. Contaminated land is slowly gaining importance in Malaysia especially in urban area. iv. Assessment and remediation of contaminated land is at its infancy stage in Malaysia. It is recognized that there are knowledge gaps in the understanding and application of various elements introduced under the CLM framework.
		No database on inventory representing the various categories of contaminated land in the country. There is a need an inventory system enables the identified sites along with relevant information and its profile to be recorded.	To create the database/ inventory system of contaminated land in Malaysia.	To developed database/ inventory system of contaminated land in Malaysia	The proposed data field/attribute for the database/ inventory system of contaminated land in Malaysia being formulate.	i. There is no database/ inventory system of contaminated land in Malaysia; ii. Very limited source of data/ information relating to contaminated land hence the n Malaysia.

	Areas of Assessment	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Innovations Contaminated Land	Status quo				

III. PROSPECT (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Infrastructure Contaminated Land	Establish demonstration project on good practises of contaminated land management	Demonstration sites that integrating best/optimum practises in remediating contaminated land into beneficial uses.	To establish demonstration project for ten (10) categories of contaminated land.	As a showcase of converting contaminated land into beneficial uses of land development in the interest of stakeholder.	At least two (2) successful demonstration project on contaminated land to be established within five (5) year.
		There is a need for establishing computerises an inventory system for mapping up information on contaminated land issues and its profile to be recorded.	To develop computerise database system on inventory of contaminated sites.	Establishing computerise Contaminated Land Inventory System (e-CLIS) and integration with DOE databank intelligent system.	Reliable tracking system on contaminated land issue in Malaysia and improving environment quality including ex-contaminated land, soil, groundwater and air in Malaysia.	Contaminated Land Inventory System (e-CLIS) to be established within five (5) years.
	Innovations Contaminated Land	NA				

II. PROGRESS (table A)- Awareness

	Areas of Assessment	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Awareness Contaminated Land	The absence of legislation coupled with the low level of awareness has, in the past diverted attention away from the contaminated sites problem. The general awareness amongst the public need to be heightened and overall capacity amongst professionals need to be raised.	Promoting awareness to the public, decision makers and the professionals on the importance of protecting the environment including issues related to contaminated land.	Present papers/ conduct courses/ sharing information to stakeholders, private and public sectors/agencies.	Seminars/ workshops/ in-house training to stakeholders.	i. Limited number of the expertise in the management of contaminated land; ii. Limited number of personnel/ human resources to implement/ manage contaminated land management in Malaysia; iii. Limited dissemination of information related to the management of contaminated land in Malaysia led to a lack of awareness among the stakeholders.

III. PROSPECT (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Awareness Contaminated Land	Efforts to enhance awareness raising programmes amongst stakeholders of land contaminated management issues will be fortified	Promoting awareness to the stakeholders, decision makers and the practitioner on new legislation and holistic approach of contaminated land management issues.	Conduct seminars, demonstration project and data information sharing to agencies, private and relevant stakeholders.	Increase awareness level and fortified environmental culture society in Malaysia.	Communicating awareness program on contaminated land issues to 500 stakeholders over five year period.

ANNEX I-2

ENVIRONMENTAL MANAGEMENT STRATEGY FOR MALAYSIA
(Annex for Strategy Paper)

I. INTRODUCTION

The areas of assessment for Air Quality with regard to Institutional policy & regulatory framework, financial initiatives, human capital, infrastructure, innovations and awareness are detailed out in the table below. Table A discussed on the progress of the activities in the 10th. MP and Table B focuses on the program/activities for the 11th. MP.

II. PROGRESS[31] (table A)- Institutional Framework

	Areas of Assessment[32]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Institutional Framework Air Quality	NA				
	Policy and regulatory framework Air Quality	1. The National Aerial Surveillance Programme continued to monitor and detect environmental pollution due to open burning activities, emission from industries, coastal and marine pollution, land clearing activities on highland and island development	• Information on the environmental pollution activities detected from the aerial surveillance would be channelled to DOE control room and ground surveillance staff for enforcement actions	• Schedule planning • Monitoring activity • Reporting • Action on non-compliance activity such as open burning cases • 28 flights were carried out in Peninsular Malaysia • 72 flights were carried out in Sabah and Sarawak	• Increased number of hotspots investigation	• Difficult to ensure airline flights as scheduled • Flights that cannot be carried out according to schedule due to weather and technical problems
	Financial Initiatives Air Quality	NA				

[31] Progress of initiatives under 10th MP
[32] Only those relevant to DOE/ThWG EM

	Areas of Assessment[32]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Human Capital Air Quality	NA				

III. PROSPECT[33] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Institutional Framework Air Quality	NA				
	Policy and regulatory framework Air Quality	1. Noise pollution is one of the causes which affect the emotions that contribute to stress. The study conducted by researchers in Malaysia showed that noise pollution caused discomfort of life, health problems such as high blood pressure, loss of hearing and mental instability. Genesis shaking or vibration environment was a risk of accidents and damage to property	➢ Policy and guidelines to control of noise pollution sources shall be developed focusing on noise from construction activities, commercial and industrial activities and air transport. ➢ The study will be conducted by a consultant to determine the legal requirements for the control of noise pollution and ambient noise limits set by the appropriate land use category.	➢ Review of monitoring data that has been implemented ➢ Review existing guidelines noise ➢ Comparison of noise regulations with other countries ➢ Enact regulations ambient noise	➢ Comprehensive noise pollution control and monitoring	➢ Regulation on noise pollution control

[33] Way forward under 11th MP

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	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
		2. Open burning is a contributor to air pollution. In order to reduce open burning cases a stringent regulation should be introduced.	➢ Review Environmental Quality (Declared Activities)(Open Burning) Order 2003	➢ Reduce of open burning declared activities and commercializing the use of biomass from these activities	➢ Reduction of open burning cases ➢ Reduce the number of hotspots	➢ Less number of activities listed in the Environmental Quality (Declared Activities)(Open Burning) Order 2003.
		3. In Malaysia, Road Worthiness Certification (RWC) is not a legal requirement for privately owned vehicles to undergo annual roadworthiness inspections. Commercial vehicles however must undergo roadworthiness checks every six months. Roadworthiness checks for private vehicles are required when the vehicle engine's capacity has been changed, the vehicle transfers ownership, the vehicle is adapted for LPG (liquid petroleum gas), the registration number on a vehicle is changed, vehicle's road tax has been out of date for more than one year, purchasing imported vehicle and purchasing a used vehicle using a loan	➢ Feasibility Study on Road Worthiness Certification (RWC)	➢ DOE proposes outline consultation approach and stakeholders views are needed to implement this strategy as follow: a) extensive series of one-on-one meetings with key stakeholders; b) draft Regulation and 'Standards and Best Practice Guidelines' for public comment.	➢ Enhance enforcement activity	➢ Regulation on Road Worthiness Certification (RWC) under Road Transport Act.
		4. In order to protect the air environment it is important to recover petrol vapour contains toxic volatile organic compounds (VOCs)	➢ Feasibility Study on Benzene Recovery at Petrol Station	➢ DOE proposes outline consultation approach and stakeholder views	➢ Reduction of pollution	➢ Regulation on Benzene Recovery at Petrol Station

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
		like benzene, which is a known carcinogen (EURO 2M contains less than 5% benzene and EURO 4M contains less than 3.5% benzene). Petrol vapour emissions at petrol service stations are a significant and growing source of air pollution, which contribute to localize and regional wide ground level ozone air pollution (smog) which may damage human health and the environment. In line with the Clean Air Action Plan (CAAP) and Malaysia National Environmental Policy for targeting better air quality, new strategies are required to address the long-term challenge of reducing ground-level ozone pollution and to improve the air quality. Petrol vapour recovery (PVR) at petrol stations provides immediate health protection benefits by reducing personal exposure to toxic substances in petrol vapour		are needed to implement this strategy as follow: a) convening an Expert Reference Group (including oil company representatives) to consult on the conduct of the equipment trial and subsequent economic analysis; b) discussions with local suppliers of petrol station equipment; c) a discussion paper proposing of vapour recovery at petrol stations for public comment; d) draft Regulation and 'Standards and Best Practice Guidelines' for public comment.		
	Financial Initiatives Air Quality	NA				
	Human Capital Air Quality	NA				

II. PROGRESS[34] (table A) - Infrastructure

[34] Progress of initiatives under 10th MP

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	Areas of Assessment[35]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Infrastructure Air Quality	1. Fire prevention and water management in peatlands programme was mooted in 2009 and continued under the Tenth Malaysia Plan (10MP) which involved collaboration from lead agencies under the Ministry of Natural Resources and Environment (NRE) with the 1NRE synergy	• The programme comprises of three main components such as:- i. Construction of canal blocks or check dams to increase peatlands' water levels and retain humidity thus making it difficult to get burned; ii. Construction of underground water tube wells for fire suppression; iii.Construction of watch towers for enhanced surveillance; and iv. Increase public awareness through establishment of warning signs on open burning.	• Project site selection • Installation and operation • Coordination meeting among the lead agencies to oversee the implementation of the programme and identify project obstacles for continuous improvement • Monitoring the number of hotspots (fires) on daily basis in project area, using satellite image and Geographical Information System (GIS) • Audit programme to monitor the effectiveness of the infrastructure and maintenance activities	• The programme had achieved its output, as follows: i. Maintaining good air quality days (except when there is transboundary haze from Indonesia) ii. Peat fires in some project areas had been gradually reduced; iii. Enhanced partnership between local communities and local government to prevent and control fires; iv. Effective in reducing response time taken to put out peatland fires in some areas, i.e. from 7 days to 2 or 3 days v. Enhanced cooperation among lead agencies under the Ministry vi. Enhanced public perception on Government initiatives and actions taken to prevent and control peatland fires and haze at local level.	• Evaluation of the effectiveness and implementation of the strategy are through:- i. Coordination meeting among the lead agencies to oversee the implementation of the programme and identify project obstacles for continuous improvement. ii. Monitoring the number of hotspots (fires) on daily basis in project area, using satellite image and Geographical Information System (GIS) iii. Audit programme to monitor the effectiveness of the infrastructure and maintenance activities
		2. Under tenth Malaysia Plan, a total of RM5.7 million development project has been approved for the purpose of strengthening the enforcement activities to control the emission from	• The projects involved the procurement of five (5) enforcement instruments and equipment are as follow:	• procurement of five (5) enforcement instruments and equipment (Opacity smoke maker,	• number of compliance of black smoke/exhaust/noise emission standard increased	• The number of registered motor vehicle is increasing 5% - 6% every year and it became a main challenge for DOE to enforce and control

[35] Only those relevant to DOE/ThWG EM

	Areas of Assessment[35]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
		the motor vehicle. The projects involved the procurement of five (5) enforcement instruments and equipment as follow:	i. 30 units opacity smoke meter for measuring emission from diesel driven motor vehicles; ii. 40 units of sound level meter with Tachometer (RPM meter) for measuring noise emission from motor vehicles; iii.30 units CO/HC gas analyzer for measuring gas emission from petrol driven motor vehicles; iv.60 units of video camera to carry out visible smoke emission from motor vehicles; and v. 20 units modified four wheels drive vehicle for the enforcer to carry out enforcement activities on controlling the emission from motor vehicles.	tachometer, CO/HC gas analyser, video camera, 4WD vehicle) • Utilised the new instruments in enforcement activity	• Enhance enforcement activity	pollution from motor vehicles. • Constraint in number of enforcement officer

