



Ministry of Local Government  
and Regional Development

## **PUTTING WASTE IN ITS PLACE:**

A National Solid Waste  
Management Strategy for the  
Cooperative Republic of Guyana  
2013-2024



### **PART 1: OUR STRATEGY**



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# FOREWORD

To be completed by MLGRD



# ACRONYMS

CARICOM	Caribbean Community
EVAT	Environmental Value Added Tax
GSWMP	Georgetown Solid Waste Management Programme
JICA	Japan International Cooperation Agency
MLGRD	Ministry of Local Government and Regional Development
NDC	Neighbourhood Democratic Council
RDC	Regional Democratic Council
SWMA	Solid Waste Management Authority

# EXECUTIVE SUMMARY

Guyana is often promoted as 'South America's Biggest Little Secret', because of its spectacular natural beauty, and amazing biological diversity. It is home to some of the world's largest and rarest flora and fauna including the Victoria Regent Lily, the tiny Golden Frog, Cock-of-the-Rock bird, and bush dogs.

Yet, the natural beauty of Guyana is overshadowed by the poor management of solid waste in our cities, towns and communities. While some measures have been initiated to enhance waste collection and disposal services, to transform waste into useful resources, and to boost anti-littering enforcement efforts, there's still much room for improvement. Littering and illegal dumping are widespread, there is limited emphasis on waste reduction and resource recovery, sustainable financing measures are lacking, and the waste collection service coverage is inadequate. Without a clear path forward to reduce our waste and manage it better, Guyana's long-term environmental, social and economic wellbeing will be at risk.

This strategy aims to provide the road map by which we can work steadily together to reduce and better manage our waste so that Guyana's image as a nature haven is preserved and the health of its greatest resource—the Guyanese people—is protected. The strategic framework will guide decision making by the government and serve as the foundation for establishing an integrated, financially self-sustaining, environmentally-sound, and socially-acceptable waste and resource recovery system for Guyana.

The strategy outlines a vision of: *Informed communities participating in a nation-wide, integrated, and financially self-sustaining waste management and resource recovery system that preserves public health and the environment, realises maximum value from resources, and minimises long-term costs to households, industry, and government.*

Three objectives or long-term outcomes have been identified, supported by six short-term goals and 44 strategic actions. The strategic framework is summarized in Table A1.

Table A1: Strategic Framework for Waste Management in Guyana

VISION	<p>Informed communities participating in a nation-wide, integrated, and financially self-sustaining waste management and resource recovery system that preserves public health and the environment, realises maximum value from resources, and minimises long-term costs to households, industry, and government.</p>		
	OBJECTIVES	<p><b>A CLEANER ENVIRONMENT</b></p> <p><i>Minimise environmental harm</i></p> <p><i>Promote environmentally-sound waste management approaches</i></p>	<p><b>BETTER PUBLIC HEALTH PROTECTION</b></p> <p><i>Promote and regulate waste management approaches</i></p> <p><i>Develop future generations of environmentally-aware Guyanese</i></p>
GOALS & KEY STRATEGIC DIRECTIONS	<p><b>LESS LITTER &amp; ILLEGAL DUMPING</b></p> <p><i>Identify and monitor dumping hotspots</i></p> <p><i>Strengthen enforcement capacity and activities</i></p> <p><i>Learn from successful behaviour change campaigns</i></p> <p><i>Implement national social marketing campaigns</i></p> <p><i>Integrate waste management into primary and secondary school curricula</i></p>	<p><b>LESS WASTE GENERATED</b></p> <p><i>Improve data collection</i></p> <p><i>Reduce plastic bag consumption</i></p> <p><i>Develop business waste reduction scheme</i></p> <p><i>Offer favourable tax breaks for waste-friendly activities</i></p> <p><i>Demonstrate public sector leadership in reducing waste</i></p> <p><i>Develop and enforce quality standards for products</i></p>	<p><b>BETTER RESOURCE RECOVERY</b></p> <p><i>Introduce backyard and community composting</i></p> <p><i>Implement container deposit programmes</i></p> <p><i>Ban Styrofoam and non-compostable food &amp; beverage container imports</i></p> <p><i>Implement recycling programmes for e-waste, vehicles, tyres, used oil</i></p> <p><i>Demonstrate public sector leadership in utilisation of recovered materials</i></p>
	<p><b>EFFICIENT AND COST-EFFECTIVE WASTE COLLECTION</b></p> <p><i>Introduce full cost accounting for waste management</i></p> <p><i>Assess and improve waste collection efficiencies</i></p> <p><i>Centralise and optimise waste collection nationwide</i></p> <p><i>Assess feasibility of introducing environmental VAT</i></p> <p><i>Regulate waste transportation</i></p>	<p><b>BETTER WASTE INFRASTRUCTURE</b></p> <p><i>Centralise and optimise waste disposal nationwide</i></p> <p><i>Licence and regulate waste management facilities</i></p> <p><i>Introduce semi-aerobic landfilling method</i></p> <p><i>Progressively close polluting dumpsites</i></p>	<p><b>STRENGTHENED HUMAN AND INSTITUTIONAL CAPACITY</b></p> <p><i>Resolve overlapping roles and responsibilities</i></p> <p><i>Develop solid waste training programmes at local institutions</i></p> <p><i>Establish a technical advisory committee to guide national solid waste management</i></p>

KEY PERFORMANCE INDICATORS	INDICATORS	2014 BASELINE	COMMENTS
	Per capita waste generation	0.73 kg/person-day	To be verified in 1 <sup>st</sup> year of strategy
	Percentage of total waste recovered	-	To be established in 1 <sup>st</sup> year of strategy
	Waste collection coverage (%)	-	To be established in 1 <sup>st</sup> year of strategy
	Waste management cost (\$/tonne)	-	To be established in 1 <sup>st</sup> year of strategy
	Percentage of government subsidy	-	To be established in 1 <sup>st</sup> year of strategy

# 1 WHY DO WE NEED A WASTE STRATEGY?

Guyana is often promoted as 'South America's Biggest Little Secret', because of its spectacular natural beauty, and amazing biological diversity. It is home to some of the world's largest and rarest flora and fauna including the Victoria Regent Lily, the tiny Golden Frog, Cock-of-the-Rock bird, and bush dogs. Guyana also boasts the majestic Kaieteur Falls, one of the tallest and most powerful waterfalls in the world, which has been featured on television in films and episodic shows such as *Lost Land of the Jaguar*, *The White Diamond*, and *Life on Earth*. The National Geographic Traveler named Guyana as one of the 21 must-see places for 2014 (National Geographic Traveller, n/d), and the country has also been featured on the British Broadcasting Corporation travel website (British Broadcasting Corporation, 2014).

Yet, the natural beauty of Guyana is overshadowed by the poor management of solid waste in our cities, towns and communities. While some measures have been initiated to enhance waste collection and disposal services, to transform waste into useful resources, and to punish litter offenders, there's still much room for improvement. Littering and illegal dumping are widespread, there is limited emphasis on waste reduction and resource recovery, sustainable financing measures are lacking, and the waste collection service coverage is inadequate. Without a clear path forward to reduce our waste and manage it better, Guyana's long-term environmental, social and economic wellbeing will be at risk.

This strategy aims to provide the road map by which we can work steadily together to reduce and better manage our waste so that Guyana's image as a nature haven is preserved and the health of its greatest resource—the Guyanese people—is protected.

This strategy was developed through consultation with national, regional, and local government, private sector organisations, and the general public. It sets out a vision, goals and targets that are practical and achievable, and which build on initiatives already in progress. Monitoring and evaluation are integral components of this strategy, and key performance indicators have been developed to track progress towards achieving the goals.

Successful implementation of the strategy requires an interagency effort, however, the Ministry of Local Government and Regional Development through the Solid Waste Management Authority will be responsible for overall coordination and implementation.

The National Solid Waste Strategy document consists of three separate parts. Part I contains the sustainable waste reduction and management strategy that covers the spectrum of activities involved in solid waste management. This is the most strategic of the three documents and the actions contained herein must be incorporated into the annual corporate workplans of the various lead agencies, so as to become core business of everyone involved.

Part II is more operational and contains standards and procedures pertaining to the management of solid and hazardous wastes, including the generation, handling, storage, treatment, transport and disposal of all types of waste. It also establishes requirements and procedures for the issuance, monitoring and enforcement of licenses to site, construct or operate solid waste management facilities or equipment.

Part III contains background information and an analysis of the solid waste sector in Guyana, which forms basis for the preparation of Parts I and II of the strategy.

## 2 SYNOPSIS OF WASTE MANAGEMENT IN GUYANA

### 2.1 Institutional Framework

The main entities involved in solid waste management in Guyana at present are discussed below:

- *The Ministry of Local Government and Regional Development (MLGRD)* is responsible for formulating national waste management policies and providing waste management oversight of RDCs, NDCs, and city councils.
- *The Environmental Protection Agency (EPA)* administers the environmental impact assessment process pertaining to waste management systems, prescribes standards for waste management facilities and issues permits for certain solid waste management activities (such as landfills).
- *Regional Democratic Councils (RDCs)* operate as decentralised offices of central government and oversee the waste management activities of Neighbourhood Democratic Councils.
- *Neighbourhood Democratic Councils (NDCs)* administer smaller divisions within each region, and are responsible for ensuring the delivery of waste management, street sweeping and drain cleaning services to the residents within their boundaries.
- *City/Town Councils* such as the Georgetown City Council are responsible for delivering management, street sweeping and drain cleaning services to the residents within their boundaries.

The draft Solid Waste Management Bill proposes the establishment of a Solid Waste Management Authority (SWMA) as a corporate body under the MLGRD to oversee and coordinate all policy, operational and licencing aspects of solid waste management in Guyana. Other agencies, such as the Ministry of Public Works and Communication, Ministry of Housing and Water, the National Bureau of Standards, and the Institute of Applied Science and Technology are also involved to some extent in waste management.

### 2.2 Legislative Framework

The right of every Guyanese to a clean and healthy environment is enshrined in Articles 25 and 38 of the Constitution of Guyana. Solid and hazardous waste management is specifically addressed in several pieces of legislation (Table 1).

Table 1: Legislation relevant to waste management

Legislation	Lead Agency	Summary
Draft Solid Waste Management Bill 2014	Solid Waste Management Authority	Establishes licencing and permit systems for waste management facilities and waste haulers. Prescribes penalties for littering, illegal dumping, burning, operating without licences and other infractions.

Customs Act	Guyana Revenue Authority	Levies an environmental tax of GY\$10 on every unit of non-returnable metal, plastic, glass or cardboard container of any alcoholic or non-alcoholic beverage imported into Guyana.
Environmental Protection Act 1996	Environmental Protection Authority	Outlines the environmental impact assessment process, and licences polluting activities.
Environmental Protection (Litter Enforcement) Regulations 2013	Environmental Protection Authority	Prescribes penalties for littering (including from a motor vehicle), and appoints Litter Prevention Wardens to enforce provisions.
Environmental Protection (Hazardous Wastes Management) Regulations 2000	Environmental Protection Authority	Grants the EPA powers to issue environmental authorisations for facilities that generate, treat, store, dispose, or transport hazardous wastes. Prescribes penalties for operation without an environmental authorisation.
Municipal and District Councils Act	Municipalities and District Councils	Empowers councils to establish, maintain and carry out sanitary services for the removal and destruction or management of all kinds of refuse and effluent, and to make by-laws. Prescribes penalties for littering and illegal dumping.
Old Metal Dealers Act & Old Metal Dealers (Amendment) Act 2006	Office of the Prime Minister	Regulates the export of old metal (scrap metal) and prohibits export without an export licence. Requires old metal dealers to be registered and licenced.
Pesticides and Toxic Chemicals Control Act 2002	Pesticides and Toxic Chemicals Control Board	Requires that importers and sellers of toxic chemicals and pesticides (and associated storage facilities) be licenced.

## 2.3 Financial Mechanisms

### 2.3.1 Council rates

Georgetown City residents pay for waste management and other basic municipal services through their council rates, which were last reviewed in 2012. Rate collection is low, as the council only collected about 40% of the amount owed in 2013. The council's revenue base is also supplemented by an annual subvention from the central government.

Other town councils as well as the NDCs also charge rates in addition to receiving an annual subvention from the central government; however, council rates have reportedly not been reviewed for more than two or three decades, and collection rates are generally low.

### 2.3.2 Environmental Tax

The Customs Act passed in 1995 imposed an environmental tax of GY\$10 on each imported non-returnable container of metal, glass or plastic holding any alcoholic or non-alcoholic drink. However, the act did not provide any guideline for the use of the funds, which were paid into general revenue.

In 2014 a Suriname-based exporter of beverages to Guyana sued the Government of Guyana alleging that the environmental tax violated the Revised Treaty of Chaguaramas, in particular the free movement of goods and the prohibition on import duties on goods of CARICOM origin. The Caribbean Court of Justice agreed and ordered the Government of Guyana to cease collection of the tax and to reimburse the Suriname company over US\$6 million. The government has since announced plans to revise the Customs Act to levy \$5 tax on all bottled beverages imported and locally produced.

## 2.4 Waste Generation and Composition

### 2.4.1 Municipal Solid Waste

The combined household and commercial waste generation for Region 4 was estimated to be 0.73 kg/person per day in 2010 (Hydroplan, CEMCO Inc, 2010). The total solid waste load (household, commercial, self-haul, *etc.*) was found to be 545.66 tonnes/day from a catchment area of 405,225 people, or equivalently, 1.35 kg/person per day.

The waste consisted of over 50% vegetable and putrescible waste, which could be composted or otherwise diverted from land disposal into beneficial uses. The other major components of the waste included plastics (14.2%), paper (10.7%), rubber and textiles (6.8%) and diapers (5.6%) as shown in Figure 1.