III. PROSPECT[36] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Infrastructure Air Quality	1. Building on the positive outcomes from the Fire Prevention and Water Management in Peatlands programme, the project was recommended to be replicated in other fire prone peatlands in Malaysia during the Eleventh Malaysia Plan (11MP). For enhancement of the programme, extensive	➢ For enhancement of the programme, extensive study on hydro-geological regime of the peatland areas was also recommended to be conducted as a roadmap towards integrated peatlands management system.	i. Preparing financial proposal ii. Budget approval iii. Project site selection iv. Preparing project specifications and scope of work v. Project award vi. Project implementation	➢ The programme expected output, are as follows: i. Maintaining good air quality days (except when there is transboundary haze from Indonesia) ii. Peat fires in some project areas had been gradually reduced; iii. Enhanced partnership between local communities and local	➢ Reducing the number of 'unhealthy' day ➢ Reduction of open burning cases in fire prone area ➢ Reduce the number of hotspots

[36] Way forward under 11th MP

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
		study on hydro-geological regime of the peatland areas was also recommended to be conducted as a roadmap towards integrated peatlands management system.			government to prevent and control fires; iv. Effective in reducing response time taken to put out peatland fires in some areas, i.e. from 7 days to 2 or 3 days compared to before this programme was implemented. v. Enhanced cooperation among lead agencies under the Ministry vi. Enhanced public perception on Government initiatives and actions taken to prevent and control peatland fires and haze at local level.	
		2. Data from air quality monitoring is important to help major agencies eg. National Security Council, Ministry of Education, Ministry of Health Malaysia and Ministry of Transport Malaysia in implementation of the National Haze Action Plan to protect public health and safety.	➢ Number of monitoring stations will be increased to cover more developed areas for the well being of the people especially during haze crisis period.	➢ Review the site suitability of existing automatic air quality monitoring stations and increase the stations number in critical areas that will be determined by the DOE based on historical data study.	➢ Representative and comprehensive of Air Quality Monitoring	➢ Increase number of automatic air quality monitoring stations (CAQM) in critical areas that will be determined by the DOE based on historical data study. ➢ Motor Vehicle Emission Test Laboratory Facility
		3. Emission Test Laboratory (ETL) is a laboratory dedicated to vehicle emission and fuel economy testing. Basically, ETL consists of 4WD chassis dynamometer, computer system, control room, emission analyzer system and other safety devices. The latest certified	➢ Feasibility Study on Emission Test Laboratory (ETL)	➢ Consultation approach and stakeholder views are needed to implement this strategy as follow: a) convening an Expert Reference Group including oil company to consult on the conduct of the	➢ Reduction of pollution from Motor Vehicle Emissions	

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
		ETL system should able to conduct test up to EURO 5 to EURO 6 standard.		equipment trial and subsequent economic analysis; c) an extensive series of one-on-one meetings with key stakeholders; d) several broader industry meetings and engagements at industry association seminars and conferences;		

II. PROGRESS[37] (table A)- Innovations

	Areas of Assessment[38]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Innovations Air Quality	1. Air pollutant index (API) is an indicator used to measure air pollution level in an area. The API value is used to facilitate the public in assessing the air quality of an area whether it is at good, moderate, unhealthy, very unhealthy or hazardous level. The objective of the project is to establish the API based on the updated Malaysia Ambient Air Quality Standard 2013. The standard set new concentration limits for five (5) current air pollutants parameter. The five air pollutants are particulate matter with the size of 10 micrometre or less (PM10), sulphur dioxide (SO2), carbon monoxide (CO), nitrogen dioxide (NO2) and ground level ozone (O3). In addition, a new parameter which is particulate matter with the size of 2.5 micrometre or less (PM2.5) with new	• The expected outcome from the project are as follows:- i. Establishment of new API for the purpose of air quality status reporting to the public; ii. Stand-alone API calculation program which use Microsoft Excel spreadsheet; and iii. Booklet which contains information of the API background and the API calculation method that can be used to educate general public.	• Review of Malaysia Air Quality Index (API)	• In progress	• Difficulty in selecting consultancy firm due to very specific theme of the project.

[37] Progress of initiatives under 10th MP
[38] Only those relevant to DOE/ThWG EM

	Areas of Assessment[38]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
		concentration limit are included in the standard. 2. Ground level ozone caused various adverse effects to human and plants. Exposure to ground level ozone usually associated to respiratory system illnesses. Long term exposure to the ground level ozone may contribute to degradation of immunity system and lung function, inflammation of lung layer and as well as discomfort. In order to minimize the pollution effects of ground level ozone to environment and human, comprehensive information is vital. Credible data and information will be required for prevention action and development of precautionary measures in the future.	• Expected outputs from the study are as follows:- i. Status of ozone pollution in Malaysia and major causes and sources contribute to ozone pollution near the stations; ii. Trends of ozone pollution in Malaysia within at least 10 years and its correlation with meteorological data as well as weather; and iii. Action plan to reduce the pollutants which contribute to ozone formation and practical measures and action to handle ground level ozone pollution in Malaysia.	• Study on Ozone Pollution in Malaysia		• Difficulty in selecting consultancy firm due to very specific theme of the project.

III. PROSPECT[39] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Innovations Air Quality	1. The technology for remote sensing of vehicle emissions is based on the principle of gases adsorption of infrared and ultraviolet light. Remote Sensing Device (RSD) is specially designed to measure vehicle emissions	➢ Feasibility Study on Remote Sensing Devices (RSD)	➢ A study to evaluate the feasibility of implementation in Malaysia RSD will be conducted. ➢ Convening an Expert Reference Group	➢ Enhance enforcement activity ➢ Comprehensive data on Motor Vehicle Emissions control ➢ Reduction of pollution from Motor Vehicle Emissions	➢ Feasibility Study on Remote Sensing Devices (RSD)

[39] Way forward under 11th MP

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	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
		as vehicles travel past a light beam adjacent to the roadway. The light beam passes through the vehicle emissions and measures pollutants using infrared and ultraviolet beams. 2. BTEX refers to chemical substances of benzene, toluene, ethyl benzene and xylene. Previous studies showed that BTEX compounds may harmful on human health by inhalation, drinking water and long term exposure. Prolonged exposure to these compounds also may decline organs such as kidney, liver and blood systems.	➢ Study on BTEX concentration in ambient air	(including oil company representatives) to consult on the conduct of the equipment trial and subsequent economic analysis; ➢ an extensive series of one-on-one meetings with key stakeholders ➢ draft Regulation and 'Standards and Best Practice Guidelines' for public comment. ➢ A study to identify level of BTEX concentration in ambient air to help planners and decision makers to develop plan of action to minimise problem from BTEX compounds.	➢ BTEX Concentration in Ambient Air control and monitoring activity	➢ Guideline on BTEX Concentration in Ambient Air
	Awareness Air Quality	NA				

ANNEX I-2

ENVIRONMENTAL MANAGEMENT STRATEGY FOR MALAYSIA
(Annex for Strategy Paper)

I. INTRODUCTION

The areas of assessment for river, marine, ground water quality and Oil Spill with regard to Institutional policy & regulatory framework, financial initiatives, human capital, infrastructure, innovations and awareness are detailed out in the table below. Table A discussed on the progress of the activities in the 10th. MP and Table B focuses on the program/activities for the 11th. MP.

II. PROGRESS[40] (table A)- Institutional Framework

	Areas of Assessment[41]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Institutional Framework River Marine Groundwater Oil Spill	Provide Inland and Marine Water Quality Information *in lieu* of river, marine & groundwater quality monitoring.: River, marine and groundwater quality monitoring data collected is as result of interval observation and sampling at national strategic network station. <u>Inventory</u> Compilation of inventory of pollution sources <u>Maritime</u> Predicting Land Based Pollution Loads	<u>River, Marine & Groundwater Quality Monitoring</u> Privatisation of River water quality monitoring FIeldwork and sampling for marine and groundwater are run by State DOE Office, while chemical assay and analysis by Chemistry Department of Malaysia. <u>Inventory</u> Comprehensive inventory of pollution point and non- point sources; Maritime	Study to rationalize and expansion of strategic national monitoring network stations. All sectors were sampled 4 times yearly Collection and compilation of pollution sources and hydrological data Inventory of pollution, sources and flowrate Provide water quality Information for enforcement use through intranet <u>Oil Spills Contigency</u>	Water Quality Monitoring Network stations had been discretely increased to; <u>RIVER</u> 891 Manual River Water Quality Station (MRWQS) **10** Continuous RWQS station <u>MARINE</u> 321 stations (Coastal =155 station, Estuary=76, Island 90) **34668** numbers data <u>GROUNDWATER</u> 105 stations 18900 numbers of Groundwater data Data compilation (inventories of pollution sources and loading) for five (5) river basins	Frequency of water sampling may not be sufficient to represent the water quality of a river area throughout the year - not well proportionate to all river basin, sources of pollution and water use. Lack of Modeling Expert and SME

[40] Progress of initiatives under 10th MP

[41] Only those relevant to DOE/ThWG EM

	Areas of Assessment[41]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
		Oil Spills Contigency Mobilizing the mechanism to control oil and hazarddous substances discharges into Malaysian and EEZ waters through National Oil Spills Contigency Plans (NOSCP) along with consent and advice from the authorized members of the National Oil Spill Control Committee (NOSCC)	Oil Spills Contigency Establishment "Centre of Excellent for Marine & Water Pollution Control" Strengthening National Oil Spill Response & Preparedness		Oil Spills Contigency Better Management on Water Quality Minimization of negative impacts to sensitive ecosystems, economic, tourism and other socioeconomic impact from land-base and sea based activities/ pollution	Oil Spills Contigency Lack of experts and information in water quality management, analysis, trajectory, modeling, and reference centre for water quality assessment and predictions. Lack of capacity building on water quality management and oil spill response Lack in oil spill response & preparedness

III. PROSPECT[42] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Institutional Framework River Marine Groundwater Oil Spill	Endure and enhance the water quality monitoring by privatisation. Sampling and laboratory analysis by concessionaire. Data processing and reporting by DOE Inventory of Water Pollution Sources Determination of Pollution Loads	River and Marine water quality monitoring through privatisation while groundwater monitoring sustain existing service routines. Reliable informative and fast dissemination through online communication Pollution Loads calculation by sector and river	Study to rationalize existing national monitoring network stations Collection and compilation of pollution sources and hydrological data	Better Reporting on River Water Quality Status Trustworthy and better accuracy information on water quality of a river and fast dissemination through online communication River pollution profiling or carrying capacity of a river may distinct TMDL application, hence restrain future river pollution event.	Increase Number of River Water Quality monitoring station Less number of polluted river Frequency of water sampling may not be sufficient to represent the water quality of a river throughout the year - not well proportionate to all river basin, sources of pollution and water use. Lack of Modeling Expert and SME