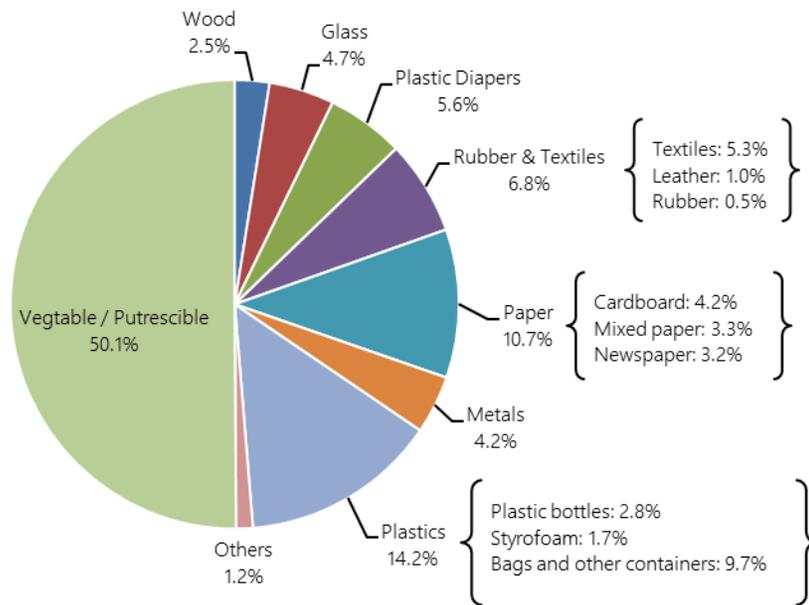


Figure 1: Household Waste Composition for Region 4 (Hydroplan, CEMCO Inc, 2010)

### 2.4.1.1 Waste Generation Forecasts

The forecasts for future waste generation are shown in Table 2. Forecasts are based on a 14 year period from the date of the last waste characterisation study (2010) to the end of the strategic planning period (2024), and assume growth in per capita waste generation of about 18%, which is consistent with global forecasts for low middle income countries (Hoorweg & and Bhada-Tata, 2012). Due to the steady population of Guyana, the forecasted total waste amount of 575 tonnes/day is largely due to the increase in per capita waste generation.

Table 2: Waste generation forecast by region

Region	Population	2010 Assumed Waste Generation Rate (kg/person-day)	2010 Total Waste Generation (tonnes/day)	2024 Projected Waste Generation Rate (kg/person-day)	Annual Population Growth Forecast (percent / year)	Forecasted Waste Generation in 2024 (tonnes/day)
Region 1	26,941	0.50	13.5	0.59	1.10	18.3
Region 2	46,810	0.73	34.2	0.86	-0.50	37.5
Region 3	107,416	0.50	53.7	0.59	0.42	67.1
Region 4	313,429	0.73	228.8	0.86	0.10	273.8
Region 5	49,723	0.50	24.9	0.59	-0.52	27.2

Region 6	109,431	0.73	79.9	0.86	-1.15	79.1
Region 7	20,280	0.50	10.1	0.59	1.52	14.5
Region 8	10,190	0.50	5.1	0.59	0.09	6.1
Region 9	24,212	0.50	12.1	0.59	2.49	19.3
Region 10	39,452	0.73	28.8	0.86	-0.40	32.1
Total	747,884	(Avg) 0.66	491.1	(Avg) 0.77	-0.04	575

## 2.4.2 Healthcare Waste

There is very little information available on healthcare waste generation in Guyana. Seven of the 380 healthcare facilities in Guyana were visited during the preparation of the National Solid Waste Management Strategy, and of these, only two were found to maintain healthcare waste disposal records. Generic guidance suggests that of the total amount of waste generated in healthcare facilities, 80% is non-hazardous general waste similar to domestic waste, while 20% is hazardous (World Health Organization, 2011) (Table 3).

Table 3: Approximate ratios of healthcare hazardous waste

Waste Type	Basic Description	Approximate Proportion of Total Healthcare Waste
Infectious waste	Waste contaminated with blood and its by-products	15%
Pathological waste	Body parts, blood and other body fluids, and fetuses	
Sharps	Syringes, needles, disposable scalpels and blades	1%
Chemicals	Laboratory reagents, X-ray and photo processing chemicals, solvents	3%
Pharmaceuticals	Expired, unused, and contaminated drugs, vaccines, and serums	
Genotoxic waste	Waste containing cytotoxic drugs often used in cancer therapy	
Waste containing heavy metals	Broken mercury thermometers, blood pressure monitors, compact fluorescent lamps, batteries	1%
Radioactive waste	Unused liquids from radiotherapy and laboratory research, materials contaminated with radioactive diagnostic material	

For planning purposes, the World Health Organization suggests that low-income countries generate between 0.2 and 0.8 kg of hazardous waste per hospital bed per day. Based on a total of 1,932 hospital beds in Guyana (Guyana Bureau of Statistics, 2013), the estimated amount of healthcare waste requiring disposal may be between 141 and 564 tonnes per year.

### 2.4.3 Hazardous Waste

A hazardous waste inventory for 2007 (Caribbean Environmental Health Institute, 2009) showed that over 741,780 kilograms of hazardous wastes (or 1.0 kg per person) were generated in Guyana in 2007 (as reported by 569 entities). Four waste streams accounted for almost 95% of the total waste reported as follows:

- Waste oils/water, and hydrocarbons/water mixtures and emulsions = 42.7%
- Waste from the production, formulation and use of organic solvents = 24.3%
- Clinical wastes from medical care in hospitals, medical centres and clinics = 14.4%
- Acidic solutions or acids in solid form = 7.2%

The actual hazardous waste generation was believed to be higher as the inventory/survey did not capture all sectors, such as mining where mercury used in gold extraction was under-reported. As there have been no major hazardous waste reduction interventions in three of the four categories identified above since the completion of the survey, the hazardous waste generation rate in 2014 is likely to be higher than in 2007.

A second study completed for Region 4 in 2010 (SENES Consultants Ltd, 2010) estimated annual hazardous waste generation rates of 615 tonnes of industrial solid waste, 494 tonnes of semi-solid hazardous waste, 694,000 m<sup>3</sup> of organic wastewater, and 134,000 litres of waste oil.

## 2.5 Resource Recovery

Waste reduction, reuse and recycling initiatives are discussed below:

- Banks DIH operates an ongoing beverage bottle return programme, which involves charging a deposit of \$200 on each case of beer sold in refillable glass bottles, and issuing a full refund when the bottles are returned in good condition.
- A cardboard recycling programme is implemented by Caribbean Container Incorporated (CCI) whereby CCI buys, collects and recycles approximately 80 tonnes/month of office-paper and old corrugated cartons to make new corrugated packaging. Eighty (80) tonnes/month represents one-third of the amount recycled (the other two-thirds are imported from Suriname and Trinidad and Tobago), and approximately 51% of the total cardboard waste generated in Georgetown.
- Scrap metal recycling is coordinated through the Guyana Metal Recycler's Association which has a membership of 23 scrap metal dealers. In 2013, just over 20,115 tonnes of ferrous and non-ferrous scrap metal and used lead acid batteries were exported, while 11,103 tonnes have been exported for the first half of 2014.

- The Institute of Applied Science and Technology (IAST) has successfully operated several pilot-scale recycling programmes involving domestic and industrial solid wastes, which it is currently working to commercialise. These include:
  - Production of roof shingles/tiles from waste high-density polyethylene (HDPE) plastics and sawdust;
  - Conversion of waste vegetable and animal fats into biodiesel;
  - Biogas generation using vegetable waste and animal dung, which has associated challenges such as the dispersed sources of the feedstock, increasing price for the feedstock (previously seen as a waste with no value), and limited cultural acceptance of cooking with gas made from dung;
  - Processing of used tyres to produce crumbed tyre which is combined with rubber and has been used to surface the Demerara bridge;
  - Manufacture of rice hull briquettes and sawdust briquettes as fuel sources; and
  - Creation of activated carbon from coconut shells to replace the use of mercury in recovering gold during the mining process.
  
- A community composting pilot was completed in 2 NDCs in Region 4 as part of the GSWMP implementation. Participating households were asked to bring their organic waste to the communal composting site where it was composted and the finished compost was distributed to the residents.
  
- The sugar industry is able to utilise or recycle a lot of its own waste, including: bagasse, which is used to fuel the boilers; filter mud which is used as a soil amendment or given to farmers for a similar purpose; scrap metal and batteries which are sold for recycling through a competitive tender process; and empty chemical containers, which are shredded and incorporated into road construction on estates belonging to the Guyana Sugar Corporation (GuySuCo).
  
- A restriction on the importation and use of Styrofoam containers was announced in June 2013 to come into effect from 1<sup>st</sup> June 2014. Specific measures were to include the imposition of stamp duty and environmental tax charges on Styrofoam for a period of one year, and the provision of incentives to the private sector to import biodegradable alternatives. However, in June 2014, the date for introducing the restrictions was postponed to a later date to be announced.

In early 2014, the MLGRD invited expressions of interest from companies to establish a recycling facility and five transfer stations in Region 4, based on the build-own-operate-transfer (BOOT) financing model, and subsequently invited seven companies to submit detailed proposals. The costs and benefits of operating 5 transfer stations within the relatively compact area of Georgetown must be carefully considered within the framework of a national strategy.

## 2.6 Waste Storage, Collection, and Transportation

Existing legislation require waste to be stored in appropriate containers, however this is not widely complied with as open piles of waste can be easily observed on parapets, in drains and on vacant lots. The most common waste receptacle provided for household use as part of a private fee-for-service waste collection service is the 205-litre (45 gallon) steel drum, which may weigh in excess of 32 kg when filled, and requires no less than two workers to lift and empty each bin. In addition to being a health and safety hazard, the use of the steel drum contributes to an inefficient waste collection system.

Under the GSWMP, 827 bins (with 240, 660 and 1100 litre capacities) were procured in 2013 for Region 4. The larger receptacles are typically used in common spaces such as markets, schools, and health centres. Where waste receptacles are in use, there are no rules governing the type of bin to be used or the types waste that can be put out for collection (*e.g.*, sand/mud, dead animals, faecal matter).

NDCs and town/city councils are legally responsible for providing waste collection services to residents within their jurisdictions. However for reasons including limited financing and equipment, the collection system is inconsistent and irregular, and collection coverage is less than optimal. The MLGRD provides support for waste collection (since 2013) through the Regional Solid Waste Management Programme, in which it has contracted several private contractors to provide waste collection services in each region (Table 4).

Rear-loading waste compactor trucks are typically used to transport waste, however, dump trucks and flatbed trucks with temporary side walls have also been observed in use. Existing legislation does not require those engaged in waste haulage to be licenced, however this will change with the enactment of the Solid Waste Management Bill. Persons are required, under the Environmental Protection (Litter Enforcement) Regulations, to ensure their load is covered or secured to prevent littering through waste falling off or being blown off the vehicle.

Table 4: Waste collection arrangements in Guyana

Region	Landfill Site	Contracted Party	Cost per Barrel for weekly collection
Region 1	Khan's Hill	MLGRD to re-tender	\$ 400
Region 2	Charity Grant Unity and Lima	Puran Brothers Disposal Inc.	\$ 360
Region 3	Windsor Forest	Puran Brothers Disposal Inc.	\$ 360
Region 5	Zorgenhoop	Advance Environmental Solution	\$ 300
	Naarsteghied	Cevons Waste Management	\$ 300
	West of Burma Road	MLGRD to re-tender	\$ 300
Region 6	New Amsterdam-Belle Vieu	Advance Environmental Solution	\$ 300
	Kilcoy/Chesney	MLGRD to re-tender	\$ 300

	Number 0 Village	Mr. Shirkissoon Ramjanam	\$ 300
Region 7	Byderado/Agatash	MLGRD to re-tender	\$ 300

## 2.7 Waste Disposal

The main waste disposal methods in Guyana are open burning, open dumping and controlled dumping. The largest waste disposal site is the Haags Bosch Sanitary Landfill located in Eccles in Region 4, which covers an area of 50 hectares (123 acres) with a waste fill area of 26 hectares (64 acres) and expected lifetime of 25 years. The facility opened in 2011 and receives approximately 110,000 tonnes of waste annually.

While Haags Bosch was designed as a sanitary landfill, it is considered a controlled dump in this National Solid Waste Strategy since some of the design features (such as the leachate treatment system) are not yet operational.

In other regions, the MLGRD in collaboration with RDCs and NDCs identified waste disposal sites in accordance with the EPA's environmental impact assessment procedures and contracted with the private sector for the development, operation and maintenance of the EPA-approved sites (Table 5).

Table 5: Waste disposal arrangements in Guyana

Region	Designated Waste Disposal Sites	Type of Facility
Region 1	Khan's Hill	Controlled dump
Region 2	Lima Dump	Controlled dump
	Charity Dump	Controlled dump
Region 3	Nil (waste currently sent to Haags Bosch, until construction of landfill in Windsor Forest is complete)	n/a
Region 4	Le Repentir Dump (now closed to the public permanently and soon to be rehabilitated)	Open dump
	Haags Bosch Sanitary Landfill	Controlled dump

Region	Designated Waste Disposal Sites	Type of Facility
	Lusignan Landfill (design of rehabilitation is in progress)	Controlled dump
	Diamond Grove (design of closure is in progress)	Open dump
Region 5	Zorgenhoop	Controlled dump
	Naarsteghied	Controlled dump
	West of Burma Road	Controlled dump
Region 6	New Amsterdam-Belle Vieu	Controlled dump
	Kilcoy/Chesney	Controlled dump
	Number 0 Village	Controlled dump
Region 7	Byderabo dump	Open dump
Region 8	Nil (site identification in progress)	
Region 9	Bonn Success	Controlled dump
Region 10	Caracara dump	Open dump
	Dokara dump	Open dump

### 2.7.1 Littering

Littering and illegal dumping in drains, rivers, parapets, and vacant lots are widespread and have negative impacts on public health and the environment including: blocking of drains and kokers which contribute to flooding;

Creation of ideal breeding conditions for vectors, which carry malaria, dengue fever, chikungunya, lymphatic filariasis and leishmaniasis, all endemic to Guyana; and pollution of water bodies from toxic compounds in the waste.

Since 2012, a number of nationwide anti-litter and clean-up campaigns have been initiated by various entities and ran independently of each other. Measuring the impact of these campaigns remains a challenge. The campaigns include:

- [Guyana Shines](#), which was launched on Earth Day 2012 by the United States Embassy in Georgetown to raise awareness among schools and young people and to promote the clean-up of 2 communities. In June 2014, a second phase (Guyana Shines: Keep Guyana Beautiful) was launched in partnership with Youths for Guyana, to focus on weekly neighbourhood clean-up activities, a small-scale compost project, and introduction of recycling bins to specific communities, among other activities (Guyana Shines, n/d).
- [Pick It Up Guyana](#), which was launched by the Minister of Natural Resources and the Environment on World Environment Day 2012. The 2-year campaign aimed to clean up litter across the nation and enforce anti-littering laws. Some of the activities included cleaning of drains and creeks, placement of litter bins, installation of public awareness sign boards.
- [Billion-Dollar Clean Up Campaign](#). The Government has allocated GY\$ 1 billion in the 2014 budget for a national clean-up campaign, which is intended as a follow-up activity to the Pick It Up Guyana Campaign. The campaign is spearheaded by the MLGRD and will cover a range of activities including the acquisition of garbage trucks for Georgetown; de-silting of drains and canals; and cleaning of parapets, alleyways and other surrounding areas.
- [Team Up To Clean Up Clean and Green Guyana](#) is the flagship campaign of the GSWMP, which aims to create behavioural change in wanton disposal of waste in Guyana. The Team Up To Clean Up initiative is one of the three segments of this campaign that aims to create a partnership between NDCs, businesses, and community groups to clean up and maintain various areas of Georgetown. Implementation of Team Up To Clean Up will commence later in 2014.