II. PROGRESS[43] (table A)- Policy and regulatory framework

[42] Way forward under 11th MP

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	Areas of Assessment[44]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Policy and regulatory framework River Marine Groundwater Oil Spill	<u>River, marine & Groundwater</u> Provision under Section 3, Environmental Quality Act 1974 require mandatory National River Water Quality to be reported annually. National Water Quality Standard (NWQS) Water Quality Index (WQI) <u>Inventory</u> reference centre for data, information and water quality assessment. <u>Oil Spills</u>	<u>River</u> Improve decision making processes by providing more comprehensive, reliable and justified information River Water Quality Monitoring is focus to indicate ambient state of river, marine and groundwater quality at a well mix and homogenized condition. <u>Marine</u> Develop SOP on Marine Water Quality Monitoring Develop Marine Water Quality Criteria and Standards Develop Marine Water Water Quality Index	<u>River</u> Revise monitoring network station criteria base on beneficial use at downstream of a river, marine environment and landuse pattern for groundwater. Classifications of river water quality status based on NWQS and WQI, Marine classification based on MWQS and MQI. Adding Network Station at strategic points at upstream of drinking water supply intake Study to rationalize and expansion of strategic national monitoring network stations. <u>Marine</u> Draft specific marine regulation under EQA Develop SOP on Marine Water Quality Monitoring in house Develop Marine Water Quality Criteria and Standards by consultant	Revised number of monitoring station Enhancing River of Life (ROL) programme with water quality monitoring stations within project area (Sg Klang system). <u>Marine</u> Draft of Marine Pollution Control Regulation Establishment and implementation of SOP on Marine Water Quality Monitoring standard since 2011. Establishment and implementation of Marine Water Quality Criteria and since 2009 Establishment and implementation of Marine Water Water Quality Index since 2012 <u>Groundwater</u> Revised all 39 parameters based on represented specific land use	Various agencies also doing river water quality monitoring (duplicating) Concession terms is expiring by April 2015

[43]Progress of initiatives under 10th MP
[44]Only those relevant to DOE/ThWG EM

	Areas of Assessment[44]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
				Develop Marine Water Water Quality Index by consultant		

III. PROSPECT[45] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Policy and regulatory framework River Marine Groundwater Oil Spill	Provision under Section 3, Environmental Quality Act 1974 require mandatory National River Water Quality to be reported annually. Not all pollution sources are covered under the EQA 1974 Provision under Section 27 and Section 29 Environmental Quality Act 1974 empowerd DOE to control oil and hazarddous substances discharges into Malaysian waters Provision under Section 10 Economic Exclusive Zone 1984 empower DOE to control oil and hazardous substances discharges into Malaysian EEZ	Strengthening Standard Operatiing Procedure, capability and capacity of DOE Fortifying rationalizing National Water Quality Monitoring Network and Program competent personnel and dedicated forensic team (capacity building) To optimize River Water Quality Monitoring parameters and stations to address complexity in river water quality assessment Enhance Inventory of pollution sources and geospatial mapping of National river water quality Tracking origin and mobilization of pollutants in the river in enhancing environmental forensic data <u>Oil Spill</u> Implemention of Marine	Revise monitoring network Classifications of river water quality status based on NWQS and WQI To include new parameter in water quality monitoring program (e.g. biological, heavy metal species, etc.) for regulatory purposes To enhance RWQI calculation by including more relevant parameters Enhance Inventory of pollution sources (PS & NPS) towards forensic approach and geospatial <u>Oil Spill</u> Gazettement of Marine Pollution Regulation Updating NOSCP and implement	Optimization of River Water Quality Management, Monitoring and enhancement of data sharing and data Enhancing River Water Quality data <u>Oil Spill</u> Minimization of negative impact to marine environment	Number of parameter Number of geospatial mapping Number of new data repository Number of environmental forensics data Improve status of marine water quality <u>Oil Spill</u> Gazettement of Marine Pollution Regulation

[45] Way forward under 11th MP

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
			Pollution Regulation Review NOSCP			Revised NOSCP

II. PROGRESS[46] (table A)- financial initiatives

Areas of Assessment[47]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
Financial Initiatives River Marine Groundwater Oil Spill	Government funding through Development Expenditure (DE) and Operational Expenditure (OE)	To propose budget for additional monitoring stations	Manage and Implement Monitoring Programme based on budget allocated	Budget is well spent and the Monitoring Programme is successfully implemented.	Budget allocated is not sufficient to have more strategic stations for better and representable water quality status Additional OE Budget approved below expected volumes, hence unable to support for expansion of monitoring network and especially additional parameters

III. PROSPECT[48] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Financial Initiatives River Marine Groundwater Oil Spill	Annual Government funding through Development Expenditure (DE) and Operational Expenditure (OE)	To budget proposal for additional monitoring stations To review current water quality monitoring policies, human resource and organizational setup, technical specification and implementation strategies. To review and study Cost Benefit Analysis between implementing water quality	Proposal for additional funds Manage and Implement Monitoring Programme based on budget allocated	Better Management on Water Quality Monitoring. Better knowledge on best monitoring practices.	Budget for river and marine water quality monitoring programme, implementing through privatisation. Budget for the studies of water quality monitoring policies, human resource and organizational setup, technical specification and implementation strategies Budget for Operation and

[46] Progress of initiatives under 10th MP
[47] Only those relevant to DOE/ThWG EM
[48] Way forward under 11th MP

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
			monitoring through privatisation against alternatives means ie own sampling but samples to be analysed at accredited laboratories. Collaboration with local, regional and international bodies (smart partnership) Budget proposal for National Oil Spills and Beach Clean-up Exercises			Maintenance of monitoring equipment and intruments required by State DoE office Budget for the O&M of groundwater wells

II.PROGRESS[49] (table A)- Human Capital

	Areas of Assessment[50]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Human Capital River Marine Groundwater Oil Spill	Monitoring works is done by Concessionaire QAQC Audits is carried out by DOE	Improve service delivery through multitasking force.	Capacity building Training course Workshop and meeting	On going training to upgrade and enhancement skill and technical expertise of staff.	Lack of skilled personnel in specialised areas. Need for training in specialised areas. Need of regular job routine for specialised function ie field experience for river monitoring skills No specific QAQC audits personnel Lack of capacity building in monitoring and audits Lack of Expert in the field of water quality modelling and TMDL

III. PROSPECT[51] (table B)

[49] Progress of initiatives under 10th MP
[50] Only those relevant to DOE/ThWG EM
[51] Way forward under 11th MP

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Human Capital River Marine Groundwater Oil Spill	Monitoring works is done by Concessionaire QAQC Audits is carried out by DOE Need of expertise and enough supporting staff for sampling and analysis Lack of Expertise Monitoring unit at state DOE consists of 2-3 personnel Lack of personnel for specific job descriptions	Multitasking technical personnel Privatisation of monitoring programme Programme for SME's	Capacity building Training course Workshop and meeting Restructuring of organization Training course for SME	Skill and expert personnel Subject Matter Expert (SME) Capacity building in marine pollution control and beach clean up Optimized skilled human resources in the field of Water Quality Management, Monitoring and enhancement of data sharing and data Strengthening the preparedness towards marine and beach pollution incident	Number of trained SME Number of training events Numbers of data exchanged

II. PROGRESS[52] (table A)- infrastructure

	Areas of Assessment[53]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Infrastructure River Marine Groundwater Oil Spill	<u>River</u> Assets and infrastuctures provided by concessionaire Operation and Maintenance is done by Concessionaire Continuous Water Quality Monitoring Stations are fixed structures at river banks <u>Marine</u> <u>Groundwater</u> <u>Maritime</u>	<u>River</u> Assets and infrastuctures provided by concessionaire River Water Quality Monitoring Works Complies the Manuals and SOP Continuous Water Quality Monitoring Stations uptime is more than 95 % daily <u>Marine Groundwater</u> <u>Inventory</u> <u>Maritime</u>	To audit on Operation and Maintenance, as well as QAQC to ensure operators are adhered to and complies with Manual and SOP. Online data retrieving at all DOE office	Calibration and maintenance of equipment as per schedule Sampling programme done as per schedule	Total dependance on concessionaire readiness and assistants In situ measurement using portable monitoring equipments CWQMS is not sufficient to monitor water quality in all strategic and sensitive area (eg. water intake for water supply)

[52] Progress of initiatives under 10th MP
[53] Only those relevant to DOE/ThWG EM

	Areas of Assessment[53]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
		Oil Spill	Comply to Operation Manual of Equipment			

III. PROSPECT[54] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Infrastructure River Marine Groundwater Oil Spill	In situ measurement using portable monitoring equipments Fixed Continuous Water Quality Monitoring Stations are build or temporary structures at river banks with online facilities Operation and Maintenance is done by Concessionaire	Comply to Operation Manual of Equipment Comply to SOP on River Water Quality Monitoring Use of advanced and high technology equipment in water quality monitoring National Environmental Quality Data Centre Improving monitoring network and monitoring efficiencies and approach by means of Applying new high technology methodologies and instrumentation Adoption and adaptation of new internationally accepted standard for specified instrumentation Widen the high technology communication instrumentation through wireless and online information dissemination for prompt report to stakeholder.	Audit on Operation and Maintenance according to Manual and Procedure Online data retrieving at all DOE office Procurement of dedicated vehicle with mobile equipments for quality monitoring Establishment "Centre of Excellent for Marine & Water Pollution Control"	

II. PROGRESS[55] (table A)- Innovations

	Areas of Assessment[56]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Innovations River Marine Groundwater Oil Spill	Improve Reporting Format Pollution loads calculation and Water Quality Modeling Spatial Mapping for River status and Classes	Develop Index for marine water quality status	Study on Establishment of Marine Water Quality Index	Establishment and implementation of Marine Water Quality Index since 2012.	

[54] Way forward under 11th MP
[55] Progress of initiatives under 10th MP
[56] Only those relevant to DOE/ThWG EM

	Areas of Assessment[56]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
		Marine Water Quality Index				

III. PROSPECT[57] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Innovations River Marine Groundwater Oil Spill	Improve Reporting Format Pollution loads calculation and Water Quality Modeling Spatial Mapping for River status and Classes	Enhance river water quality Index formulation (to add more parameters) Calculate and predict pollution loads for 5 selected rivers Designing Spatial Map in reporting River Status and Classes based on WQI Comparing manual sampling data against instrument assist data	To review the formulation of river water quality Index To conduct special studies to obtain data sets from manual sampling versus machine instrumentation and run statistic manipulation and regression.	Revised WQI Calculate and forecast pollution loads, source of pollution and carrying capacity of a river Information dissemination of water quality in the form of spatial map and GIS format To implement auto instrumentation monitoring and develop relative constant of a river monitoring.	Revised WQI formula Number of rivers with prediction of Pollution Loads

II. PROGRESS[58] (table A) - Awareness

	Areas of Assessment[59]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Awareness River Marine Groundwater Inventory Oil Spill	NA				

III. PROSPECT[60] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Awareness River Marine	Public participation in awareness programme is very important in combatting river pollution.	Enhance promoting public participation in river water quality programme (CEPA)	Promoting via website, publications, brochure, dialogue and mainstream social media.	Increase awareness among public and stakeholders Increase public participation in	Number complaints

[57] Way forward under 11th MP
[58] Progress of initiatives under 10th MP
[59] Only those relevant to DOE/ThWG EM
[60] Way forward under 11th MP

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Groundwater Inventory Oil Spill				taking care of river cleanliness and citizen water quality monitoring	

ENVIRONMENTAL MANAGEMENT STRATEGY FOR MALAYSIA
(Annex for Strategy Paper)

I. INTRODUCTION

The areas of assessment for Enforcement & Compliance with regard to Institutional policy & regulatory framework, financial initiatives, human capital, infrastructure, innovations and awareness are detailed out in the table below. Table A discussed on the progress of the activities in the 10th. MP and Table B focuses on the program/activities for the 11th. MP.