## 2.7.2 Industrial Waste Disposal

It is worth noting that the sugar and rice industries generate significant amounts of solid waste. In the sugar industry, waste such as bagasse, filter mud (or mill mud) and scrap metal are recycled, while sharps and infectious waste from GuySuCo's healthcare facilities are sent to the Georgetown Hydroclave or incinerated on GuySuCo's estates. Empty chemical containers are shredded and incorporated into the construction of roads on GuySuCo's estates.

Waste from the rice industry includes paddy hulls (or husk) and rice straw. Paddy hulls are typically burn at the rice mill, which generates a fine ash that can travel long distances in the air and create a public health hazard for nearby residents. Rice straw is often burnt in the rice fields, or ploughed into the soil.

## 2.8 Healthcare Waste Management

The Georgetown Public Hospital is the national hospital and the largest single generator of healthcare waste. Infectious waste and sharps from this hospital and from several healthcare centres in other regions are sterilised in a Hydroclave, which was commissioned in March 2012 at a cost of approximately US\$ 1 million. The Hydroclave uses steam at 132 degrees Celsius for 20 to 30 minutes, combined with fragmentation of the waste into small pieces to render the waste inert. The sterilised waste is shredded and disposed of as general waste.

A few of the remaining healthcare facilities (Table 5) utilise the Hydroclave for infectious waste disposal on a fee-for-service basis. A few of the larger healthcare facilities have rudimentary on-site waste incinerators or De Montfort incinerators in various states of disrepair, while others dispose of infectious waste by opening burning.

In general, there are no appropriate protocols or systems in place to manage other non-infectious waste types arising from healthcare including chemical wastes, genotoxic waste, radioactive waste, waste with high concentrations of heavy metals, and some pharmaceuticals waste.

The majority of pharmaceutical wastes are either burnt under supervision of the Ministry of Health Food and Drug Department or returned to the Materials Management Unit. Humanitarian donations of near-expired pharmaceuticals were identified by several healthcare facilities as a factor contributing to the generation of pharmaceutical waste.

Table 6: Healthcare facilities in Guyana

Type of Facility	National Total	Coastal Regions					Hinterland Regions				
		3	4	5	6	10	1	2	7	8	9
Specialist hospital*	4	0	2		2						
National hospitals	1	0	1	0	0	0	0	0	0	0	0
Regional hospitals	6	1	2	0	1	1	0	1	0	0	0
District hospitals	20	3	0	2	2	2	4	1	2	2	2
Health centres	133	13	39	15	28	12	3	12	3	5	3
Health posts	210	27	10	1	4	16	42	20	22	16	52
Private hospitals	6	0	6	0	0	0	0	0	0	0	0
Facility Totals	380	44	60	18	37	31	49	34	27	23	57

Source: (Health Systems 20/20 and the Guyana Ministry of Health, 2011)

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\* includes geriatric and rehabilitation facilities

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# 3 A WAY FORWARD FOR WASTE MANAGEMENT IN GUYANA

The Government of Guyana is committed to improving the way that wastes are managed to ensure that negative impacts on public health and the environment are reduced or eliminated, and to secure a healthy environment for future generations of Guyanese to enjoy. The government recognises the intrinsic value of a clean environment and understands the associated benefits for the health and well-being of its people. The government will therefore act to protect, conserve and maintain the environment by providing leadership in implementing environmentally-sound waste management and resource recovery policies and activities.

The strategic framework described in this chapter will guide decision making by the government and serve as the foundation for establishing an integrated, financially self-sustaining, environmentally-sound, and socially-acceptable waste and resource recovery system for Guyana.

## 3.1 What wastes does this strategy cover?

This strategy covers all types of solid waste, from residential, commercial, institutional and industrial sources, and healthcare waste from hospitals and health centres. It also covers scrap metal, used oil, used lead acid batteries, and used electrical and electronic waste (e-waste).

The strategy does not address wastewaters and sludge (such as domestic wastewaters, sewage, and septic tank sludge), waste from industrial processes, or industrial waste from the mining sector. Exceptions to these exclusions are the wastes generated in the course of managing the other wastes that are included (such as refrigerants arising from recycling of air conditioners and refrigerators).

## 3.2 Guiding principles

Implementation of this National Solid Waste Management Strategy shall adhere to the following policy principles:

- Polluter pays principle** Those responsible for causing pollution or creating waste that must be managed should pay proportionally for the cost of managing that pollution or waste.
- Proximity principle** Waste should be managed close to the point at which it is generated, to minimise the costs associated with collection and transportation.
- Transparency** All waste management activities shall be conducted in an open and transparent manner and Guyanese citizens shall have access to information regarding waste management in Guyana where such access does not infringe on the rights of individuals or private businesses.
- Sound decision-making** Decision-making shall be based on scientific information and risk analysis from national, regional and/or international sources and shall promote the optimum

utilisation of resources.

**Precautionary approach**

When an activity raises threats of serious or irreversible damage to human health or the environment, precautionary measures should be taken, even if the cause and effect relationships of the activity are not fully understood or established scientifically.

**Adherence to regional and international conventions**

The Guyanese Government and citizens shall abide by their obligations to regional and international waste conventions to which Guyana is a party.

### 3.3 Vision

Informed communities participating in a nation-wide, integrated, and financially self-sustaining waste management and resource recovery system that preserves public health and the environment, realises maximum value from resources, and minimises long-term costs to households, industry, and government.

### 3.4 Policy Objectives

Three objectives or long-term outcomes have been defined towards achieving the vision:

1. **A Cleaner Environment.** Our environment sustains our people and is a part of our national identity. We have a responsibility to:
  - a. Eliminate or minimise detrimental impacts to the environment arising from waste management and resource recovery activities including, but not limited to, generation, storage, collection, transportation, recycling, treatment and landfilling; and
  - b. Promote approaches to waste management that have the least environmental impacts and which comply with Guyana's obligations under international and regional environmental treaties.
2. **Better Public Health Protection.** The wealth of our nation depends on the health of our people. We must do more to reduce the impacts of our waste management activities on the health of the population by:
  - a. Promoting and regulating waste management approaches that have the least public health impacts; and
  - b. Developing future generations of environmentally-aware Guyanese, who understand the links between waste management, environment, and public health and who make the right decisions.

3. **Contribute to Economic Prosperity.** Solid waste is a substantial unrealised resource in our society, which we cannot afford to continue to ignore. Realising the potential value in the waste stream will require:
  - a. Creating opportunities, incentives, and markets to encourage the development and prosperity of the resource recovery sector; and
  - b. Adopting a whole-of-government approach that integrates resource recovery activities into public sector projects and programmes.

### 3.5 Goals

This vision and policy objectives set the scene for six key goals and 44 strategic actions, which identify the Government's expectations of waste management at the end of the strategic period and into the future. All future decisions will give due consideration to these goals:

1. Less litter and illegal dumping (Chapter 4)
2. Less waste generated (Chapter 5)
3. Better resource recovery (Chapter 6)
4. Efficient and cost-effective waste collection (Chapter 7)
5. Better waste infrastructure (Chapter 8)
6. Strengthened human and institutional capacity (Chapter 9)

An overview of the new policy framework for waste management in Guyana is shown in Table 6.

### 3.6 Coordination Mechanism

The implementation of the National Solid Waste Management Strategy shall be coordinated by a Solid Waste Management Steering Committee, which shall be established within one month of the strategy being approved. THE STEERING COMMITTEE shall meet at least once each quarter to review progress under the strategy, and provide guidance to the lead implementing agencies as necessary. The steering committee shall also comprise of high-level representatives (who have the power to make decisions and commit resources) from the key stakeholder agencies. The key agencies shall include the SWMA, the MLGRD, the EPA, and the RDCs.

A charter for the steering committee shall be defined to ensure consistent and unambiguous operation of the committee. A suggested charter, which may be further modified and adopted, is provided in Appendix 1. It is envisioned that the steering committee shall sit at the same level of the existing national Inter-Agency Coordinating Committee, but provide more focus and attention on solid waste issues in Guyana.

Table 7: Strategic framework for solid waste management in Guyana

VISION	<p>Informed communities participating in a nation-wide, integrated, and financially self-sustaining waste management and resource recovery system that preserves public health and the environment, realises maximum value from resources, and minimises long-term costs to households, industry, and government.</p>		
	OBJECTIVES	<p><b>A CLEANER ENVIRONMENT</b></p> <p><i>Minimise environmental harm</i></p> <p><i>Promote environmentally-sound waste management approaches</i></p>	<p><b>BETTER PUBLIC HEALTH PROTECTION</b></p> <p><i>Promote and regulate waste management approaches</i></p> <p><i>Develop future generations of environmentally-aware Guyanese</i></p>
GOALS & KEY STRATEGIC DIRECTIONS	<p><b>LESS LITTER &amp; ILLEGAL DUMPING</b></p> <p><i>Identify and monitor dumping hotspots</i></p> <p><i>Strengthen enforcement capacity and activities</i></p> <p><i>Learn from successful behaviour change campaigns</i></p> <p><i>Implement national social marketing campaigns</i></p> <p><i>Integrate waste management into primary and secondary school curricula</i></p>	<p><b>LESS WASTE GENERATED</b></p> <p><i>Improve data collection</i></p> <p><i>Reduce plastic bag consumption</i></p> <p><i>Develop business waste reduction scheme</i></p> <p><i>Offer favourable tax breaks for waste-friendly activities</i></p> <p><i>Demonstrate public sector leadership in reducing waste</i></p> <p><i>Develop and enforce quality standards for products</i></p>	<p><b>BETTER RESOURCE RECOVERY</b></p> <p><i>Introduce backyard and community composting</i></p> <p><i>Implement container deposit programmes</i></p> <p><i>Ban Styrofoam and non-compostable food &amp; beverage container imports</i></p> <p><i>Implement recycling programmes for e-waste, vehicles, tyres, used oil</i></p> <p><i>Demonstrate public sector leadership in utilisation of recovered materials</i></p>
	<p><b>EFFICIENT AND COST-EFFECTIVE WASTE COLLECTION</b></p> <p><i>Introduce full cost accounting for waste management</i></p> <p><i>Assess and improve waste collection efficiencies</i></p> <p><i>Centralise and optimise waste collection nationwide</i></p> <p><i>Assess feasibility of introducing environmental VAT</i></p> <p><i>Regulate waste transportation</i></p>	<p><b>BETTER WASTE INFRASTRUCTURE</b></p> <p><i>Centralise and optimise waste disposal nationwide</i></p> <p><i>Licence and regulate waste management facilities</i></p> <p><i>Introduce semi-aerobic landfilling method</i></p> <p><i>Progressively close polluting dumpsites</i></p>	<p><b>STRENGTHENED HUMAN AND INSTITUTIONAL CAPACITY</b></p> <p><i>Resolve overlapping roles and responsibilities</i></p> <p><i>Develop solid waste training programmes at local institutions</i></p> <p><i>Establish a technical advisory committee to guide national solid waste management</i></p>

KEY PERFORMANCE INDICATORS	INDICATORS	2014 BASELINE	COMMENTS
	Per capita waste generation	0.73 kg/person-day	To be verified in 1 <sup>st</sup> year of strategy
	Percentage of total waste recovered	-	To be established in 1 <sup>st</sup> year of strategy
	Waste collection coverage (%)	-	To be established in 1 <sup>st</sup> year of strategy
	Waste management cost (\$/tonne)	-	To be established in 1 <sup>st</sup> year of strategy
	Percentage of government subsidy	-	To be established in 1 <sup>st</sup> year of strategy

## 4 LESS LITTER AND ILLEGAL DUMPING

Instances of littering and illegal dumping are widespread across Guyana, despite the interventions of several national awareness campaigns. Trash attracts trash, and it takes just one illegally dumped bag or pile of rubbish to attract other would-be dumpers. These practices: contribute to flooding and infrastructure damage when drains and kokers are blocked during heavy rains; create breeding grounds for disease carrying vectors such as rats and mosquitoes; and tarnish the image of Guyana as a nature lover's paradise. Littering and illegal dumping are symptomatic of a lack of awareness of the negative impacts, and/or apathy in those that offend.

Offences for littering are covered under the Municipal and District Councils Act 1988 and the recently promulgated Environmental Protection (Litter Enforcement) 2013. A total of 269 persons were charged for littering and illegal dumping in 2013 in Georgetown. Media reports also indicate that more than 600 cases were tried between February and March 2007 (Stabroek News, 2007), and at least 40 cases in April 2010 (Stabroek News, 2010).

Some incidents of littering are caused by residents and businesses disposing of their waste with unauthorised persons, who then dump the waste in drains, on the road sides, vacant lots, etc.).

To address the littering situation, several anti-litter campaigns have been conducted in recent times, however the success or otherwise of these campaigns is not fully understood. A sustained long-term approach to combating littering and illegal dumping is needed.

### 4.1 Targets

- Increase in the number or fixed penalty notices issued, or prosecutions for littering and illegal dumping.
- Fewer illegal dumps and littering sites and fewer instances of littering and illegal dumping across Guyana.

### 4.2 Strategies

Reduce provocations for illegal dumping by making legal disposal easier. Providing adequate litter bins in areas with heavy pedestrian traffic (combined with awareness) will contribute to a reduction in litter. Similarly, if everyone has access to an efficient, regular, and cost-effective waste collection system (Chapter 7), then the motivation for illegal dumping reduces.

The decision to commit a crime is influenced by the perceived risk of getting caught and the perceived benefits of the action. Increasing the risk of getting caught will deter some offenders from illegal dumping. Ramping up enforcement efforts, publicising instances of illegal dumping prosecutions, and potentially offering rewards for videos/pictures of littering and illegal dumping activities that lead to successful prosecutions could deter would-be dumpers.

Remove excuses for littering and illegal dumping by educating and informing the community. A lot of effort has been invested in awareness programmes in recent times. Expanding and sustaining effective awareness and

education programmes, and investing in youth awareness are necessary to change a lifetime of bad practices. Finding out what people value and making the links between littering/dumping and those values should be the basis of a long-term education and awareness strategy going forward. Removing excuses for littering can be achieved through targeted education; advertising recycling, collection and disposal services; and keeping areas free of litter and waste by cleaning and beautifying unoccupied lots and parapets.

Strategies that combat illegal dumping must be constantly reviewed and refined to account for the dynamic nature of illegal dumping. The most effective responses to the problem can change over time.

### 4.3 Actions

Strategic Action	Lead Agency	Implementation Timeframe
1. Identify areas susceptible to repeated high levels of littering and illegal dumping and ramp-up compliance monitoring of these 'hotspots'.	EPA, RDCs	
2. Strengthen enforcement capacity by legally empowering and training community policing groups as voluntary litter wardens.	EPA	
3. Design and implement a pilot programme to encourage the public to report illegal dumping activities with pictures/videos and expand if effective.	EPA	
4. Enforce all provisions of the Environmental Protection (Litter Enforcement) Regulations, including littering from a moving vehicle; provision of litter receptacles on public transportation; littering on private premises; and provision and maintenance of litter receptacles by NDCs and RDCs in public places under their control.	EPA	
5. Conduct judicial training seminars to provide a forum to analyse, discuss and identify solutions (e.g., litter-pick up service instead of fine or jail time) to the challenges posed by the application and administration of litter prevention and waste management laws.	EPA	
6. Conduct a stakeholder consultation meeting with those who have completed major behavioural change campaigns (such as the HIV/AIDS campaign) to identify approaches and lessons that could be transferred to changing litter/dumping behaviours. This should be done in collaboration with the local university or research institutions to assist in capturing knowledge/information for ongoing research and improvement.	EPA, SWMA	
7. Sponsor research projects with local research institutions to build local knowledge of littering and illegal dumping behaviours and to identify culturally-appropriate intervention strategies with a view to applying successful strategies across the country.	EPA, SWMA	
8. Develop and implement a national communications and social marketing strategy for waste management, make it widely available to environmental groups, NGOs and others engaged (or who may wish to engage) in environmental campaigns, and encourage others to align their individual campaigns to achieve nationally agreed objectives.	SWMA	
9. Develop a Best Kept Village programme to recognise community efforts in waste management, beautification and overall environmental protection.	SWMA	

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10. Integrate waste management education into the primary and secondary curricula.

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Min. of Education

## 5 LESS WASTE GENERATED

Avoiding or minimising the generation of waste means: less waste to manage; reduced costs associated with transporting, sorting, and recycling materials; and ultimately less waste going to landfill. Waste reduction is one of the most effective and least expensive waste management strategies, yet it is also one of the more difficult because the measures required to achieve waste reduction—such as import restrictions and levies—are politically unpopular.

Guyana is fast becoming a dumping ground for waste. The national solid waste generation rate is estimated at 0.59 kg/person-day and is forecasted to rise to 0.77 kg/person-day by 2024 as Guyana continues to develop economically. The non-biodegradable component of the waste stream will increase as consumption patterns shift with increasing economic development and affluence of residents.

Single-use plastic shopping bags, which are used for a very short time before becoming an environmental nuisance are one of the trappings of a wasteful society. They are typically issued by establishments at the point of sale for the purpose of transporting food or merchandise out of the establishment. Single-use plastic bags are often the focus of waste reduction measures because they are difficult to recycle and their improper disposal contributes to blocked drains, spoilt landscapes, and animal deaths when mistakenly ingested as food. Several countries have banned these bags, some have imposed a tax payable at the point of sale, while others have applied a combination of the two measures (see Table 8, a complete list is provided in Appendix 2).

Table 8: International measures for plastic bag control

Countries with plastic bag bans	Countries with plastic bag tax	Countries with combination of measures
Argentina	Bulgaria	Belgium
Australia (several cities)	Denmark	Botswana
Haiti	Ireland	Kenya
Philippines (several cities)	Vietnam	Canada (several cities)
Rwanda	USA (several cities)	
Switzerland		
USA (several cities)		

Source: (Earth Policy Institute, n.d)

Second-hand imported and donated merchandise that are nearing the end of their useful life contribute to premature waste generation. Importation of very old motor vehicles accelerates waste generation, while in the

healthcare sector, the donation of pharmaceuticals near their expiry dates has been raised as an issue of concern by several health centres.

The public sector must take the lead (and be seen to be taking the lead) in reducing waste. Simple measures such as implementing a no-Styrofoam or no-disposables office policy, especially for catered meetings, workshops, and public functions, will build public goodwill and help to achieve national waste reduction targets. The good practices and habits cultivated in the workplace will also eventually become habits outside of the workplace.

## 5.1 Targets

- Better data on solid waste generation across all of Guyana available by end of 2015 to establish the national per capita waste generation rate and to better inform detailed planning and private sector investment in the waste management sector.
- National per capita solid waste generation rate decreases annually compared to the 2015 baseline.
- Waste generation in the public sector determined by 2015 and decreases annually.

## 5.2 Strategies

The collection, management and access to waste management information and data must be improved to support informed decision making in waste reduction, resource recovery, collection and disposal. To this end the Government of Guyana will establish national guidance for conducting waste generation studies, and collection of waste disposal data. Emphasis will be placed on developing local competence within the central and local government to implement these studies on a regular basis.

The government will develop cost-effective legislative measures to reduce the consumption of single-use plastic shopping bags and encourage the use of less wasteful alternatives.

The government will work collaboratively with the private sector and stakeholders (such as the Chambers of Commerce and Industry, and the Guyana Consumers' Association) to develop voluntary waste reduction programmes. Businesses will be provided with the opportunity to examine their activities and identify areas for voluntary waste reduction, which will be measured and recorded to enable reporting against the national waste reduction targets. Areas for reduction that could be considered include bottled water and non-essential beverages in units smaller than 0.5 litres, beverages in Tetra Pak containers (which are difficult to recycle), and implementation of consumer choice options where customers are incentivised to reduce waste (*e.g.*, reduced price for eating-in versus take-away).

One example of a voluntary waste reduction scheme is the Packaging Covenant of Australia, which is an agreement between government, industry and community groups in Australia to find and fund solutions to address sustainable packaging, increase recycling rates and reduce packaging litter. The Packaging Covenant of Australia demonstrates the potential success of a non-regulatory approach. The key features of the Packaging Covenant are summarised in Appendix 3).

The government will prioritise the implementation of preferential taxation on products (locally manufactured and imported) and services that avoid or minimise waste generation, or that generate benign and recyclable wastes,

such as reusable (cloth) diapers, refillable containers, paper bags, reusable shopping bags, and other reusable versus disposable products.

The public sector will examine its practices to identify and implement waste reduction opportunities including, but not limited to, eliminating disposable cutlery and tableware at catered functions, mandating double-sided printing and photocopying, and reducing paper memos and correspondence in favour of electronic versions.

### 5.3 Actions

Strategic Action	Lead Agency	Implementation Timeframe
11. Develop, disseminate and implement a National Waste Characterisation Guideline, and a business waste audit procedure in collaboration with the National Bureau of Standards.	SWMA	
12. Provide NDCs and RDCs with training in the implementation of the guideline, and require the annual submission, and reporting of waste generation and disposal data within each NDC/RDC in collaboration with the Bureau of Statistics.	SWMA	
13. Complete an evaluation of options to reduce single-use plastic bag consumption, including a legislative ban, plastic bag tax, or a combination of both, and implement the recommendations.	SWMA	
14. Require the inclusion of waste reduction activities (as a component of overall waste management) in the environmental management plans submitted by new developments.	EPA	
15. Establish a taskforce of key stakeholders ( <i>e.g.</i> , Georgetown Chamber of Commerce and Industry, Manufacturing & Services Associations) to develop a voluntary waste reduction scheme for the commercial and industrial sectors with appropriate recognition and incentives for top-performing businesses (such as a 'Green Business Award').	SWMA	
16. Prepare and implement a tax incentive programme that encourages eco-friendly products over non-eco-friendly ones ( <i>e.g.</i> , higher taxes on plastic bags and lower or no taxes on paper bags would encourage paper bag use).	Guyana Revenue Authority, SWMA	
17. Provide appropriate tax breaks to those wishing to establish flea markets, second-hand charity shops, <i>etc.</i> where people can trade, buy, or sell unwanted items to avoid or delay those items becoming waste.	Guyana Revenue Authority, SWMA	
18. Strengthen and continue enforcement of product standards including for new and used pneumatic tyres.	Bureau of Standards, Guyana Revenue Authority	
19. Develop new national standards for importation of used products (including but not limited to motor vehicles, computers, and laptops) and guidelines for humanitarian donations including, but not limited to, pharmaceuticals.	Bureau of Standards, SWMA	
20. Complete waste audits for the public sector and mandate each public sector agency to develop and implement simple waste reduction and management plans, which must be reported on annually with awards for	MLGRD, All government agencies	

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top-performing agencies.

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## 6 BETTER RESOURCE RECOVERY

Recovering value from waste through recycling, composting and other resource recovery methods diverts waste from landfills, delays the need to construct expensive new landfills, and creates economic opportunities.

To achieve the most impact, resource recovery efforts should target the largest components of the waste stream. The Georgetown domestic waste stream contains about 50 percent organic (putrescible) material, which suggests that organic waste management activities should comprise a major component of Guyana's resource recovery programme. Additional components should focus on recovering metals, cardboard, plastics, and hazardous wastes (such as electrical and electronic waste).

A ban on the importation and use of Styrofoam was expected to be in place by June 2014, however, this has been postponed to a later date. If the ban comes into effect, it would not necessarily resolve indiscriminate disposal practices and the attendant environmental issues, but it would result in a range of alternative materials on the market—not all of which may be desirable. The ban should therefore stipulate that all disposable food and beverage containers imported or manufactured locally should be 100 percent compostable, with a suitable national definition of 'compostable' developed based on internationally accepted standards. In this respect, the Styrofoam ban is discussed in this section since it will likely lead to more eco-friendly alternatives that can be recovered.

Implementing a successful resource recovery programme typically involves implementing several discrete sub-programmes including, but not limited to, container deposit programmes, environmental handling fees, voluntary agreements based on legislated targets, and mandatory take-back schemes for specific waste types. A few of these sub-programmes are described in Appendix 4.

### 6.1 Targets

- 40 percent of waste generated is recycled, composted, or put to other beneficial uses based on best practices by 2024.
- Deposit/refund programmes implemented for food and beverage containers, lead acid batteries, used tyres, and other priority waste streams by 2019.
- Styrofoam and other non-compostable disposable food and beverage containers banned by 2015.
- A nation-wide resource recovery system covering the ten regions in place by 2024.

### 6.2 Strategies

Resource recovery priorities will be guided by the composition of the waste stream and the economic value of the waste. Given that the domestic waste stream in Guyana consists of over 50% organic waste, which is largely responsible for the environmental pollution and nuisance of landfills, organic waste management programmes such as composting, mulching, and anaerobic digestion will be prioritised. Other priorities for resource recovery are consumer recyclables (paper, plastics, metals), bulky wastes (end-of-life appliances and vehicles) and hazardous materials (used oil, electrical and electronic goods, lead acid batteries).

Resource recovery priorities must be aligned and integrated with other national and sectoral priorities in order to improve the success of resource recovery initiatives. For example, the resource recovery priority of organic waste management (through composting and mulching) aligns well with the government’s priorities in agriculture to promote soil health and certification systems for organic produce and environmentally sustainable farms (Ministry of Agriculture, 2013).

Measures to support alignment and integration of resource recovery priorities into national priorities will be instituted including, but not limited to:

- regulatory measures to control destructive practices (such as backyard burning of organic waste, plastics, cardboard, and other solid waste);
- national specifications for the quality of recovered materials (such as mulch and compost);
- regulatory and economic incentives to stimulate local markets;
- technical assistance programmes for businesses and institutions to plan and implement resource recovery measures (such as assistance to hotels to implement mulch and compost programmes);
- mandatory requirement to utilise recovered materials on state properties and in state projects (such as utilisation of compost in landscaping and beautification, and utilisation of crushed glass in government construction projects)
- mandatory policy for public sector agencies to utilise composting facilities for waste generated by their programmes and operations (*e.g.*, hospital kitchens, government cafeterias, *etc.*).

Extended producer responsibility (EPR) will be promoted in the private and public sectors. EPR refers to the concept where manufacturers (producers) and importers of products bear a significant degree of responsibility for the environmental impacts of their products throughout the product’s life-cycle, including upstream impacts inherent in the selection of materials for the products, impacts from the production process, and downstream impacts from the use and disposal of the products. EPR is based on the principle that producers (usually brand owners) have the greatest control over product design and marketing, and thus the greatest ability and responsibility to reduce toxicity and waste.

### 6.3 Actions

Strategic Action	Lead Agency	Implementation Timeframe
21. Implement pilot programmes in selected communities for at-source reduction of organic waste through backyard mulching and composting by 2015. Pilot programmes should include the provision of appropriate technical advice to households and communities, in addition to subsidised, locally-manufactured compost bins.	SWMA	
22. Scale-up and expand backyard and community composting programmes at the rate of 3 communities each year commencing in 2016, based on lessons learnt through the pilot programmes.	SWMA	

Strategic Action	Lead Agency	Implementation Timeframe
23. Implement a 1-year centralised composting and organic waste collection pilot project in a selected urban community where backyard composting may be difficult or undesirable by 2016. Evaluate the project and implement the recommendations.	SWMA	
24. Design and implement a container deposit programme for food and beverage containers of all types (glass, plastics, aluminium, tin, Tetra Pak), and lead acid batteries, with provisions to add other waste types in the future. The design should identify the end markets for the recovered materials and examine the practicality of utilising existing transportation networks to recover waste materials from distant regions.	SWMA	
25. Restrict the importation and use of Styrofoam and other non-compostable disposable food and beverage containers by 2015.	SWMA	
26. Complete a study of options to implement recycling programmes for electronic goods, vehicles, tyres, appliances, and lubricants, with the application of environmental handling fees, and consideration of extended producer responsibility.	SWMA	
27. Include product take-back as a mandatory requirement in tenders and contracts for the supply of goods (such as computers, lubricants, and chemical containers) in the public sector.	SWMA, All government agencies	
28. Develop and implement a 'Clean Schools' Programme, which encourages schools to adopt waste reduction, reuse, and recycling practices and rewards top performers. A guideline on Fiji's implementation of such a programme is available from: <a href="http://www.environment.gov.fj/3rproject/3rs_school_nadi.html">http://www.environment.gov.fj/3rproject/3rs_school_nadi.html</a>	SWMA, Min. of Education	
29. Develop and implement a 'Clean Campus' programme targeting waste reduction, reuse, and recycling at the University of Guyana, as well as at technical and vocational institutions across Guyana.	Institutions of higher education	
30. Require public sector agencies to participate in recycling programmes and to utilise recovered materials (e.g., compost and crushed glass) in their projects and operations.	MLGRD, SWMA	

## 7 EFFICIENT AND COST-EFFECTIVE WASTE COLLECTION

The problems with the existing waste collection system include lack of standards for waste receptacles, potential occupational health and safety issues involved in lifting waste receptacles, incomplete geographic coverage, low collection productivity, aging and unreliable vehicles, lack of user fees tied to the amount of waste disposed, and collection coinciding with peak traffic times. The efficiency of the existing system needs to be improved.

Improving waste collection efficiency requires maximising vehicle payloads, optimising routes, minimising the effort to transfer waste from receptacles to vehicles, having a well-maintained vehicle fleet, and scheduling collection during non-peak traffic hours.