II. PROGRESS (table A)- Institutional Framework

	Areas of Assessment	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Institutional framework Enforcement & Compliance	In line with the focus on adaptation and mitigation strategies to reduce the emission of greenhouse gases GHG);several projects had been carried out focusing on the reduction of GHG, strengthening enforcement compliances, reviewing the Environmental Quality (Clean Air Regulations) 1978, as well as the Environmental Quality (Control of Emission from Diesel Engines) Regulations 1996 and Enviroenmental Quality	• The formulation of the National Policy on the Environment (DASN) • The formulation of the National Policy on Climate Change • The formulation of the National Policy on Biological Diversity	• The establishment of 1 NRE Enforcement Team (1NET) aimed at improving enforcement of environmental laws and regulations utilising all available manpower and resources under NRE in carrying out enforcement.	• A Task Force established under 1NET is responsible for identifying resources needed to combat environmental crimes such as poaching, illegal land clearing and deforestation. • DOE's enforcement programmes continuously focuses on the compliances of industries, motor vehicles and non-industrial sources.	• Physical development in supporting enforcement programmes are insufficient - Efficiency of analysis method is questionable • Regulations no longer suitable with the demand of current environmental requirements for sustainable development nation -Some regulations are outdated and might not be relevant with current situation and technological changes • Different level of enforcement mechanism, procedures and capacity amongst environmental related agencies - resulting in low compliances • Overlapping and uncoordinated of jurisdiction/mandate in EQA, 1974 and other related Acts -Uncoordinated and overlapping legislations resulting in low compliances

	Areas of Assessment	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
		(Control of Emission from Petrol Engines) Regulations 1996.				

III. PROSPECT (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Institutional Framework Enforcement & Compliance	The DOE Strategic Plan 2011-2020 has outlined 9 strategic thrusts which form the basis of environmental management for DOE till the year 2020. This plan was formulated taking into consideration the requirements of all stakeholders in achieving more sustainable developed nation.	Thrust 2- Achieve compliance to the Environmental Quality Act,1974 and regulations thereunder;	• To develop standard operating procedure (SOP) for environmental forensic investigation, • To conduct rationalisation of enforcement approach based on sectors, sources and polluted area. • To set up joint committee to review environmental provisions that are overlapping, and uncertain jurisdiction as well as reviewing existing regulation for institutionlised self regulatory principle • To promote self-regulation to industries through incentives and facilitative approach	Environmental Management will be guided by DOE Strategic Plan 2011-2020	SOP Inter-agencies committee Number of participating industries

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	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
				• To promote enforcement program to increase number of competent person to operate pollution control systems and its instrumentations • To apply remote monitoring & enforcement • To enhance self-reporting of compliance on environmental regulations		Number of competent person Application of ICT and system Development Number of self-compliance report

II. PROGRESS (table A)- Policy and regulatory framework

	Areas of Assessment	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Policy and regulatory framework Enforcement & Compliance	The environmental sectors entered a new era that is more challenging and require higher commitment from all stakeholders in this aspect, the DOE Strategic Plan 2011-2020 has outlined 9 strategic thrusts which form the basis of environmental management for DOE till the year 2020. This plan was formulated taking into consideration the requirements of all stakeholders in achieving more sustainable developed nation.	• Thrust 2- Achieve compliance to the Environmental Quality Act,1974 and regulations thereunder;	• Compliance is defined based on the existence of infrastructure in polluted premises to achieve compliance all year round • Revisit the enforcement approach based on sector • Enforcement target based on sector/polluted area • Develop program and SOP for forensic investigation • Implement Electronic Motor Vehicle Investigation (EMVI) • Implement third party audit • Identify industry that is capable of self regulation • Introduce self regulation incentives • Develop self regulation criteria • Ensure all pollution control system are run by competent persons • Timely procument of the relevant equipment • Equip the enforcement officer/team with relevant gadget for immediate response	Environmental Management will be guided by DOE Strategic Plan 2011-2020	

	Areas of Assessment	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
				action • Train enforcement officers to handle equipment professionally • Review existing law and develop new regulations for the new approach in conducting enforcement • To formulate regulation on pig rearing and effluent discharge • To formulate regulation on restaurant discharge		

III. PROSPECT (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Policy and regulatory framework Enforcement & Compliance	In line with DOE Strategic Plan , the thrust to be incorporated will be Thrust 2- To achieve full compliance towards Environmental Quality Act, 1974 and Regulations thereunder.	• Strengthening Enforcement Mechanism • Physical Development to Support Enforcement Programme • Review of Act and Legislations • Synchronization of enforcement mechanism, procedures and capacity amongst environmental related	•To strengthen enforcement mechanism through: - Enforcement Action Plan - Implementation of effective Enforcement Mechanism by sector -To promote Self Regulatory Elements -To promote Green Industries Concept • Physical Development to Support Enforcement Programme	Full compliance to the Environmental Quality Act, 1974 and regulations thereunder	• No. of subject Matter Expert in DOE • Increase of percentage in usage self-regulatory application system • Increase of percentage of compliance of Industries towards Environmental Quality (Industrial Effluent) Regulations, 2009 • Increase of percentage of compliance of

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
			agencies Coordination of jurisdiction/mandate in Environmental Quality Act, 1974 and other environmental related Acts	-To equip enforcement officers with adequate and state of the art technical equipment • Review of Act and Legislations -To review and enhance Environmental Quality Act, 1974 To control non industry pollution sources • Synchronization of enforcement mechanism, procedures and capacity amongst environmental related agencies Coordination of jurisdiction/mandate in Environmental Quality Act, 1974 and other environmental related Acts		industries towards Environmental Quality (Scheduled Waste) Regulations, 2005 • Increase of percentage of compliance of palm oil mills towards Environmental Quality (Prescribed Premises) (Crude Palm Oil),1978 • Increase of percentage of compliance of rubber mills towards Environmental Quality (Prescribed Premises) (Raw Natural Rubber) 1978 • Increase of percentage of compliance of scheduled waste facilities Increase of percentage of competent persons accordance to number of industries • No. of pilot projects under Cleaner Production Programmes

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II. PROGRESS (table A)- Human Capital

	Areas of Assessment	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Human Capital Enforcement & Compliance	Limited number of : • Enforcement team The number of enforcement team for DOE is 173 which is insufficient to cover all number of pollution sources.	• Prioritize enforcement programmes based on number of complaints and percentage of compliance.	• To implement enforcement programmes according to priority.	• A total of 278 cases of non-compliances were charged in courts with a fine of RM 3,275,950 were collected in 2012. • A total of 1,103 written directives and 1,185 notices were issued for offenders to take appropriate actions in order to comply with the Environmental Quality Act, 1974	The number of pollution sources against the number of human resources are imbalanced. -The number of industries in Malaysia is 56,000 and the number of motor vehicles is 22 million, whereas the number of enforcement team for DOE is 173 which is insufficient to cover all number of pollution sources. These numbers of industries and motor vehicles keep increasing from year to year. From DOE yearly KPI assessment, only 10-15% number of pollution sources successfully inspected.

III. PROSPECT (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Human Capital Enforcement & Compliance	Increasing the number of : • Enforcement team To match the imbalance number of pollution sources against the number of enforcement staff	• Recruiting new staff • Job rotation for existing staff	• To recruit new staff from university graduates and non university graduates. • To do job rotation for existing staff so as to be able to multi tasking.	• Increase number of enforcement teams	• Immediate action taken in addressing complaints

II. PROGRESS (table A)- Financial Initiatives, Infrastructure, Innovations, and awareness

	Areas of Assessment	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Financial Initiatives	NA				
	Infrastructure Enforcement & Compliance	The conduct enforcement work requires assets such as vehicles and equipments	• Strengthen existing facilities to facilitate enforcement work	• To facilitate scheduled enforcement work	• As to date all enforcement teams are equipped with cameras, GPS, tablet and PPEs.	• Physical development in supporting enforcement programmes are insufficient -Insufficient technical equipment and tools -Insufficient of logistic facilities such as vehicles
6.	Innovations Enforcement & Compliance	NA				
7.	Awareness Enforcement & Compliance	NA				

III. PROSPECT (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Infrastructure Enforcement & Compliance	• Effective enforcement actions requires sufficient number of state of the art equipment and vehicles • PPEs should be used during field work so that safety is not compromised.	• The procurement of sufficient number of state of the art equipment and vehicles for enforcement teams is necessary to ensure effective and prompt enforcement actions • Enforcement teams need to be equipped with the complete Personal Protective Equipment (PPE) during field work.	• To do timely procurement of technical equipment • To provide adequate and suitable enforcement equipment for every enforcement team to enable immediate action taken • To train enforcement officers on handling technical equipments professionally	• Each enforcement team is equipped with state of the art equipment and vehicle	• Immediate action taken in addressing complaints
	Innovations Enforcement & Compliance	Environmental desktop enforcement need to be	Electronic and enforcement systems that have been	• To upgrade and improve environmental desktop	• Wide usage of self-regulatory application	• Increase in percentage of usage of self

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
		enhanced and strengthened which comprises of electronic and enforcement monitoring systems and performance monitoring for self compliance of industries and non-industries.	developed for the usage of DOE officers to monitor compliance of industries such as Continuous Emission Monitoring System (CEMS), Monthly Discharge Monitoring Report (MDMR), Electronic Consignment Note (ECN), and 'Elektronik Kawalan Alam Sekitar'(EKAS)	enforcement (electronic and enforcement monitoring system) via application systems CEMS,MDMR,ECN and EKAS. • To equip enforcement teams with application systems and equipment such as mobile enforcement(m-force) for issuing compounds, field citations and prohibition orders on the spot. • To incorporate GIS application in desktop enforcement methodology to assist enforcement officer in terms of case location study.	systems .	regulatory application systems
	Awareness	NA				

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ENVIRONMENTAL MANAGEMENT STRATEGY FOR MALAYSIA
(Annex for Strategy Paper)

I. INTRODUCTION

The areas of assessment for Green Industry with regard to Institutional policy & regulatory framework, financial initiatives, human capital, infrastructure, innovations and awareness are detailed out in the table below. Table A discussed on the progress of the activities in the 10th. MP. and Table B focuses on the program/activities for the 11th. MP.