Historically, waste collection (and disposal) services have been carried out on a regional basis on the assumption that waste should be contained to specific regions. However, this is not necessarily the most efficient or cost-effective management method. The waste collection system needs to be considered on a national scale in order to identify the optimum arrangement of collection routes, disposal sites and supporting facilities such as waste transfer stations (if required).

Cost recovery through user fees, is a necessary component of a sustainable collection system, and requires knowledge of the true costs of providing the waste collection service. Ideally, user fees should be based on waste quantities, so that the more waste a user disposes of, the more he/she pays. This method of waste charging is quite helpful when implementing source-reduction and diversion programmes as most users will readily participate in order to reduce their waste bills. However, strong monitoring and enforcement is required to minimise illegal dumping from those that try to avoid the fee. Flat-fee mechanisms, paid through an existing bill (such as electricity, water, or council rates) may also be used and while they create less incentive to dump illegally, there is also less incentive to reduce waste and participate in recycling programmes.

An evaluation of options for implementing a solid waste management user fee in Region 4, commissioned for the GSWMP, recommended that the household waste collection cost be recovered through an updated property tax (Hydroplan, 2011), however, this is yet to be implemented. The user fee options considered were: through the property tax, direct fee collected by the municipality, tipping fee, electricity bill surcharge, direct fee collected by private operator, prepaid bags, and quantity based fee upon servicing.

The evaluation did not consider the option of implementing an Environmental Value Added Tax (EVAT), where customers would pay for waste through their purchases. The more purchases made, the more waste is likely to be generated; hence the EVAT is a quantity-based mechanism. An EVAT would also capture waste fees from visitors to the country, who make purchases and generate waste but pay no share of the waste management costs. Incentives for eco-friendly purchases can be built in through EVAT-exempted products. However, a mechanism would be required to ensure the fair distribution of the EVAT proceeds to those managing the waste.

## 7.1 Targets

- Full cost accounting for waste management is introduced in town councils and NDCs by 2017 to assist in determining the true costs of waste management.
- An equitable system of charging for waste management (collection, disposal) based on the polluter pays principle is fully introduced by 2020.
- Waste collection activities are regulated and conducted in accordance with best practices.

## 7.2 Strategies

The region-by-region approach to waste management must be phased out in favour of a national, centralised approach, which would optimise waste collection routes, and waste disposal site locations and ultimately be more efficient and cost-effective. The public is more likely to be willing to pay for an efficient system.

Strong political will, as well as a commitment to improve service delivery, must be demonstrated in order to overcome the dilemma associated with imposing a fee on residents for an inefficient or non-existent waste management service in order to generate the revenue required to improve the service, especially as residents are often reluctant to pay the fee for a poor service.

Given the existing situation with respect to user fees in waste management (low coverage, and low cost recovery rates), measures should be implemented that ease the administrative burden associated with recovering the fees, while also limiting the ability of users to evade payment of the fees. Previous evaluations and recommendations for cost recovery should be revisited to include consideration of previously unconsidered measures such as EVAT.

## 7.3 Actions

Strategic Action	Lead Agency	Implementation Timeframe
31. Require NDCs, and town councils to introduce full cost accounting for waste management.	MLGRD	
32. Complete productivity studies of existing waste collection systems to assess waste collection efficiencies and identify areas for improvement (consistent with recommendations of the Waste Characterisation and Waste Loads and Flow report prepared by Hydroplan).	Councils, NDCs, SWMA	
33. In concert with Strategic Action 33, complete a nation-wide study to determine the most cost-effective centralised arrangements for waste collection and disposal and implement the recommendations.	SWMA	
34. Assess the feasibility of implementing an EVAT for waste management, compared to the recommendations of the Hydroplan Finance and Cost Recovery Report (Hydroplan, 2011), and implement the recommendations.	SWMA	

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35. Develop, disseminate and enforce national guidelines for waste storage, collection and transportation.

SWMA, Bureau of Standards

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## 8 BETTER WASTE INFRASTRUCTURE

While the strategic emphasis going forward is on waste reduction and resource recovery, it is accepted that waste disposal to landfill will continue to be an integral component of Guyana's waste management system in the near future. As with the waste collection system, a regional approach has previously dictated the placement of dumpsites, such that each region (with the exception of Region 3) has at least one dumpsite.

The predominant method of waste disposal in Guyana is the controlled dumping method, and the country's largest landfill—the Haags Bosch Sanitary Landfill—is based on an anaerobic landfilling method. Several Pacific developing countries with high organic-content waste streams, have had success with a Semi-Aerobic Landfill Method (also known as the Fukuoka Method), which relies on a network of leachate and gas venting pipes to induce semi-aerobic decomposition of the organic waste fraction (see Appendix 5). The Fukuoka Method offers many benefits including reduced landfill pollution, reduced operational costs, and design flexibility to incorporate local materials, and should therefore be considered as an option for Guyana. The design for the conversion of the Lusignan dump in semi-aerobic landfill is in progress (HYDEA 2014).

There are approximately 15 sanctioned and operational waste disposal sites, in addition to a number of disused dumpsites and illegal dumping sites that may be unsuitably located in residential areas. There are almost no landfill manuals for the operational facilities, limited environmental monitoring, and many of the disused dumpsites are believed to have been abandoned without environmentally sound closure.

### 8.1 Targets

- Waste management facilities such as landfills, recycling facilities, and scrap metal yards are designed to eliminate or minimise detrimental public health and environmental impacts, and are licensed and managed in accordance with best practices and approved environmental management plans.
- Waste collection and disposal considerations are integrated into new developments.
- Disused dumpsites are closed in an environmentally sound manner and periodically monitored to minimise detrimental environmental and public health impacts.

### 8.2 Strategies

Siting waste disposal facilities on the basis of regional administrative boundaries, rather than on a holistic consideration of factors such as population distribution and haulage distances, may not be the most cost-effective approach. The central government will adopt a holistic approach to waste infrastructure planning that is compatible with land use planning and promotes coordination and optimisation across all regions.

Where waste disposal cannot be avoided, the government will promote waste disposal techniques, such as the semi-aerobic landfill method, that have the least public health and environmental impacts and which comply with Guyana's obligations under international and regional environmental treaties.

The government will also provide appropriate guidance to support the commissioning, operation and closure of waste management facilities in a way that eliminates or minimises detrimental public health and environmental impacts, while strengthening monitoring and enforcement capacity.

Illegal dumpsites, disused dumpsites, and poorly operated dumpsites are threats to good environmental and public health. These facilities will be progressively rehabilitated commencing with the most dangerous sites.

Planning and development consent procedures will be strengthened to ensure that waste management considerations (such as provisions for waste recovery, storage, and collection) are integrated into the design and construction of new infrastructure.

### 8.3 Actions

Strategic Actions	Lead Agency	Implementation Timeframe
36. In conjunction with Strategic Action 30, complete a nation-wide study to determine the most cost-effective arrangement of waste disposal sites, and implement the recommendations.	SWMA	
37. Develop, disseminate and enforce guidelines for the siting, design, operation, closure, rehabilitation, and environmental monitoring of waste management facilities.	SWMA/EPA	
38. Prepare individual site operational plans for each waste disposal site currently in operation.	RDCs, NDCs, Councils	
39. Collaborate with a local research institution to conduct a research trial of the Fukuoka Semi-aerobic Landfill Method (Fukuoka Method) at the Lusignan dumpsite and disseminate lessons learnt to RDCs, town councils, and NDCs.	SWMA, University of Guyana	
40. Strengthen the planning, development consent and consultation process to ensure that requirements for best practice waste management are incorporated into designs of new developments and to ensure that safeguards such as separation distances for landfills and waste management facilities are maintained.	EIA, Central Housing & Planning Authority	
41. Establish an inventory of all known dumpsites (rehabilitated or not), complete a qualitative risk assessment of these dumpsites, and budget for the progressive rehabilitation of priority sites (at least 1 site per year).	SWMA	

## 9 STRENGTHENED HUMAN AND INSTITUTIONAL CAPACITY

Several public sector agencies are involved in waste management including the Solid Waste Management Authority, the MLGRD, Ministry of Health, EPA, RDCs, NDCs, and town councils, with the attendant potential for overlap in roles and responsibilities. One such overlap involves the EPA's Environmental Protection (Litter Enforcement) Regulations 2013 that impose a fine of GY\$50,000 on individuals for a first-time public littering offence, compared to a fine of not less than GY\$5,000 and not more than GY\$20,000 for a similar offence under the Municipal and District Councils Act. Roles and responsibilities therefore need to be streamlined to avoid legal loopholes.

The main forum for coordination between the various agencies is an Interagency Coordinating Committee that includes the EPA, the Ministry of Housing and Planning, and other public sector agencies that meets once quarterly. There is also a *Concordat on the Management of the Environment* between the EPA and Ministries, Agencies and Statutory Authorities of the Government of Guyana, under which the EPA and Ministry of Health have signed a memorandum of understanding (MOU) to collaborate on environmental health and management issues. The successful implementation of this National Solid Waste Management Strategy will require an interagency collaborative approach, and may require the development of additional MOUs between the lead agencies identified for specific actions.

The solid waste sector employs a number of staff at various levels to support the delivery of the solid waste management programme. Continual professional development is required within the sector, to ensure that staff capacity maintains pace with the evolution of waste management techniques and approaches. Short-term solid waste training programmes are currently limited to the JICA bilateral training programme and several solid waste staff have participated in 6-week JICA-facilitated training workshops in Japan. Locally, there are no known short-term training and development programmes to support the continual professional development of staff.

### 9.1 Targets

- Better clarity and demarcation of the roles and responsibilities of the various agencies involved in solid waste management by December 2015.
- Local talent and expertise in solid waste management available to support relevant agencies/entities and to support implementation of the National Solid Waste Management Strategy.

### 9.2 Strategies

A waste management system is only as good as the people and the institutions in charge of its implementation. The government will support processes to review and streamline existing legislation to better demarcate roles and responsibilities for solid waste management. Review processes for new legislation will also be strengthened to ensure areas of overlap with other legislation are identified and resolved early.

The government identifies solid waste management as a national training priority in the short term and will establish training and certification mechanisms to provide ongoing training and capacity development to staff involved in

solid waste management and to the interested wider public. This shall also include appropriate training and development for instructors, such as through a train-the-trainer programme.

Institutional capacity can also be strengthened by harnessing the considerable waste management technical expertise already in Guyana to provide guidance to the various agencies involved in the implementation of the National Solid Waste Management Strategy.

### 9.3 Actions

Strategic Action	Lead Agency	Implementation Timeframe
42. Complete a review of solid waste management legislation in Guyana to identify and resolve overlaps in roles and responsibilities. Implement the recommendations.	Attorney General’s Office	
43. Develop and offer a decentralised solid and hazardous waste management training and certification programme in collaboration with local educational institutions (technical and vocational institutions and/or university). Decentralisation ensures that people in distant regions have the same opportunities and access to training.	SWMA, Ministry of Education	
44. Establish a permanent waste management technical advisory committee to provide technical guidance on implementation of the National Solid Waste Management Strategy. The committee must comprise of nominated experts in solid waste management and closely related fields.	SWMA	

# 10 IMPLEMENTATION, MONITORING AND EVALUATION

## 10.1 Implementation

The Solid Waste Management Authority is responsible for coordinating the implementation of *Putting Waste In Its Place*. In this regard, the work of the Authority will be assisted through existing national coordinating *mechanisms* such as the Interagency Coordinating Committee.

All government agencies that have been identified to lead on different strategic actions are required to convert those strategic actions into activities in their annual work plans. It is crucial to align the annual departmental work plans of the relevant agencies and the work plans of individual officers with the National Strategy, otherwise, the activities required to implement the Strategy will always be seen as 'extra work' and will take a back seat to other priorities.

## 10.2 Monitoring

Monitoring and reporting on our progress annually will help us to identify previously unconsidered barriers and issues, and to develop and implement strategies to overcome those barriers. To this end, the annual monitoring and reporting template provided in Appendix 6 will be used for internal (governmental) purposes. Relevant information from each annual report should be translated into a format appropriate for public consumption and disseminated widely, to keep waste management and the National Strategy in the public eye.

## 10.3 Evaluation

A mid-term evaluation of the National Solid Waste Management Strategy shall be conducted in 2019 to determine the overall progress towards achieving the targets and goals. The mid-term evaluation is an opportunity to: correct erroneous assumptions; identify lessons learnt that could inform the next half of the strategic period; identify new and emerging opportunities for solid waste management; and specify corrective measures to ensure the relevance of the strategy going forward.

A final evaluation of the strategy shall also be conducted at the end of the strategy period in 2024 to provide the basis for development of the next strategy.

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# APPENDIX 1: DRAFT STEERING COMMITTEE CHARTER

## SOLID WASTE MANAGEMENT STEERING COMMITTEE CHARTER (DRAFT)

### Purpose and Composition

The primary function of the Solid Waste Management Steering Committee is to progress the implementation of the National Solid Waste Management Strategy by: facilitating partnerships and collaborative efforts in waste management across government, industry and the public; committing and coordinating resources to assist in implementing vital actions; and providing guidance and advice on overcoming implementation issues as necessary.

The specific roles of the steering committee are to:

- Regularly review, assess, and report on achievements against the National Solid Waste Management Strategy actions/outcomes;
- Ensure that available assets and resources are coordinated effectively to avoid duplication and waste;
- Facilitate collaborative programmes and initiatives in waste management between stakeholder groups;
- Assist in the identification and resolution of strategic level issues and risks affecting implementation of the strategy;
- Assist with resolving technical issues;
- Adjust strategic priorities as necessary to proactively respond to changing social, economic, and environmental conditions in Guyana, and to take advantage of beneficial opportunities as necessary;
- Use individual and collective influence and authority to achieve the goals of the National Solid Waste Management Strategy; and
- Investigate options and provide recommendations of funding mechanisms to deliver the National Solid Waste Management Strategy.

### Chair

The Chair is the Director of the SWMA, who shall convene the steering committee meetings. If the designated Chair is not available, then the Acting Chair—the Deputy Director of SWMA—shall be responsible for convening and conducting the meeting. The Acting Chair is responsible for informing the Chair as to the salient points/decisions raised or agreed to at that meeting.

### Membership

The members of the steering committee shall be drawn from the highest level of relevant stakeholder agencies, or at a sufficiently senior level so as to be able to provide strategic guidance and practical advice on matters relevant to the steering committee, and to commit available resources (staff time, equipment, etc.) to achieve common goals. The members of the steering committee shall include:

1. Director, SWMA
2. Permanent Secretary, MLGRD

3. Executive Director, EPA
4. Regional Executive Officer from each of the 10 RDCs
5. Permanent Secretary, Ministry of Health
6. Representative from private sector organisation (e.g. Director, Georgetown Chamber of Commerce)

Members of the steering committee may agree to invite other persons to participate in meetings of the taskforce as necessary to assist in fulfilling its functions.