II. PROGRESS (table A)- Institutional Framework

	Areas of Assessment	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Institutional Framework Green Industry	CP is only being promoted by the Green Industry Unit in DOE Putrajaya whereas no dedicated unit in the state office level to perform similar tasks.	No strategy was developed to overcome the issue. The focus was given more on the promotion of CP to SMEs			• Low application of Green Industry concept by DOE state office

III. PROSPECT (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Institutional Framework Green Industry	Till now, the Green Industry Unit is operating in DOE headquarters. In order the green industry program to be successful , the need to establish green industry unit in every state office is crucial	Strengthen institutional framework to enhance the application of green industry practices by SMEs	• To establish the Green Industry unit in DOE state offices • To promote the Green Industry Helpdesk and mobile help desk • To establish post Audit & Monitoring sub-unit in the, to monitor the implementation Green Industry practices by the Industry	• Dedicated Green Industry unit to perform tasks related to Green Industry • DOE officers to become mobile help desk • Increase number of SMEs that applies Green Industry practices in their operations.	• 14 DOE state departments • 14 DOE state departments • 14 DOE state departments • No. of SMEs adopts green industry

II. PROGRESS (table A)- Policy and regulatory framework

	Areas of Assessment	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Policy and regulatory framework Green Industry	CP is implemented voluntarily by SMEs	To Improve and increase the Green Industry practices among Small and Medium Enterprises (SMEs)	• To carry out CP Integration Project in batik making premise to become a model for other industries in CP implementation. • Cleaner Production (CP) Training Program towards the development of the Green Industry Demonstration Premise of Rice Mill Premise • To develop guideline on green industry practices for specific industries	• The Green Industry Demonstration Project for Batik Industry has been conducted in 2 phases which1st phase took place in 2011 and the 2ndphase in 2012. Batik Kraf was chosen as a demonstration premise for batik Industry. • Guideline on Green Industry practices in batik industry was developed to serve as a reference for the batik industry in the implementation of Green Industry practices • At 2014, the 1st phase of a green industry demonstration project for rice mill premise starts with the aim to help rice milling industry in the implementation of green industry practices. The 2nd phase of the project will start in 2015. A rice mill will be selected to become a demonstration premise. • Guidelines for green industry practices of the rice milling industry that act as a reference for other rice mill premises	• Lack of Green Industry Demonstration Project to serve as a model for other industries in implementation of CP/ Green Industry Initiatives. • Lack of guideline of green industry practices for different types of industry

III. PROSPECT (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Policy and regulatory framework Green Industry	To boost up the green industry implementation by SMEs, the green industry concept should be applied in every aspect of DOE activities.	Strengthen Policy and regulatory framework to include the Green Industry application concept in DOE enforcement program	• To review Environmental Quality Act 1974 to include Provision on Green Industry • To review ATOP to include Green Industry concept and application	• Industries are compelled to adopt Green Industry practices • More industries to adopt the Green Industry concept	• Revised EQA 1974 • Revised ATOP

II. PROGRESS (table A)- Financial Initiatives

	Areas of Assessment	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Financial Initiatives Green Industry	SMEs need financial support to implement green industry practices / CPin their premises	To identify the financial support / incentives for SMEs to implement CP in their premises.	Hold a roundtable meeting / discussion with relevant stakeholders.	A stakeholder meeting was led in 2013 to discuss on the matter pertaining to incentives and financial support from government agencies. A seminar for batik industry was also held 2013 to share the experience and knowledge in implementing CP in batik premise and inform batik industry on the incentives available for them.	Industries should have a valid license from local authorities and registered with SSM in order to get the incentive.

III. PROSPECT (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Financial Initiatives Green Industry	Financial initiatives needed in particular to SMEs for improvement or adoption of green industry practices	To work with financial institutions and relevant agencies that provide incentives and financial support to SMEs.	To have dialogue / meeting with the relevant stakeholders regarding the incentives and financial support	Increase in the number of SMEs that implement green industry practices	No. of SMEs adopts green industry

II. PROGRESS (table A)- Human Capital

	Areas of Assessment	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Human Capital Green Industry	Limited number of: • DOE officers who are expert in CP capable of giving advice on the matter pertaining CP to SMEs • Green industry auditors / CP consultants with sufficient experience to provide consultancy to SMEs	• Establish a group of experts in the particular field of Green Industry Cleaner Production at Department of environment • Create consultancy group of Green Industry	• To carry out the Green Industry Competency Program for DOE officers and Green Industry Auditor • To develop training modules on green industry/ CP for both DOE officers and industry/ consultants	• There are 5 programs have been conducted in 2013 which the participation of 28 DOE officers. At the end of the programs, they have been certified as Green Industry Auditors. • In addition, there are 21 external Green Industry auditors have been competent in 2013 out of 32 participants from various industries, consultants and academicians • A module on Green Industry Auditor Competency has also been developed and being used in Green Industry Auditor Competency Program in 2013	• The Green Industry concept is not applied by DOE officers in their enforcement activities. • No opportunity to practice Green Industry auditing by the trained Green Industry auditors due to no mandatory requirement by DOE. • No clear direction of the Green Industry audit at DOE state level and the need of coordination between the state offices and DOE Putrajaya.

III. PROSPECT (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Human Capital Green Industry	Human capital is one the resources that play important role in the successful implementation of green industry strategies.	To Increase the capacity building in Green Industry auditing at local and regional level	• To carry out competency programme for Green Industry Auditor for DOE officers • To carry out competency programme for Green Industry Auditor for industries / consultants • To carry out Green Industry competency programme for	• Trained Green Industry auditor among DOE officers • Trained Green Industry auditor among industries and consultants • Trained Green Industry auditor among government agencies and	• One programme per year • 2 programmes per year • 2 programmes per year

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
				government agencies and local authorities • To carry out training attachment programme in Green Industry for DOE office • To carry out Green Industry auditor registration scheme to provide technical assistance to industry	local authorities • Create Subject Matter Expert in Green Industry among DOE officers • A list of registered Green Industry auditor	• One programme per year • One programme (2016 -2020)

II. PROGRESS (table A)- Infrastructure

	Areas of Assessment	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Infrastructure Green Industry	The promotion and awareness program of CP require database to keep trackor monitor the implementation of CP by SMEs. It can also used to gauge the success of the promotion program and develop new strategy to suit the need of SMEs	• Strengthen existing database to acquire more data on status of CP implementation by the industries • Upgrade the database to become user friendly.	• To conduct surveys on the status of implementation of CP by SMEs	• Malaysian Green Industry database (MGID)	Maintenance of infrastructure in particular updating of database.

III. PROSPECT (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Infrastructure Green Industry	More demonstration projects are needed to show how green industry practices being implemented to increase productivity in industrial premises	Increase the number of Green Industry Demonstration Project	• To carry out the Green Industry demonstration project • To develop guidelines on Green Industry practices	• As a model for SMEs in implementing Green Industry practices • Guidelines on Green Industry practices for a specific industry sector	• 2 demonstration projects (2016 – 2020) • 2 guidelines(2016 – 2020)

II. PROGRESS (table A)- Innovations

	Areas of Assessment	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Innovations Green Industry	Green industry practices do not require any new innovation, but the practices can be started with simple housekeeping and 5S.Without proper training and exposure to CP, SMEs will not be able to see the benefits of CP in the production and operation of their premises.	To emphasize on the importance of training to SMEs, the existing CP audit assistance to SMEs program was changed Cleaner Production (CP) Training Program for SMEs towards the development of the Green Industry demonstration premise	Carry out Cleaner Production (CP) Training Program for SMEs towards the development of the Green Industry demonstration premise	Pre-Audit has been carried out for 75 premises in 2011 and 2012. In addition, 15 detail audits that have been carried in 2011-2012 and 15 premises in 2013. One of the outcomes of this program is that SMEs have been introduced and exposed on Green Industry practices and carbon footprint reduction	• Difficult to obtain SMEs cooperation to join the program. • Very few competent Green Industry auditors available in the market. • Lack of commitment of the industry to implement CP options. In reality, only few SMEs implement the CP options in their premises.

III. PROSPECT (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Innovations Green Industry	ICT plays important role in disseminating information to public. Existing ICT facilities should be used extensively and innovatively to promote green industry to SMEs	Increase the use of information technology (ICT) in the Green Industry Outreach Program	• To enhance the usage of Green Industry Virtual Centre (GIVC) to promote and share Green Industry initiatives / CP and other relevant information. • To upgrade and expand Malaysia Green Industry Databases (MGID) and Cleaner Production Implementation Tools (CPIT) system to become more user friendly.	• More countries get to know Malaysia and enhance the image of Malaysia • Sharing of information on Green Industry with visitors from all over the world • Full utilization of the system by users, especially DOE officers and industry	• No. of visitors to the GIVC • No. of data updated • No. of industry uses the CPIT

II. PROGRESS (table A)- Awareness

	Areas of Assessment	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Awareness Green Industry	Level of awareness of the benefit of Cleaner Production among SMEs are still low	Improve the Green Industry practices among Small and Medium Enterprises (SMEs)	Information Sharing and Dissemination Programmes The Green Industry Unit has been conducting various information sharing and dissemination programmes such as seminar, course / workshop, published materials, exhibition, Green Industry Virtual Centre (GIVC) and Green Industry Awards.	From 2011 to 2013, 625 participants have attended • Through workshops and courses, fifty (50) DOE officers have passed Cleaner Production Audit level 1 that enables them to execute the CP audit in their enforcement. • 12 exhibitions on green industry have been carried out throughout Malaysia in 2011-2013 and 17,357 attendees have been recorded visiting Green Industry booth. • 59,056 visitors have been recorded to visit Green Industry Virtual Centre (GIVC) since 2011. • In addition to seminar, courses and workshops, 10 materials in the form of bulletin and books on Cleaner Production and Green Industry have been published in 2011 -2013.	The only issue in publication of promotional materials is the difficulty to get the specific articles related to the Green Industry. It is found that the use of ICT in conveying the information on green industry/CP is still low, especially through the Green Industry Virtual Centre (GIVC)

III. PROSPECT (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Awareness Green Industry	Existing green industry promotion and awareness programme should be reviewed and strengthen to	• Strengthen the promotion efforts of Green Industry Practice among SMEs towards	• To carry out Green Industry training and advisory program for SMEs	• More SMEs to be exposed and trained in Green Industry practices • Well planned programme to	• 20 programmes per year • 10 programmes per

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
		capture more industries and government agencies to implement and adopt the green industry/ CP	compliance with the Environmental Quality Act 1974 • Reduce intensity of carbon emission in Malaysia through implementation of Green Industry practices using Carbon Footprint (CFP) and Water Footprint (WFP) as quantifiable measurement	• To increase Green Industry promotion and awareness program through exhibition, seminar, dialogue and mass media, which involve relevant agencies • To establish Green Industry awards / recognition scheme for the industry that successfully implementing Green Industry practices. • To publish Green Industry bulletin, books and brochures for reference of SMEs • To hold round table meetings/ discussions at national level on Green Industry (National Roundtable Meeting) which involve relevant • To integrate comprehensive elements of Carbon Footprint (CFP) and Water Footprint (WFP) into the Green Industry training module	promote Green Industry to SMEs. • SMEs implement Green Industry practices • Publication of materials for SMEs reference • Sharing of experiences and ideas among the stakeholders • Effective promotion and training programme for Green Industry can be developed • Modules on CFP and WFP for Green Industry training	year • Once in every 2 years • 15 publications (2016 - 2020) • Once per year Once in every 5 years

ANNEX I-2

ENVIRONMENTAL MANAGEMENT STRATEGY FOR MALAYSIA
(Annex for Strategy Paper)

I. INTRODUCTION

The areas of assessment for EIA with regard to Institutional policy & regulatory framework, financial initiatives, human capital, infrastructure, innovations and awareness are detailed out in the table below. Table A discussed on the progress of the activities in the 10th. MP and Table B focuses on the program/activities for the 11th. MP.