#### Meetings

The steering committee shall meet at least once every quarter, and more frequently at its own discretion if necessary, in order to fulfil its functions.

A briefing package will be distributed to members at least 5 business days in advance of a taskforce meeting. This briefing package will include the following:

- Agenda for the upcoming meeting;
- Minutes of the previous meeting;
- A progress report of activities agreed to in the National Solid Waste Management Strategy;
- Decision papers, if applicable (using the template provided at the end of this charter); and
- Any other documents/information to be considered at the meeting.

Secretariat support to the steering committee will be provided by the SWMA.

Full copies of the minutes, including attachments, shall be provided to all the steering committee members no later than 5 working days following each meeting.

#### Proxies

Members of the steering committee shall nominate a proxy to attend a meeting if the member is unable to attend. The Chair shall be informed of the substitution at least 3 working days prior to the scheduled meeting.

The nominated proxy shall have voting rights at the attended meeting. The nominated proxy shall have the authority to provide relevant comments/feedback of the steering committee member they are representing, to the attended meeting.

#### Quorum and Decision-making

Attendance from a minimum of two-thirds of the steering committee members is required for the meeting to be recognised as an authorised meeting and for the recommendations or decisions to be valid.

If there is a quorum, the affirmative vote of at least half (50 %) of the members present at the meeting or by simultaneous telecommunications link or by proxy, is required for decisions of the steering committee to be valid.

## FORMAT FOR DECISION PAPER

### OBJECTIVE

*Describe the issue for which a decision is sought*

### STRATEGIC ISSUES

*What are the implications of not making a decision as per the recommendations? What are the implications of accepting the recommendations?*

### FINANCIAL IMPLICATIONS

*What are the cost implications of this decision?*

### RECOMMENDATIONS

*What would you like the Atoll Coordinating Committee to do?*

### LIST OF SUPPORTING INFORMATION ATTACHED

- 1.
- 2.

## APPENDIX 2: PLASTIC BAG REGULATIONS WORLDWIDE

Earth Policy Institute - Data for Plan B Update 123  
 The Downfall of the Plastic Bag: A Global Picture  
[http://www.earth-policy.org/plan\\_b\\_updates/2013/update123](http://www.earth-policy.org/plan_b_updates/2013/update123)

### Plastic Bag Regulations Worldwide

AFRICA	
Botswana	In 2007, Botswana established a minimum thickness for bags and mandated that retailers apply a minimum levy to thicker bags, which would be used to support government environmental projects. Many retailers charged more than the minimum tax, and prices fluctuated over time. A study of four retail chains 18 months after implementation of the charge showed that bag use fell by half.
Cameroon	In 2013, the government of Cameroon launched a campaign against plastic bag and banned them in 2014.
Chad	In 2010, the mayor of N'Djamena, the capital, attempted to enforce a 1992 law prohibiting the import of plastic bags, in addition to embarking on an awareness campaign to promote less frequent consumption of plastic bags.
Côte d'Ivoire	A ban on non-biodegradable plastic bags that was expected to come into effect in November 2013 was delayed due to opposition from the plastics industry. The law includes plastics used for bags of drinking water.
Egypt	In 2009, Hurgada, a city on the Red Sea, banned plastic bags.
Eritrea	In 2002, the government announced a ban on plastic bags.
Ethiopia	In 2008, Ethiopia passed a law banning thin plastic bags.
Guinea-Bissau	In 2013, the government announced a ban on plastic bags to come into effect in 2014.
Kenya	In 2007, Kenya banned the manufacture and import of thin plastic bags, yet the ban was not enforced. In 2011, the use of thin bags was banned and a tax was imposed on thicker bags, yet neither the tax nor the ban has been well enforced.
Malawi	In 2013, Malawi banned plastic bags.
Mali	A ban against non-biodegradable bags was announced in 2013.
Mauritania	In 2013, Mauritania banned plastic bags. In the capital of Mauritania, an estimated 70 percent of cattle and sheep deaths are from plastic bag ingestion.
Nigeria	In 2013, Nigeria announced a ban on plastic bags to begin in 2014, which includes both plastic shopping bags and plastic sachets of drinking water.
Republic of the Congo	In 2011, the government announced a ban on plastic bags, but did not announce when it would take effect.
Rwanda	In 2008, Rwanda banned the use of non-biodegradable plastic bags thinner than 100 microns, which covers most typical carryout bags. Expatriate and journalist accounts note that plastic bags found in the luggage of airline passengers from outside the country are confiscated. However, there is a black market for plastic bags, and there have been reports that bags are freely used in some areas.
Somaliland	In 2005, Somaliland banned plastic bags.
South Africa	In South Africa, thin plastic bags were banned in 2003. The government set a charge for thicker plastic bags and took a portion of it as a levy to fund environmental projects. Bag use decreased by 90 percent when the measures were first introduced, but consumption has slowly increased since. Retailers charge consumers varying prices near half a rand (50¢).
Tanzania	In 2006, Tanzania passed a law banning plastic bags. In 2011, semi-autonomous Zanzibar also banned plastic bags.
Uganda	In 2007, Uganda banned the import and use of thinner bags and mandated a charge on thicker bags.

<i>ASIA</i>	
Bangladesh	Plastic shopping bags were introduced to Bangladesh in the early 1980s and quickly became ubiquitous. They were blamed for exacerbating flooding in 1989 and 1998 by blocking drains. In 2002, the government attempted to ban the manufacture and use of plastic bags in Dhaka (the capital) and then nationwide. However, a lack of enforcement has prevented a noticeable decrease in use.
Bhutan	Plastic bags were banned in Bhutan in 1999 as part of the kingdom's effort to increase Gross National Happiness. However, the ban was poorly implemented and as a consequence it had to be reintroduced in 2005; monitoring of compliance is difficult.
China	A few cities and provinces introduced and tried to implement policies limiting or eradicating bags in the beginning in the late 1990s, but enforcement was poor. In association with the 2008 Beijing Olympic Games, a set of national laws limiting plastic bag production and consumption came into effect. These mandated that all retailers stop providing bags under a certain thickness and charge a fee for thicker bags that is higher than the cost of the bag. According to government figures, one year after the charge began, bag use was reduced by 40 billion bags, and by 2013, the savings reached 67 billion bags. A detailed study found that shoppers in Beijing and Guiyang used fewer new plastic bags, filled them with more items, and were more likely to reuse them after the law was implemented.
Hong Kong	In 2009, major supermarkets and chain stores in Hong Kong were required to charge HK50 cents (6¢) for plastic bags. In 2013, the government announced that the fee raised less than initially projected, pulling in HK\$26.5 million, far short of the expected HK\$200 million. The charge successfully reduced plastic bag use by 75 percent in the affected stores. In 2014, the Legislative Council voted to expand the charge to all retailers and allow the stores to keep the proceeds.
India	For 15 years, various levels of government have tried to regulate plastic bags to little effect. In 1999, the Indian government banned very thin plastic bags used to carry food. There have been multiple attempts to ban plastic bags in Delhi. After plastic bags were implicated in severe flooding, Mumbai, the capital city of India's largest state, Maharashtra, tried to ban plastic bags. Later the entire state tried twice to institute a ban. All these efforts have been unsuccessful due to poor enforcement and pressure from the quickly growing plastics industry. Pune, also in Maharashtra, is the latest city to attempt banning plastic bags, passing legislation in February 2014.
Malaysia	As of 2011, shoppers in the state of Penang are charged 20 sen (6¢) per plastic bag.
Mongolia	In 2009, Mongolia banned plastic bags.
Pakistan	In 2006, thin plastic bags were banned in Karachi. In 2013, the Islamabad Capital Territory also banned thin plastic bags.
Papua New Guinea	Papua New Guinea banned plastic bags in 2009.
Philippines	Beginning in 2013, several cities in the Manila metropolitan area banned plastic bags. Several other cities across the archipelago followed suit, including Laoag, Bontoc, and Ilolio.
Singapore	In 2013, the Singapore Environment Council released a study of plastic bag use and recommended different actions to reduce use such as plastic bag free days and education campaigns. The National University of Singapore has voluntarily banned plastic bags.
South Korea	South Korea has a levy on plastic bags.
Taiwan	Taiwan used 16 million shopping bags a day before the government began restricting their use in 2001. Now plastic bags cost between NT\$1 and NT\$2 (3–6¢) each. In 2006, 72 percent of people surveyed said they regularly carried used plastic bags when they went shopping, compared with 18 percent in 2001 before the bag charge.
Thailand	Tesco Lotus, a supermarket, is piloting "no bag" policies in two stores, one in Koh Samui and the other in Phuket.
Vietnam	Non-biodegradable bags are taxed by weight.
<i>CENTRAL AND SOUTH AMERICA AND CARIBBEAN</i>	
Argentina	The provinces of Buenos Aires and Mendoza both ban plastic bags. In 2012, the city of Buenos Aires tightened the province-wide restrictions on non-biodegradable plastic bags that had been passed in 2008.

Brazil	In 2007, Brazil attempted to pass a national bill to encourage biodegradable plastic bags, but it failed. In 2010, the state of Rio de Janeiro passed a law to discourage the use of plastic bags in medium and large supermarkets. The stores were given three options: give a R\$0.03 (1¢) discount for every five items placed in a customer's reusable bag; exchange one kilogram of rice or beans for every 50 plastic bags returned by a customer; or provide sturdier, reusable bags instead of plastic bags. Several cities in Brazil have attempted to restrict plastic bag use and encourage reusable or biodegradable bags. The states Goiás and Espírito Santo have each passed laws restricting plastic bag use in favor of biodegradable ones. In 2012, the state of São Paulo began a plastic bag ban, but it was overturned in court later that year.
Chile	Pucón was the first city in Chile to ban plastic bags in 2013, to be fully enforced in 2015. Punta Arenas followed suit, passing a ban in early 2014.
Haiti	In 2012, the Prime Minister announced a ban on black plastic bags and polystyrene (commonly referred to as Styrofoam) containers for to-go food. Small plastic bags filled with drinking water are exempt from the ban. The government announced a crack-down in 2013 and conducted a raid on warehouses.
Uruguay	In 2008, lawmakers proposed national plastic bag restrictions.
<i>EUROPE</i>	
European Union	Some 88 billion single-use plastic bags are used in the EU every year, ranging from about 4 single-use bags a year in Denmark and Finland to over 400 bags per person annually in Portugal, Poland, and Slovakia. Although many European countries have attempted to decrease plastic bag use on their own, bag litter is still problematic enough—especially in the marine environment—that the European Commission (EC) decided to attempt enforcing a Europe-wide law. In April 2014, draft rules amending the EC's Packaging Waste Directive were approved by the European Parliament. The new rules aim to decrease plastic bag use in the EU by 50 percent by 2017 and by 80 percent by 2019. Member states can choose whether to use bans, taxes, or other means to hit the targets.
Austria	Some Austrian supermarkets have stopped offering single-use plastic bags.
Belgium	The combination of a tax on plastic bag producers, a voluntary fee charged by retailers, and a voluntary bag reduction initiative by the retail sector led to an 86 percent drop in plastic bag consumption between 2003 and 2011.
Bulgaria	Bulgaria's tax on plastic bags began in October 2011, at 15 stotinki (11¢) per bag. It has since increased to 55 stotinki. This tax is imposed on producers and importers and is then passed on to retailers, who pass it on to consumers. Bag consumption more than halved in the first month of the tax.
Channel Islands	Stores began charging 5 pence (8¢) per single-use bag in 2008. Bag use dropped 90 percent in the year after the charge was introduced.
Cyprus	A proposal to require charging for plastic bags failed in 2008.
Czech Republic	Supermarkets that do not charge their customers for plastic bags must pay the government some 230 euros (\$320) per ton for their disposal.
Denmark	Denmark began taxing producers for plastic and paper shopping bags by weight in 1994. The rate paid today is 22 kroner (\$4) per kilogram of plastic bags, slightly higher than the original rate of 20 kroner. Bag manufacturers pass the cost on to retailers, who then decide if they will in turn charge customers. Consumers generally pay 2–3.5 kroner (37–65¢) per bag, which may be the highest price in the world. The country experienced an initial reduction in bag use of 60 percent in the year after the tax took effect.
Estonia	Retailers charge about 10 euro cents (14¢) per bag. In addition, bag manufacturers are responsible for arranging the recovery or recycling of their product. If recycling or material recovery targets are missed, producers must pay a tax based on the shortfall amount.
Finland	Most supermarkets charge for all types of grocery bags.
France	Multiple efforts have been made to reduce single-use plastic bag consumption in France, which fell from 10.5 billion in 2002 to 1.5 billion in 2009. Starting in 1996, major supermarket chain E.Leclerc voluntarily removed non-biodegradable bags from the checkout counter, slashing its plastic bag handouts from 1 billion. In 2007, non-biodegradable plastic bags were banned in Paris. Discussions on how to implement a nationwide tax on non-biodegradable plastic bags, initially set to come into effect in January 2014, were ongoing as of April 2014. The tax of 10 euros (\$14) per kilogram of plastic bags would amount to approximately 6 euro cents (8¢) per bag.