II. PROGRESS[61] (table A)- Institutional Framework

	Areas of Assessment[62]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Institutional Framework **EIA**	NA				

III. PROSPECT[63] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
1	Institutional Framework **EIA**	Protection of sensitive ecosystems for natural forest, hill slopes and highlands and coastal zone.	Protection of these sensitive ecosystems through formulation and strengthening of institutional framework.	• To formulate guideline and standard to integrate the environmental in National Highlands Policy. • To Strengthen the institutional framework for management for environmental impacts developments at hill slopes, and highlands. To setup State committee for slopes & Highland protection • To review current guidelines on Hill Slopes and High Land	Protect sensitive ecosystems of natural forest, hill slopes, highlands and coastal zone.	i. National Highlands Policy. ii. Establishment of Hill Slopes and High Land Development Council at Federal and state levels iii. Revised guidelines on Hill Slopes and High Land Development.

[61] Progress of initiatives under 10th MP
[62] Only those relevant to DOE/ThWG EM
[63] Way forward under 11th MP

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
				Development. • To formulate and implement ESCP plan to development activities on hill slopes, highland and catchment area • To enforce restriction on development of fragile hill and highlands ecosystems.		

II. PROGRESS[64] (table A)- Policy and regulatory fram

	Areas of Assessment[65]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Policy and regulatory framework **EIA**	Integration of EIA in planning process to help decision makers consider the environmental consequences of proposed actions.	Conduct a study to review the effectiveness of EIA in Malaysia.	The study focus on the status of EIA practice and identify major strengths and limitations, and recommendation on measures for strengthening the practice	i. Study the findings are: Weakness at the Policy and Programme Level. The format of EIA reports need to be improved. ii. Inadequate stakeholder engagement in EIA process iii. Code of conduct for consultants to be strengthened. iv. Skills of EIA consultants to • Study and enhancement programme of the effectiveness of EIA in Malaysia.	i. Weakness at the Policy and Programme Level -environmental impacts or issues at higher level policies or plans less attention. ii. Poor understanding on EIA as a planning tool. iii. Outdated EIA Inadequate stakeholder participation No statutory body under DOE for regulating the registration & professional & environmental practitioners.

[64]Progress of initiatives under 10th MP
[65]Only those relevant to DOE/ThWG EM

	Areas of Assessment[65]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
		.				
		Quality of EIA reports	Develop EIA support tools.	Development of specific EIA Guidelines and other guidance documents.	i. Development of EIA Guidelines for Solid Waste Incineration Plant, Solid Waste Sanitary Landfill, Siting and Zoning of Industries and Erosion and Sediment Control (ESCP) for Agriculture, Mining and Forestry Activity.	i. Amendment of EIA Order ii. Outdated EIA guidelines & No specific EIA guidelines for forest and agriculture
		Implementation of Best Management Practices (BMPs) on erosion and sedimentation control for highland development.	Demonstration of practical and cost effective BMPs for highland development.	Pilot project to demonstrate effective BMPs. implementation	Study on ESC using , Pilot Project, in Lojing, Kelantan.	-
		Public concern on safety and environmental hazard of cyanide in mining	Develop Ambient Air Quality Emission Standard for Hydrogen Cyanide.	Conduct a study to develop standard.	Study on suitability Ambient Air Quality Emission Standard for Hydrogen Cyanide.	-

III. PROSPECT[66] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
		2.1 Mainstreaming of environmental consideration in policy, plan and programme through National Environmental Strategy (NES).	NRE to formulate the "National Environmental Strategy" (NES) to follow through the National Environmental Policy.	The NES shall set goals and targets for environmental quality, spell out sustainable development principles and guidance for economic activities, formulate action plans for short and long-term improvements including for capacity building. The NES shall be formulated in a participatory manner.	Green development project Protection of environment	One (1) NES Document
		2.2 Quality EIA reports to	Develop EIA support tools	• To develop specific EIA	Improvements on the quality of	Number of new/revised

[66] Way forward under 11th MP

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
		assist decision making process	through formulation of specific EIA Guidelines for prescribed activities taking into consideration the amendments of EIA Order 1987, review of existing outdated EIA guidelines.	Guidelines for prescribed activities taking into consideration the amendments of EIA Order 1987. • To review and revise existing outdated EIA guidelines.	EIA reports thus improve assistance in decision making process.	specific EIA Guidelines
		2.3 Protection of sensitive ecosystems for natural forest.	Develop EIA support tools for development of forest plantation activities.	To develop EIA specific guidelines on development of forest plantation activities (combination of agriculture and forestry activities).	Protection of sensitive ecosystems for natural forest	One (1) EIA specific guidelines on development of forest plantation activities. Legislation on hill slopes and highlands development. Legislation on coastal zone and man-made islands development

II. PROGRESS[67] (table A)- Human Capital

	Areas of Assessment[68]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Human Capital **EIA**	Limited number of DOE officers to enforce EIA approval conditions.	Enforcement programmes based on complaints and non-compliance.	To implement enforcement programmes according to priority.	Enforcement programmes based on number of complaints and percentage of compliance.	Shortage ofhuman resources

III. PROSPECT[69] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Human Capital **EIA**	4.1 Number of DOE officers to conduct enforcement on EIA projects.	Enforcement through self-regulation approach.	Self regulating through performance monitoring and third party auditing.	Full compliance of EIA approval conditions.	Number of third party auditing. One (1) guidelines for

[67] Progress of initiatives under 10th MP
[68] Only those relevant to DOE/ThWG EM
[69] Way forward under 11th MP

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
				Develop guidelines for performance monitoring on EIA projects.		performance monitoring on EIA projects.
		4.2 Management of environmental practitioner. Establishment of a statutory body under DOE for the purpose of regulating the professional conduct and practice of registered EIA consultant, Environmental Auditor and other environmental practitioners in order to safeguard the safety and interest of the public. The function of the body are: i. maintains a register ii. Processing Applications for Registration iii. Assessments of Academic Qualification. iv. Regulating the Conduct and Ethics of the Engineering Profession. v. Publication of newsletter and bulletin or other printed materials. vi. Promotion of Continued Learning and Education.	To establish a statutory body within DOE to regulate the professional conduct and practice of registered environmental practitioners.	To conduct a study on establishment of a board to manage environmental practitioners. To draft a legislation to provide for the registration of environmental practitioners. Establish one (1) statutory body within DOE to manage environmental practitioner.	Systematic approach in managing environmental practitioners. Improvement in quality of EIA reports, environmental auditing and environmental compliance.	Reports of the study on establishment of a board to manage environmental practitioners. A Bill on the registration of environmental practitioners which includes the establishment of a statutory body to manage environmental practitioners. One (1) statutory body within DOE to manage environmental practitioner.

II. PROGRESS[70] (table A)- Financial/Infrastructure/Innovations/Awareness

	Areas of Assessment[71]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Financial Initiatives **EIA**	NA				

[70] Progress of initiatives under 10th MP

[71] Only those relevant to DOE/ThWG EM

	Areas of Assessment[71]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Infrastructure **EIA**	NA				
	Innovations **EIA**	NA				
	Awareness **EIA**	NA				

III. PROSPECT[72] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Financial Initiatives **EIA**	NA				
	Infrastructure **EIA**	NA				
	Innovations **EIA**	NA				
	Awareness **EIA**	High level of awareness on EIA as planning tool targeted at government agency (decision makers), private sector and non government organisation.	Strengthen capacity building on EIA for stakeholders - (project proponents, government agencies, private sectors, NGO's and EIA consultant).	To enhance competency through training, knowledge sharing, development of subject matter expert, hands on training and attachment programme: • Attachment programme with relevant public and private sectors on EIA. • International training and attachment on EIA. • Develop technical communication and negotiation skills on EIA. • Develop training operation plan for specific	Improved awareness and understanding of EIA as a planning tool.	Number of attachment programme Number of international training and attachment Number of training on technical communication and negotiation skills on EIA. 1 training operation plan Number of dialogues /forums

[72] Way forward under 11th MP

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
				stakeholders on EIA. • Host dialogues/forums with various stakeholder groups (project proponents, government agencies, NGOs, consultants, etc) to disseminate information about upcoming regulations, guidelines and standards, tell success stories, explain penalties imposed, solicit feedback; and build support.		

II. PROGRESS[73] (table A)- Awareness

	Areas of Assessment[74]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Awareness **EIA**	NA				

III. PROSPECT[75] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Awareness **EIA**	High level of awareness on EIA as planning tool targeted at government agency (decision makers), private sector and non government organisation.	Strengthen capacity building on EIA for stakeholders - (project proponents, government agencies, private sectors, NGO's and EIA consultant).	To enhance competency through training, knowledge sharing, development of subject matter expert, hands on training and attachment programme: • Attachment programme with relevant public and	Improved awareness and understanding of EIA as a planning tool.	Number of attachment programme Number of international training and attachment Number of training on technical communication and negotiation skills on

[73] Progress of initiatives under 10th MP
[74] Only those relevant to DOE/ThWG EM
[75] Way forward under 11th MP

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	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
				private sectors on EIA. • International training and attachment on EIA. • Develop technical communication and negotiation skills on EIA. • Develop training operation plan for specific stakeholders on EIA. • Host dialogues/forums with various stakeholder groups (project proponents, government agencies, NGOs, consultants, etc) to disseminate information about upcoming regulations, guidelines and standards, tell success stories, explain penalties imposed, solicit feedback; and build support.		EIA. 1 training operation plan Number of dialogues /forums

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ENVIRONMENTAL MANAGEMENT STRATEGY FOR MALAYSIA
(Annex for Strategy Paper)

I. INTRODUCTION

The areas of assessment for capacity building with regard to Institutional policy & regulatory framework, financial initiatives, human capital, infrastructure, innovations and awareness are detailed out in the table below. Table A discussed on the progress of the activities in the 10th. MP and Table B focuses on the program/activities for the 11th. MP.

II. PROGRESS[76] (table A)- Institutional/Policy/Financial/Human Capital/Infrastructure/innovations/Awareness

	Areas of Assessment[77]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Institutional Framework **EiMAS**	NA				
	Policy and regulatory framework **EiMAS**	NA				
	Financial Initiatives **EiMAS**	NA				
	Human Capital **EiMAS**	Environment Institute of Malaysia (EiMAS) - Training Institute • **Development of Environmental Training Module and Expert**	a) Development of training modules and training infrastructure based on "Instructional Design"; b) Development of trained and skilled workforce both in enforcement agencies and industrial sectors in environmental management and pollution control; c) Enhancement of DOE trainers' competency in specific environmental management areas; and d) Training of both pollution control equipment operators and factory managers so that they will	a) Development of Training Module b) Providing The Training Infrastructure c) Execute Training	**Project Outputs:** a) A total of 2660 participants from DOE and other government agencies attended 105 trainings conducted in 2011 and 2012; b) A total of 2219 participants from industrial sectors attended 106 trainings for industrial sectors conducted in 2011 and 2012; c) A total of 11 DOE officers attended six overseas attachment programmes and 38 officers attended six local attachment programmes; and d) A total of 57 EiMAS trainers attended local and overseas training courses;	1. The implementation of self-regulation on voluntary basis among the industrial sectors in this country are less successful mainly due to: a) Lack of awareness and knowledge on the implementation of self-regulation; b) Improper implementation of the preventive maintenance and performance monitoring on the

[76] Progress of initiatives under 10th MP
[77] Only those relevant to DOE/ThWG EM

	Areas of Assessment[77]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
			be competent in carrying out their duties.		e) A total of 18 training infrastructures procured; and f) A total of 6 Training Modules were developed which include: i. Treatment and Disposal of Hazardous Waste ii. Certified Person In Environmental Noise and Vibration Measurement iii. Certified Erosion and Soil Control Plan Reviewer (CESCPR) iv. Certified Erosion and Soil Control Inspector (CESCI) v. Flue Gas Desulphurisation vi. Air Pollution Control Engineering (APCS Design) **<u>Project Outcomes:</u>** 1. Number of participants successfully certified as a Competent Person (after successfully attending the certification training course, passing the exam, submitting field training report six months after the course and passing the interview session). A total of **810** pollution control equipment operators and factory managers were certified as Competent Person i.e *Certified Environmental Professional in*: a) *Scheduled Waste Management* = **420** b) *Bag Filters Operation* = **24**	unit operations and unit process of pollution control system; and c) Lack of expertise among stakeholders in addressing environmental problems. 2. The certification program is one of the main tools in the self-regulation approach currently being executed by the DOE. However due to present and greater future needs and demands, it is pertinent that the following issues are addressed: a. Insufficient training facilities; b. Insufficient financial allocation for capacity building; c. No focus group on Research and Development (R & D); and d. Lack of Subject Matter Experts (SMEs)

	Areas of Assessment[77]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
					c) *Scrubber Operation* =**18** d) *Operation of Industrial Effluent Treatment Systems (Biological Processes)* = **175** e) *Operation of Industrial Effluent Treatment Systems (Physical Chemical Processes)* = **159** f) *Sewage Treatment Plant Operation* = **14** 2. Result of the survey among both participants and their superiors conducted six months after courses executed by EiMAS to measure the effectiveness of the course in terms of improvement in their skills at work-place. a) Survey in 2011, involved 365 respondents indicate: i. Improvement in job performance = 88% ii. Improvement in job quality = 84% iii. Effective job delivery = 80% iv. Efficient job delivery = 60% v. Irrelevant course content to job function = 8% b) Survey in 2012 involved 457 respondents indicate: i. Improvement in job performance = 86% ii. Improvement in job quality = 82%	

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	Areas of Assessment[77]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
					iii. Effective job delivery = 77% iv. Efficient job delivery = 45% v. Irrelevant course content to job function = 9%	
	Infrastructure **EiMAS**	NA				
	Innovations **EiMAS**	NA				
	Awareness **EiMAS**	NA				

III. PROSPECT[78] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Institutional Framework **EiMAS**	NA				
	Policy and regulatory framework **EiMAS**	NA				
	Financial Initiatives **EiMAS**	NA				
	Human Capital **EiMAS**	Environment Institute of Malaysia (EiMAS) - Trainiig Institute • **Mainstream self-regulation culture within industries**	1. Developing specific training that will encompass a bigger spectrum of activities which fall under the DOE's jurisdiction. 2. To develop trained / skilled workforce in environmental management and pollution control; through Certification Programme 3. Development of trained and skilled within relevant government agencies in environmental management and pollution control 4. Developing in-house Subject Matter Experts (SME) among the DOE officers in specific technical environmental subjects	1. Development of training specific modules 2. To provide the training facilities and infrastructure 3. Enhancement of training facility 4. To utilize other training facility (under 1MTC) 5. Execute Training 6. To establish R & D Unit in DOE 7. Attachment programme (local and overseas) 8. Specific industrial training and Certification Programme with recognized agencies 9. Collaboration with international or national institutional or agencies to	i) Produce Skilled manpower both within industries and government agencies (a) Number of personnel from industries certified as Competent Person) (b) Number of Subject Matters Experts ii) Industries embrace self-regulation (executed performance monitoring and preventive maintenance)	Number of training modules - five (5) training modules a) Number training conducted: - 60 trainings / year for industries b) Number of participants from industries attended training: *Year 2016 = 1700 2017 = 1700 2018 = 2000 2019 = 2000 2020 = 2000 c) Number training conducted: - 50 trainings / year for DOE / government agencies d) Number of participants from government

[78] Way forward under 11th MP

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	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
				produce Subject Matter Experts and post graduate		agencies attended training - 1200 / year
				10. Establishment of National Registry of Certified Environmental Professional (NRCEP - online submission of CPD Hour - online monitoring of self-regulation activities		Number of personnel certified as Subject Matter Experts (SME) - 30 SME
			5. Establishment of NRCEP as a mechanism to monitor self-regulation conducted by Competent Persons and online submission of Continuing Professional Development (CPD) Hour	11. To evaluate / accredited training courses offered by training provider with CPD hour	iii) Monitoring and Evaluation of Competent Person / self regulations activities: (a) Continuing Professional Development (CPD) of Competent Person (b) Number of Competent Person performed self-regulation activities (e.g. Performance monitoring of Industrial Effluent Treatment System / Air Pollution Control System, Scheduled waste Management, as part of activities to collect CPD Hour)	Number of Competent Person submit self regulation activities (e.g. Performance monitoring of Industrial Effluent Treatment System / Air Pollution Control System, Scheduled waste Management, etc) through NRCEP system **Year 2016 = 1200 2017 = 1300 2018 = 1400 2019 = 1500 2020 = 1600
				12. Continuous engagement and enhanced community based programme (Dialog, audit, seminar, sharing technical knowhow, success story /experiences)		
				13. Develop E-learning Module and facilities		
			6. Engagement and facilitation programme with industry communities and the public to promote	14. Enhancing and providing training facilities and infrastructure based *on situational based learning*		Number of dialog,

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	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
			self-regulation approach to control of environmental pollution 7. Optimising of information, communication technology (ICT) as a tool to enhance capacity building. E-learning has been identified as one of the output of this activity 8. Enhancing and providing training facilities and infrastructure based *on situational based learning* and *factual based learning* concepts to create high impact learning	and *factual based learning* concepts to create high impact learning		seminar, workshop - 3 dialog / seminars / workshops Two (2) E-learning modules and trainings Number of training infrastructures procured
	Infrastructure **EiMAS**					
	Innovations **EiMAS**					
	Awareness **EiMAS**					

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ENVIRONMENTAL MANAGEMENT STRATEGY FOR MALAYSIA
(Annex for Strategy Paper)

I. INTRODUCTION

The areas of assessment for CEPA with regard to Institutional policy & regulatory framework, financial initiatives, human capital, infrastructure, innovations and awareness are detailed out in the table below. Table A discussed on the progress of the activities in the 10th. MP and Table B focuses on the program/activities for the 11th. MP.

II. PROGRESS[79] (table A)- Institutional Framework/Policy/Financial/Human Capital

	Areas of Assessment[80]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Institutional Framework CEPA	NA				
	Policy and regulatory framework CEPA	NA				
	Financial Initiatives CEPA	Government Fund (RMK 10) RM 33,000,000	Conducting Environmental Awareness program with the budget allocated	Environmental Awareness Program through Rakan Alam Sekitar Program	RM 23,000,000 has been spent from 2011-2013	Not enough fund for 2014-2015
	Human Capital CEPA	NA				
	Infrastructure CEPA	NA				
	Innovations CEPA	NA				

III. PROSPECT[81] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Institutional Framework CEPA	NA				
	Policy and regulatory framework CEPA	NA				
	Financial Initiatives CEPA	Government Fund (RMK 11) and Fund from Strategic Partners	Signing of Memorandum of Understanding (MOU) with Strategic Partners	Signing of MOU with the various stakeholders and continue collaboration with the existing partners	With an enough fund, it will facilitate smooth implementation of environmental awareness program in Malaysia through	No of environmental activities conducted

[79] Progress of initiatives under 10th MP
[80] Only those relevant to DOE/ThWG EM
[81] Way forward under 11th MP

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
					stakeholders participation Increase the number of Rakan Alam Sekitar (RAS) member	 No of Rakan Alam Sekitar (RAS) member
	Human Capital CEPA	NA				
	Infrastructure CEPA	NA				
	Innovations CEPA	NA				

II. PROGRESS[82] (table A)- Awareness

	Areas of Assessment[83]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
	Awareness CEPA	Environmental Education and Awareness Programs had been conducted in accordance with the requirements of the National Environmental Policy and the Langkawi Declaration. The objective of Environmental Education and Awareness Campaign is to promote and increase awareness among the public. The approach of this program also involves all target groups to transform the thoughts and attitudes of the people in the preservation and conservation of the environment.	Environmental Awareness and Education Programs have been implemented continuously. In 2009, a new program, Rakan Alam Sekitar (RAS) was introduced. RAS Program has become the umbrella for all other environmental awareness programs under the purview of Department of Environment..	Environmental Awareness and Education Programs which has been implemented by the Department of the Environment are as follows : - i . Environmental Heroes Project ii . Earth Day Celebration iii . World Environment Day Celebration iv . Malaysia Environment Week Celebration v . Sustainable School - Environmental Award Program vi . Sustainable Cities – Environmental Award Program vii . Langkawi Award viii . Information Dissemination on the	i . RAS activity in 222 parliamentary constituencies which involved participation of local communities. ii . RAS activity at National Level involves The Rebranding of RAS Program, *Perhimpunan RAS 1Malaysia* and *Jelajah Jejak Mesra RAS (JJMRAS)* which were held in conjunction with Malaysia Environment Week (MASM). iii . Educational programs implemented such as Environmental Debate for the Institution of Higher Learning, Environmental Heroes Project, Sustainable School - Environment Award, Sustainable Pre - School, Sustainable City – Environment Award, Exhibition , Earth Day, World Environment Day and Malaysia Environment Week celebration . iv . Information Dissemination through DOE Environmental Quality Report (EQR), Annual Report ,	i . The implementation of the program to all RAS members is limited due to financial constraints and resources. Thus participation in the RAS program is also limited. ii . Publicity and Promotion of RAS programs involved a high cost. This causes the message /information about RAS cannot be conveyed to the public properly. iii . Transforming the approach of existing programs from output - based to outcome -based (outcome -based approach through process) iv . Strategic direction and holistic approach through a Strategic Plan (Blue Print Establishment) and strategic partnership (

[82] Progress of initiatives under 10th MP

[83] Only those relevant to DOE/ThWG EM

	Areas of Assessment[83]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
				Environment ix. Publishing of DOE Annual Report, Environmental Quality Report (EQR), IMPAK and Era Hijau Magazine, x. Environmental Debate xi. Sustainable Pre-School Program	IMPAK and Era Hijau Magazines. v . Publicity and Promotion Through Mass Media which includes broadcasting programs on the radio, advertorials in magazines and newspapers, and promotions via sms for environmental awareness activities/ programs conducted. vi . Providing Facility and Secretariat to develop a MyRAS system and RAS membership form. In addition, RAS membership cards were circulated to all members who have been registered. All these programs were intended to produce output to increase environmental awareness and participation of community in environmental activities in order to improve the quality of the environment.	synergy) , Pre- school (PERMATA NEGARA , higher education institutions, and partners such as government agencies , NGOs , Private Sector s, MNC / GLC v . Restructuring the implementation method of RAS Program vi . Effective Communication Plans to create and develop new channels for RAS members to receive environmental information vii . Self- centric mentality is overcome by dialogue and seminars for RAS members regularly to share information and develop Sense of Ownership