Germany	To comply with the 1991 Packaging Ordinance, German packaging distributors and manufacturers finance the collection, sorting, and recycling of their products—including plastic bags—through what is known as the "Green Dot" system (named for the symbol found on recyclable packaging). According to a study by the German Society for Packaging Market Research, virtually all plastic bags consumed in the country are recycled, almost three quarters of consumers use carrier bags multiple times, and only about a tenth of groceries are taken home in a new plastic bag. Most German supermarkets voluntarily charge 5–10 euro cents (7–14¢) per bag. In 2000, Germans used 7 billion plastic bags; in 2012, the figure had dropped to 6 billion (76 bags per person).
Hungary	Some supermarkets choose to charge for plastic bags.
Ireland	Ireland's bag levy, which came into force in March 2002, is a frequently referenced example of a successful plastic bag regulation. Prior to implementation, the government gained the support of retailers and the public. The levy applies to both biodegradable and non-biodegradable bags. The proceeds go to the implementation of the levy and to an environmental fund that pays for recycling centers, landfill cleanups, and other environmental projects. The levy began as a 15 euro cent (21¢) tax and resulted in an over 90 percent decrease in consumption—from 328 bags per consumer per year to 21 bags. A subsequent increase in consumption—to 31 bags per person by 2006—resulted in a 7 euro cent increase in the levy in July 2007. Again, bag consumption decreased. In 2011, legislation allowed the levy to be amended once a year with the aim of limiting use to 21 bags per person per year or less, with a ceiling at 70 euro cents per bag.
Italy	In 1988 Italy passed a law taxing importers and producers of non-biodegradable bags 100 lira (7¢) per bag, but it did not last or appear effective. A national pilot program aiming to gradually reduce consumption of non-biodegradable shopping bags began in 2007, and in 2011 Italy banned single-use plastic bags. The ban has not been fully implemented or enforced because of unresolved legal disputes over EU trade laws.
Latvia	Retailers are taxed to pay for the disposal of plastic bags. Customers can no longer get a free plastic bag at the supermarket.
Luxembourg	A voluntary agreement between the Environment Ministry and the packaging materials industry association VALORLUX began in 2004, promoting the sale of reusable "Eco-sac" bags in order to reduce disposable plastic bag consumption. In 2007, a charge of 3 euro cents (4¢) per "emergency" single-use bag was introduced. Plastic bag use decreased from 55 million in 2004 to 6.5 million in 2009.
Macedonia	Starting in 2009, stores were barred from giving out free plastic bags. Customers reportedly pay 1 denar (2¢) for a bag.
Malta	Plastic bag taxes were attempted in 2005 and again in 2009.
Netherlands	Since the mid-1990s, supermarkets have voluntarily charged for most kinds of plastic bags. Customers pay about 20 euro cents (28¢) per bag.
Northern Ireland	Since April 2013, all single-use carrier bags cost consumers 5 pence (8¢). Proceeds go to the Northern Ireland Environment Link's NGO Challenge Fund for environmental projects.
Poland	A tax of up to 40 groszy (13¢) was considered but eventually dropped in 2010.
Portugal	In 2008, Parliament passed a resolution recommending the government work to cut plastic bag use by educating retailers and the public, creating incentives for reusable bag use, and using other measures such as a charge per bag.
Romania	Romania introduced a 20 bani (6¢) per bag eco-tax on plastic bag producers and importers in 2009.
Scotland	Proposed legislation would have customers pay 5 pence (8¢) per single-use carrier bag starting in October 2014.
Slovakia	Billa, Hypernova, and Kaufland are among the food stores that charge for plastic bags.
Slovenia	The European Commission reports that proposals are being considered for a tax of 50 euro cents (69¢) on plastic bags.
Spain	Through a voluntary agreement among Catalonia's Waste Agency, regional and national business groups, plastic bag manufacturers, food distributors, and supermarkets, single-use plastic bag consumption in the region dropped by more than 40 percent between 2007 and 2011. Annual supermarket plastic bag use dropped by 1 billion units in that time, an impressive 87 percent decline. Stores began charging customers in the Andalucía region 5 euro cents (7¢) for each plastic bag in 2011. Spain had planned to phase out plastic bags completely by 2018, but this effort is on hold as Spain resolves issues raised by the European Commission.
Sweden	Producers pay for the cost of disposal, which is passed on to consumers. Plastic bags cost between 17 euro cents (24¢) and 30 euro cents.

Switzerland	In 2012, the Swiss Parliament passed a motion banning single-use plastic bags.
Turkey	In 2010, Kadıköy, a district within Istanbul, announced a ban on plastic bags.
Wales	Since October 2011, Welsh customers pay 5 pence (8¢) per single-use carrier bag. A survey of 13 retailers published in 2012 showed 35 to 96 percent reductions in single-use bag consumption as a result of the charge.
<i>NORTH AMERICA</i>	
Canada	The Ontario Plastic Bag Reduction Task Group, a coalition of grocery, retail, and plastics industry associations and the Recycling Council of Ontario, formed in 2007 to work toward the province's goal of halving plastic bag use by 2012. Stores offered a variety of alternatives to plastic, with many providing incentives for using reusable bags and charging a fee for plastic bags or even dropping them altogether, helping Ontario meet its goal two years early. Retailer participation also helped the province of Québec reach a similar 50 percent reduction goal well before the target date. The Northwest Territories began requiring that grocery stores charge 25¢ for all single-use bags in January 2010; the law expanded to cover all retailers in February 2011. Loblaw, a grocery store chain with more than 1,000 stores throughout Canada, began charging 5¢ per plastic bag in 2009. The chain reported in April 2013 that since 2007 it had avoided giving out 5 billion plastic bags and had donated \$5 million of the fee proceeds to WWF-Canada. Other retailers, such as Thrifty Foods, IKEA, Sobey, and Metro, have achieved similar success in reducing plastic bag use. At the municipal level, in 2007 the town of Leaf Rapids, Manitoba, became the first Canadian community to ban single-use plastic bags. The city of Thompson, also in Manitoba, banned them in 2010, as did, Fort McMurray—a city that has been called "ground zero" for Alberta's controversial tar sands development. A 5¢ charge on plastic shopping bags took effect in Toronto in June 2009. Although it had helped halve plastic bag use, Mayor Rob Ford called on the City Council to end the fee in mid-2012. The Council voted to scrap the fee, replacing it instead with an outright ban to begin January 1, 2013. But in November 2012, the Council abandoned the bag ban following lawsuits from retailers and the plastics industry.
Mexico	Mexico City passed a plastic bag ban in 2009, but the law was reformed before it came into effect to simply encourage biodegradable bags and require a certain recycled content in plastic bags.
United States	Currently 100 billion plastic bags pass through the hands of U.S. consumers every year—almost one bag per person each day. More than 20 million Americans in 132 cities and counties live in communities with plastic bag bans or charges. The movement gained momentum in California and is now going national. Hawaii has a virtual state prohibition, as its four populated counties have gotten rid of plastic bags at grocery checkouts, with the last one beginning enforcement in July 2015. In Texas, 11 cities—including Austin and Dallas—have plastic bag bans or charges on the books. The nation's capital was the first to pass a 5¢ charge on plastic and paper bags. The plastics industry has been active in challenging plastic bag bans and fees by supporting opposition groups, suing communities attempting to pass legislation, and promoting recycling to change public attitudes toward plastic bags. National retailers who no longer hand out plastic bags include Whole Foods, which credits shoppers at least 5¢ for bringing their own reusable bags.
<i>OCEANIA</i>	
Australia	Coles Bay (Tasmania) became Australia's first town to forgo plastic bags in 2003. Motivated by a desire to protect whales from bag litter as they passed by on their annual migration and to keep the National Park clean, all the retailers agreed to stop providing plastic bags. The rest of the state of Tasmania banned very thin plastic bags in 2013. South Australia was the first state to ban plastic bags, starting in 2009. A 2012 study found that ban effective, with customers bringing their own bags more often. Northern Territory and Australian Capital Territory followed with their own plastic bag bans in 2011. While Australia's four other states do not ban the bag, several cities and towns have initiated voluntary bans.
<i>MIDDLE EAST</i>	
Israel	In 2008, Israel considered but did not pass legislation for a charge on plastic bags. In early 2014, it considered proposals from the Knesset and the Environmental Protection Ministry for a ban or complete phase-out of plastic bags.
Oman	In 2009 the Environment Society of Oman (ESO), a non-governmental organization, staged a five-month "road show," traveling to supermarkets, schools, malls, and gas stations around the Sultanate to raise awareness about the environmental risks posed by plastic bags. Their efforts were backed by the Ministry of Environment and Climate Affairs, which, as of March 2014, was deliberating on how to implement a proposed ban on production and import of non-biodegradable plastic bags. ESO is part of the committee being consulted.

United Arab Emirates	As part of its "No to Plastic Bags Campaign," the Dubai Municipality's Waste Management Department announced a contest in 2013 to see which retailers could reduce their plastic bag use the most. All supermarkets and hypermarkets had already switched entirely to biodegradable plastic bags, but the city urged them to cut the number of these given out as well.
<p>Note: While not necessarily comprehensive, nor an indicator of the effectiveness of such actions, this table conveys the wide-ranging geography of the desire to reduce plastic bag use.</p> <p>More on global efforts at: <a href="http://www.earth-policy.org/plan_b_updates/2013/update123">http://www.earth-policy.org/plan_b_updates/2013/update123</a></p> <p>More on U.S. efforts at: <a href="http://www.earth-policy.org/plan_b_updates/2014/update122">http://www.earth-policy.org/plan_b_updates/2014/update122</a></p> <p>Map at: <a href="https://mapsengine.google.com/map/edit?mid=ztaMPVI5Hmsg.kbA3CI52AtWs">https://mapsengine.google.com/map/edit?mid=ztaMPVI5Hmsg.kbA3CI52AtWs</a></p>	
Source: Compiled by Earth Policy Institute, 1 May 2014, www.earth-policy.org.	

# APPENDIX 3: PACKAGING COVENANT OF AUSTRALIA



## About the APC

### The Australian Packaging Covenant

The APC is a sustainable packaging initiative which aims to change the culture of business to design more sustainable packaging, increase recycling rates and reduce packaging litter.

It is an agreement between government, industry and community groups to work together to find and fund solutions to address packaging sustainability issues.

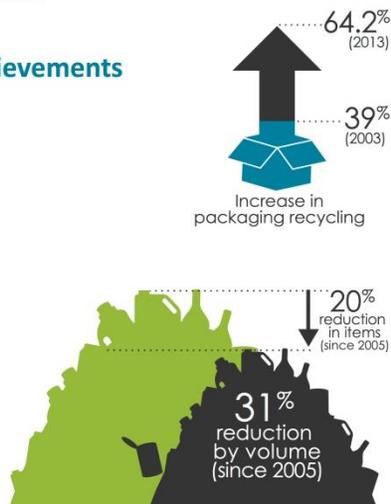
Organisations sign the Covenant to signal their commitment to:

- Design packaging that is more resource efficient and more recyclable
- Increase the recovery and recycling of used packaging from households and away-from-home sources
- Take action to reduce the incidence and impacts of litter.

The Covenant aims to ensure that all involved in the packaging chain play their part by undertaking these commitments.

Currently over 900 organisations (business and industry, government and non-government) are signatories to the Australian Packaging Covenant.

### Achievements



### What does being an APC signatory mean?

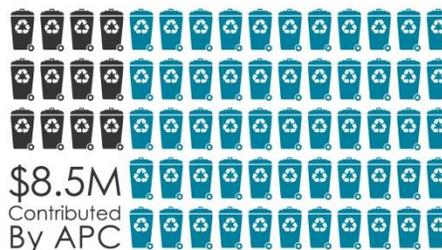
When an organisation signs the Covenant they pay a contribution to the Covenant fund, and develop an action plan that sets out what they propose to do to contribute to the Covenant's objective and goals of design, recycling and product stewardship. Each signatory then submits an annual report which details the progress made towards completing the actions outlined in the action plan.

*Through the Covenant industry plays a leading role in managing the environmental impact of its packaging.*

### What else does the APC do?

The Australian Packaging Covenant also provides funding to signatories to develop and complete projects which contribute towards the achievement of the Covenant's goals to increase recycling and reduce litter.

**\$55.4M funded for 75 New Projects between 2010-2013**



Find out more at

[www.packagingcovenant.org.au](http://www.packagingcovenant.org.au)

## About the APC

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### Becoming a Signatory

By signing the APC you get access to:

- A business community committed to a culture of packaging sustainability
- A network of progressive organisations that share ideas and actions
- Project funding to increase the recovery and recycling of used packaging
- Resources to design cost-efficient and sustainable packaging

What do I need to do once I become a signatory?

- Submit an action plan within three months that sets out what your organisation proposes to do to contribute to the Covenant's objectives and goals (you will be provided a template and other resources on signing).
- Take action to support achievement of the three goals and eight key performance indicators of the Covenant and report on these actions.
- Pay an annual contribution to the Covenant Fund.

To become a signatory to the APC you need to download and sign the Commitment Form available at [www.packagingcovenant.org.au/pages/become-a-signatory.html](http://www.packagingcovenant.org.au/pages/become-a-signatory.html)



## APPENDIX 4: RESOURCE RECOVERY APPROACHES

Programme	Description and key features	Issues to consider	Typical products involved	Countries where implemented
Container deposit programme	<p>A deposit (passed down to the consumer) is applied at the point of sale to every specified 'container' produced locally or imported, and a partial refund is issued for each used container redeemed at authorised depots.</p> <p>The un-refunded portion of the deposit is retained in a special fund and used to administer the program, to ensure the used containers are recycled and to support awareness and other related activities.</p> <p>The programme operator is selected through an open tender process and he/she receives a handling fee for each container from the special fund (to support processing and export) and retains any profit from the sale of the recovered containers.</p>	<p>The amount of the refund should be sufficiently high to encourage redemption of the waste.</p> <p>Reduces waste collection costs as less waste will be put out for collection.</p> <p>Creates knock-on opportunities (<i>e.g.</i>, for house-to-house recyclable collectors).</p> <p>Requires robust monitoring to prevent redeemed containers from re-entering the system.</p> <p>A special fund must be maintained to ensure sustainability and success of the programme.</p> <p>A policy will be needed do deal with charitable, or humanitarian donations (<i>e.g.</i>, bottled water, and tinned foods), which have no point-of-sale.</p>	<p>Food and beverage containers such as aluminium and tin cans, PET bottles, glass bottles (<i>e.g.</i>, wine bottles), and drink boxes (made of Tetrapak material).</p> <p>Also applied by some countries to lead acid batteries, and tyres.</p>	<p>Federated States of Micronesia, South Korea, Kiribati, Palau,</p>
Environmental handling fees	<p>This fee is equivalent to the cost of end-of-life management (collection, handling, recycling). It is charged at the point of sale.</p>	<p>Success increases if the fees are paid into a special account that can legally only be used for related recycling activities.</p>	<p>Lubricants, vehicles, computers, electrical goods, tyres, batteries, pesticide and chemical containers</p>	<p>Australia, Canada</p>

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Voluntary agreements based on legislated targets

The government sets mandatory recycling targets for each industry (*e.g.*, recycle 75% of all beverage containers) and allows the industry to develop their own systems and reach agreements among themselves to achieve the targets. Failing to reach the legislated targets incurs penalties or may result in alternative government actions (such as an importation ban).

Provides incentive for industry to import or manufacture easier-to-recycle products, and more durable products that minimise waste generation.

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Mandatory take-back schemes

Producers are mandated to take back and recycle their products and may collaborate to meet their obligations. A financial guarantee is required and is calculated on the level of expected annual sales and the unit costs for managing the waste. The guarantee is then adjusted at the end of the year based on actual sales.

Should the producer go out of business or fail to do their share of the recycling, the financial guarantee can be used to cover the costs of collection and recycling.