III. PROSPECT[84] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Awareness CEPA	Fortify Environmental Education and Awareness Programmes	1) Implementing Environmental Awareness Assessment Activity on leadership and commitment of local community towards environment	Commitment of the Local Community Leader is critical to ensure that the environmental education and awareness programs reached the target groups in the community. Commitment of the local communities should be identified to evaluate the effectiveness of environmental awareness programs by establishing an indicator to	Fortify community environmental awareness in Malaysia towards achieving Environmental Cultured Society	Number of Environmental Leaders Number of Community involvement with DOE Percent (Environmental Awareness Index)

[84] Way forward under 11th MP

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	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
				measure the effectiveness of Environmental Education and Awareness Program (there should be a measurable element for each program)		
			2) Enhance the effectiveness of the environmental information dissemination	Increase the effectiveness of the dissemination of environmental information, and publicity and promotion of RAS programs through collaboration with other agencies.	Increase Environmental Awareness in all 222 Parliamentary Constituency towards achieving Environmental Cultured Society	No of hits/surfing (DOE digital library/EKMC)
			3) Fortify Partnerships with stakeholders that involved in the collaboration through Memorandum of Understanding (MOU) with DOE	Signing of a new MOU with the various stakeholders and continue the collaboration with the existing MOU partners	Facilitate smooth implementation of environmental awareness program in Malaysia through stakeholders participation	No of MOU signed to reach a target of 2,000.
			4) Increase the Impact of the Awareness Programs organized /conducted	Increase the Impact of the Awareness Programs organized/conducted by Improving Program / Rebranding programs / New Programs Creating a network with agencies and NGOs.		
			5) Improve method of communications between the public/industry with the government on all environmental matters	(Mechanisms to inform the activities/programs will be implemented to all target group) - Creating the right avenue/appropriate channels for the industry to voice their opinions.	Increase Environmental Awareness in all 222 Parliamentary Constituency towards achieving Environmental Cultured Society Better communication system for stakeholders/public to communicate with agencies	Survey by questionnaire to evaluate knowledge, attitude and practices of stakeholders No of Networking/ Partnership

ENVIRONMENTAL MANAGEMENT STRATEGY FOR MALAYSIA
(Annex for Strategy Paper)

II. INTRODUCTION

The areas of assessment for ICT with regard to Institutional policy & regulatory framework, financial initiatives, human capital, infrastructure, innovations and awareness are detailed out in the table below. Table A discussed on the progress of the activities in the 10th. MP and Table B focuses on the program/activities for the 11th. MP.

II. PROGRESS[85] (table A) - Institutional Framework

	Areas of Assessment[86]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
1.	Institutional Framework	ICT and GIS is a support tools in environmental management activities. Institutionalization of ICT and GIS in job functions on environmental management would increase effectiveness and efficiency.	Increased use of ICT and GIS in environmental monitory, enforcement and management.	• Increase no. of ICT & GIS applications in environmental management and self-regulation by industries. • Provide ICT and GIS infrastructures • Modernised method of monitoring and enforcement	• ICT and GIS applications were developed to assist in environmental management • ICT and GIS infrastructures were provided in headquarters and state offices. • Monitoring and enforcement activities were modernized. • Promoting self-regulation among the industries and stakeholders through the use of self-monitoring application systems.	• ICT are not fully utilized. • Reluctance in using ICT by the industries due to high cost of computers and maintenance.

III. PROSPECT[87] (table B)- Institutional Framework

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
1.	Institutional Framework	ICT and GIS is implemented as one of tools toward fast, efficient, effective management of environment.	Environmental Management Application Development programme	To develop new Environmental Management application systems including mobile applications using latest technology and upgrading existing environment management, monitoring and enforcement	Automated and modernised service deliveries for public and stake holders, and to increase efficiency of environmental management, monitoring and enforcement.	• Number of application system. • Number of users.

[85] Progress of initiatives under 10th MP
[86] Only those relevant to DOE/ThWG EM
[87] Way forward under 11th MP

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
				application system.		

II. PROGRESS[88] (table A)- Policy and regulatory framework

	Areas of Assessment[89]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
.	Policy and regulatory framework	National Environmental Quality Act 1974 and ICT Policies is the basis of ICT and GIS planning and implemention in environmental management.	The implementations of ICT dan GIS projects are based on current ICT policies and related environmental act.	Develop ICT and GIS applications using current ICT and environmental policies as guideline.	Application systems that are based on ICT and environmental policies.	No issues.

III. PROSPECT[90] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
.	Policy and regulatory framework	National Environmental Quality Act 1974 and ICT Policies is the basis of ICT and GIS planning and implemention in environmental management.	The implementations of ICT dan GIS project follows current ICT policies and related environmental act.	Develop ICT and GIS applications using current ICT and environmental policies as guiideline.	Application systems that are based on ICT and environmental policies.	No. of SOP of application system.

II. PROGRESS[91] (table A)- Financial Initiatives

	Areas of Assessment[92]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
.	Financial Initiatives	RM8Mil was allocated for ICT projects and RM7Mil for GIS projects.	Budget and cost effectiveness in ICT & GIS	Implementation projects as planned	• Current ICT & GIS projects are based on allocation of development budget. • 100% spending as allocated	Not enough operating expenditure/budget allocation for system, application maintenance and software licensing.

III. PROSPECT[93] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
.	Financial Initiatives	Development budget and operating budget needed for ICT and GIS activities.	Presentation of project planned in 11thMP and budget required.	• Plan ICT and GIS project developments. • Plan ICT and GIS infrastructure	Project implementation according to schedules.	• Percentage in expenditure of projects development. • Percentage in

[88] Progress of initiatives under 10th MP
[89] Only those relevant to DOE/ThWG EM
[90] Way forward under 11th MP
[91] Progress of initiatives under 10th MP
[92] Only those relevant to DOE/ThWG EM
[93] Way forward under 11th MP

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
				requirements.		expenditure of operating activities

II. PROGRESS[94] (table A)- Human Capital

	Areas of Assessment[95]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
.	Human Capital	ICT & GIS technical know-how and expertise needed to run the project and in maintenance	To train as much staff based on job scope	• in –house and outsource training programme • Subject Matter Expert programme	• 8 staff in Management & Professional group and 22 in support group. • 10 to 12 ICT and GIS courses are offered every year	High rate of staff turnover and brain drain

III. PROSPECT[96] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
.	Human Capital	Ensure that expertise in ICT and GIS are retained.	Create expertise group in ICT & GIS.	• ICT & GIS capacity building programme • Transfer of Technology (ToT) by vendors	Talent retention on subject matter expert in ICT & GIS.	• Number of capacity building programme. • Number of Subject Matter Expert (SME) group.

II. PROGRESS[97] (table A)- Infrastructure

	Areas of Assessment[98]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
.	Infrastructure	ICT as part of support tools to the Environmental Management require continuous developments and improvements	• Develop new applications and infrastructures • Improved & upgrade existing modules & systems • Strengthening of ICT Security	• Procurement of ICT development's hardware and software • Installation of Local Area Network and procurement of related hardware • Increase security of computer network, servers and Personal Computer • Develop, upgrade application system in-	• 6 new environmental monitoring, enforcement and management application system • 7 existing application system was improved/upgraded • 1,212 unit of ICT hardware • 76 unit of software • 93 unit of network devices and 10 LAN installed. • 786 licences of security's related software • ISMS certification	• Computer hardware over their end-of-life (5 years) will increase maintenance and upgrading cost • Continuous improvement and upgrading of Environmental Management Application Systems • Increasing number of ICT threats

[94] Progress of initiatives under 10th MP
[95] Only those relevant to DOE/ThWG EM
[96] Way forward under 11th MP
[97] Progress of initiatives under 10th MP
[98] Only those relevant to DOE/ThWG EM

	Areas of Assessment[98]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
				house or by third party • Procurement of ICT services (*consultation*, audit, etc)	• 12 ICT courses every year • 5 star rating for JAS Portal & Website • Harden network computer system, servers and PCs • Electronic Knowledge Management Centre (EKMC)	• Data sharing and integration is still not fully automated between inter-agency and stakeholders • High rate of staff turnover and brain drain

III. PROSPECT[99] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
.	Infrastructure	Performance and security of ICT & GIS infrastructure and application need to be maintained.	• ICT & GIS hardware & infrastructure replacement programme • Environmental Management Application Development programme • ICT security strengthening programme • ICT Capacity Building programme	• To replace end-of-life and obsolete ICT & GIS hardware (Servers, PCs, Printers, Laptops, Tablets), Network Cabling/Wiring and related ICT peripherals • To develop new application system, upgrading and expand/rollout of existing application system and modules • To address continuous ICT security threats from hackers, viruses and malicious code on system applications, networking and ICT peripherals • To address problem of high turn-over and brain drain	• Maintain the efficiency of ICT & GIS infrastructure operations and reduce maintenance cost. • Modernised service deliveries for public and stake holders, and to increase efficiency of environmental management, monitoring and enforcement. • Increasing confidence level of users and stakeholders.	• Number of ICT & GIS hardware & software. • Number of LANs/ Cabling. • Number of application system. • Number of application strengthening activities • Number of capacity building programme

[99] Way forward under 11th MP

II. PROGRESS[100] (table A)- Innovations

	Areas of Assessment[101]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
.	Innovations	Innovations based on ICT and GIS technology as a tools in environmental management.	Automate work task in environmental monitoring, enforcement and management.	• Develop application systems in environmental monitoring. • Develop application systems in environmental enforcement. • Develop application systems in environmental management.	• 16 aplication systems have been developed. • 3 mobile applications have been developed.	More ICT and GIS based innovations could be created featuring current technology and user friendly.

III. PROSPECT[102] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
.	Innovations	Innovations based on ICT and GIS could be explored and expanded.	Create applications with new technology.	• Study new available technology and apply to existing or new application system.	Broad categories of users in environmental application system usage.	No. of applications using new technology such as mobile technology and smart devices.

II. PROGRESS[103] (table A)- Awareness

	Areas of Assessment[104]	Descriptions	Strategy	Action plans	Performance	Issues and Gaps
.	Awareness	Awareness level in an application system developed.	Create awareness programme	• Awareness using portal, website, sosial media and e-mail. • Awareness in seminars/ workshops/ in-house training.	Increase in application systems usage rate.	ICT and GIS usage are not fully institutionalised by DOE staffs and the industry.

[100] Progress of initiatives under 10th MP
[101] Only those relevant to DOE/ThWG EM
[102] Way forward under 11th MP
[103] Progress of initiatives under 10th MP
[104] Only those relevant to DOE/ThWG EM

III. PROSPECT[105] (table B)

	Areas of Assessment	Descriptions	Strategy	Action plans	Expected Outcome	KPI's
	Awareness	High level of awareness on existing or new ICT and GIS system, targeted at the industry and general public.	Create awareness programme	• Awareness using portal, website, social media and e-mail. • Awareness in seminars/ workshops/ in-house training.	Increase in awareness among the general public and the industry on new application system.	Percentage increase in application system usage.

[105] Way forward under 11th MP