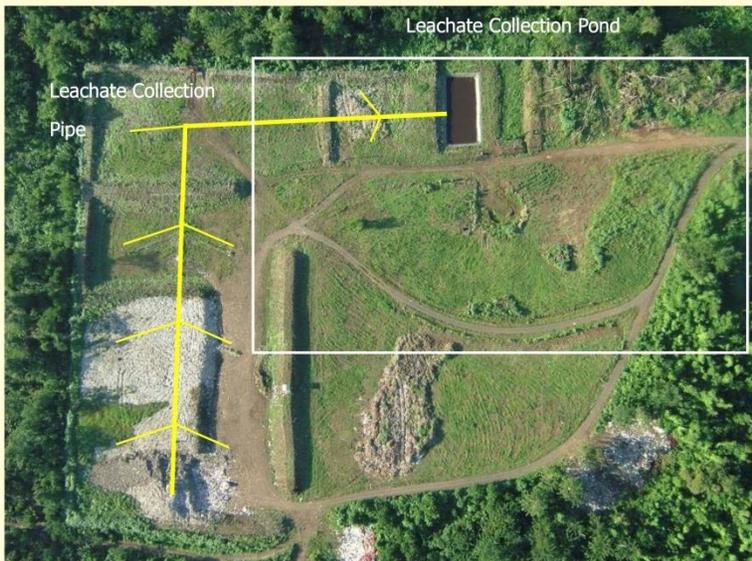
Fairly high administrative burden involved in determining the financial guarantee amount.

Computers, electrical goods, packaging waste, Japan

# APPENDIX 5: SEMI-AEROBIC LANDFILL METHOD

## Samoa's Tafaigata Landfill Rehabilitation Project in Action

The Tafaigata landfill in Upolu, Samoa, has been transformed from a messy, smelly dump to a clean and fresh semi-aerobic landfill structure using the Fukuoka method, now the standard method of landfill in Japan. The transformation process was funded by the Japan International Cooperation Agency (JICA), at a cost of only US\$400,000 (consultant supervisor not included). Transformation took place in two phases. The first one was setting up waste cell bunds, consolidating the soil "floor", installing the air ventilation / leachate collection pipes, a leachate collection pond, and all-weather access roads. The second phase included setting up the leachate treatment facilities. When completed in December 2005, the project was handed over from JICA to the Samoan Government's Ministry of Natural Resources, Environment and Meteorology (MNREM).



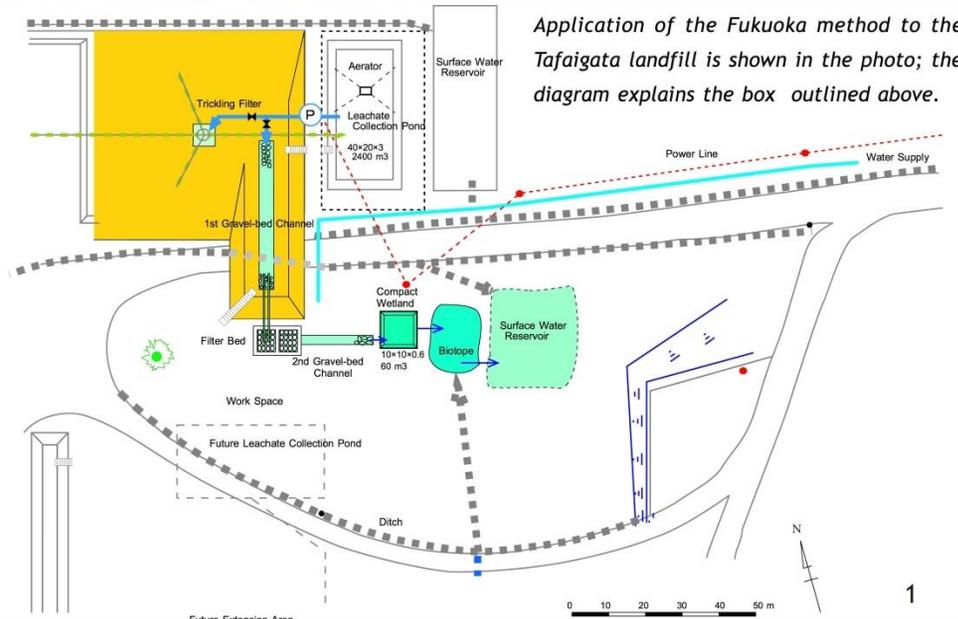
### What is the 'Fukuoka method'?

Researchers at Fukuoka University on Kyushu Japan were comparing anaerobic and aerobic landfills. Aerobic means air (which includes the required oxygen) is blown into the waste pile through a network of pipes; this increases the breakdown speed of organics such as food, paper, and garden waste. The fans were too expensive to run. The experimenters found that the heat in the waste caused a convection current drawing air through the pipes anyway. This *passive ventilation* keeps the waste pile supplied with enough oxygen to maintain rapid breakdown. It also reduces the impact on global warming by 60%.

This is a joint project from the Secretariat of the Pacific Regional Environment Programme (SPREP) and the Japan International Cooperation Agency (JICA).

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Application of the Fukuoka method to the Tafaigata landfill is shown in the photo; the diagram explains the box outlined above.

## How does Tafaigata differ from a 'normal' landfill?

The Samoan landfill used to be an open dump, just like most landfills in the world (including rural ones in the USA, Australia and New Zealand). Waste was simply piled on top of itself. Usually a waste pile becomes quickly anaerobic because the moisture and the digestion of the organics consume any oxygen in the pile; the composition of dominant bacteria then changes to species that can live without oxygen.

Instead of carbon dioxide (CO<sub>2</sub>), these “anaerobic” bacteria give off strong odours and methane (CH<sub>4</sub>). Methane is flammable and so open dumps often have fires burning, with toxic pollution (from plastics for example) being blown over neighbouring areas. It also affects global warming as methane gas has an effect that's 21 times worse than carbon dioxide. The leachate, the liquid produced by the breakdown of waste, is very high in nutrients which can cause damaging algal growth in streams and lagoons. This in turn can consume all the available oxygen in the water so that fish and other biota suffocate.

Developed countries usually have their anaerobic, urban landfills fully contained in a giant, expensive, plastic or clay “bath”. Their methane is captured and burnt or used for electricity generation. The leachate is caught in drains and treated before discharge.



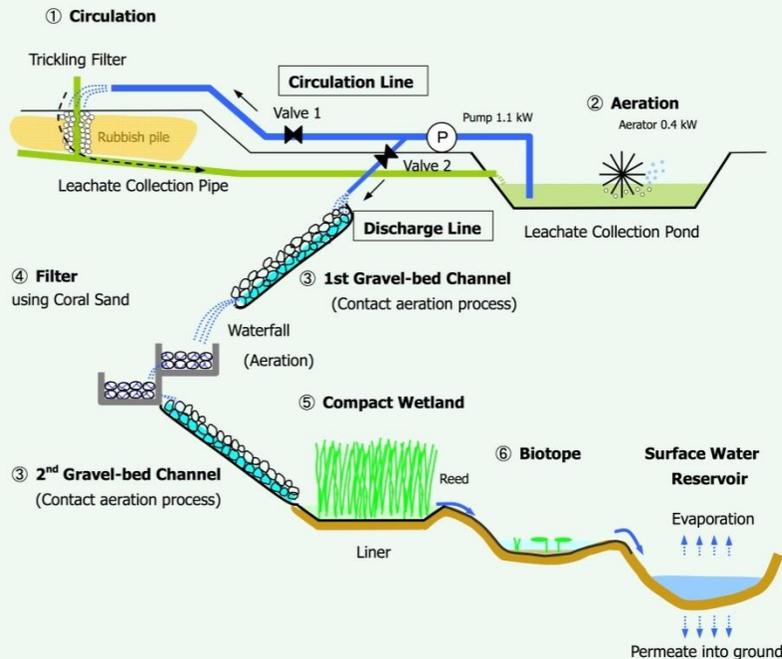
Above: One of the vents in the landfill, giving off less harmful CO<sub>2</sub> and passively sucking air into the pipes for aerobic garbage / leachate breakdown.

Below: A comparison of a conventional, anaerobic rubbish dump and a semi-aerobic landfill structure.

<p><b>Characteristics of a conventional, anaerobic rubbish dump</b></p>	<p><b>Semi-aerobic landfill structure (Fukuoka Method)</b></p>
<p>Rubbish dumped on the ground or in a hole. Leachate stagnates which leads to anaerobic condition</p>	<p>Leachate collection and gas venting pipes are set up. These provide fresh air into the rubbish layer through the convection effect of heat generated by fermentation in the rubbish</p>
<p>Emits an offensive odour into the air and gives off high nutrient leachate to soil</p>	<p>Immediate removal of leachate and flow of air makes landfill aerobic, causing cleaner leachate and less smell than conventional landfill</p>
<p>Aggravates global warming through the generation of methane gas (CH<sub>4</sub>)</p>	<p>Generation of methane gas is low and therefore reduces fire risk and global warming impacts</p>
<p>Methane has a 21 times more negative effect on the atmosphere than carbon dioxide (CO<sub>2</sub>)</p>	<p>Fast stabilization for re-use and easy maintenance</p>
<p>Long-term decomposition is required under anaerobic conditions before land can be reused</p>	<p>Cost-effective using local materials such as bamboo, waste tyres, waste drums for pipes</p>

## The Leachate Treatment System

The Tafaigata Facility uses mainly natural cleansing methods and effects such as gravel-bed channels and compact wetland. This cheap and eco-friendly system requires little energy for operation and only minimum maintenance.



It comprises six discrete steps:

**1. Aeration**—mechanical stirring provides more oxygen into the leachate collection pond, so micro-organisms can decompose the organic matter better.

**2. Circulation treatment**—a leachate treatment system through a trickling filter back down to the leachate collection pipe. Trickling filters are an aerobic treatment system that exploit micro-organisms growing on the rocks exposed to air: these aerobic bacteria metabolise organic matter from waste water.

The contents from the Leachate Collection Pond are pumped up and sprinkled onto a trickling filter; the now cleaner leachate flows back to the collection pond again.

By repeating this process, organic matter is gradually consumed by the bacteria until the Biological Oxygen Demand is low enough to be directed into the next phase of purification.

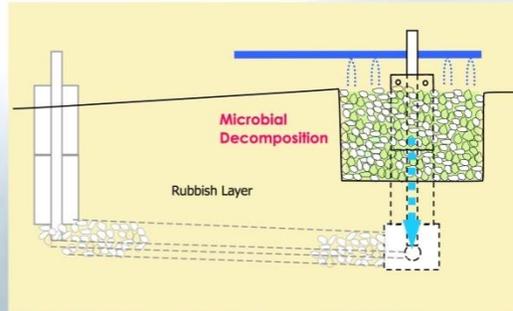
**3. Gravel-bed channel**— another natural cleansing method. It continues the process of the trickling filters but uses aquatic organisms such as algae that are attached to the surface of gravel.

When water flows over and through the gravel, these aquatic organisms decompose and absorb the polluting nutrients.

**4. Filtration.** Local materials such as coral sand, coconut husk and activated carbon are used as filters to adjust the acidity (pH) and remove heavy metals and organic compounds from the leachate.

**5. Compact Wetland**—This is another natural cleansing method using aquatic vegetation, such as reeds. These plants remove the nutrients phosphorous and nitrogen to prevent any undesirable excessive plant growth downstream. The outflow is now clean enough to be released into the natural environment.

**6. Biotope**—a mini-natural ecosystem, which is an indicator of treated water quality. If the plants and animals in the biotope are healthy, then the harmless water is ready to be released into streams, over land or to the sea.



Illustrated are various components of the leachate purification process:

*Top, left:* The aerator draws air into the leachate pond to help aerobic bacteria break down the harmful substances.

*Top, right:* The effluent of the pond is given the circulation treatment over a trickling filter, shown here as photo and diagrammatic cross-section.

*Right:* The leachate collected from the inflow, and then again after a month's circulation.

*Below:* The Tafaigata Landfill in December 2005. Only a small area of rubbish is exposed; the remainder is breaking down under a layer of topsoil. Vents remove carbon dioxide and supply air with the oxygen needed.



**What next?** JICA has handed over control of the site to the Samoan government in December 2005. Samoa, JICA and SPREP will use the Tafaigata as a showcase and training facility to encourage other Pacific island countries and territories, and donors to consider installing these in their own countries.

**Is this method suitable for atolls?** Atolls have very little land and the high tides often come up into the landfills. Being waterlogged slows the aerobic breakdown. SPREP is now looking at how best to manage waste on atolls in the future; the Fukuoka method may be part of the solution. At present, there is no approach that is affordable for atolls yet without environmental impacts.

# APPENDIX 6: MONITORING TEMPLATE FOR THE NATIONAL SOLID WASTE MANAGEMENT STRATEGY

Reporting Period: \_\_\_\_\_

Targets	Actions (abbreviated version)	Indicators	Lead Agency(ies)	Timeframe	Progress over reporting period	Implementation issues
<i>LESS LITTER AND ILLEGAL DUMPING</i>						
Increase in the number or fixed penalty notices issued, or prosecutions for littering and illegal dumping.	1.	Identify areas susceptible to repeated high levels of littering and illegal dumping and ramp-up compliance monitoring of these 'hotspots'.	Number of incidents of illegal dumping; Number of hotspots	EPA, RDCs		
	2.	Strengthen enforcement capacity by legally empowering and training community policing groups as voluntary litter wardens.	Number of policing groups trained and engaged	EPA		
	3.	Design and implement a pilot programme to encourage the public to report illegal dumping activities with pictures/videos and expand if effective.	Number of useful reports received	EPA		
	4.	Enforce all provisions of the Environmental Protection (Litter Enforcement) Regulations, including littering from a moving vehicle; provision of litter receptacles on public transportation; littering on private premises; and provision and maintenance of litter receptacles by NDCs and RDCs in public places under their control.	Number of fines/prosecutions for littering	EPA		
	5.	Conduct judicial training seminars	Number of	EPA		

Targets	Actions (abbreviated version)	Indicators	Lead Agency(ies)	Timeframe	Progress over reporting period	Implementation issues
	to provide a forum to analyse, discuss and identify solutions (e.g., litter-pick up service instead of fine or jail time) to the challenges posed by the application and administration of litter prevention and waste management laws.	members of the judiciary trained				
Fewer illegal dumps and littering sites and fewer instances of illegal dumping across Guyana.	6. Conduct a stakeholder consultation meeting with those who have completed major behavioural change campaigns (such as the HIV/AIDS campaign) to identify approaches and lessons that could be transferred to changing litter/dumping behaviours. This should be done in collaboration with the local university or research institutions to assist in capturing knowledge /information for ongoing research and improvement.	Number of successful lessons identified and implemented	EPA, SWMA			
	7. Sponsor research projects with local research institutions to build local knowledge of littering and illegal dumping behaviours and to identify culturally-appropriate intervention strategies with a view to applying successful strategies across the country.	Number of research projects implemented	EPA, SWMA			
	8. Develop and implement a national communications and social marketing strategy for waste management, make it widely available to environmental groups, NGOs and others engaged (or who may wish to engage) in environmental campaigns, and encourage others to align their individual campaigns to achieve nationally agreed objectives.	Strategy finalised	SWMA			
	9. Develop a Best Kept Village	Number of	SWMA			

Targets	Actions (abbreviated version)	Indicators	Lead Agency(ies)	Timeframe	Progress over reporting period	Implementation issues
	programme to recognise community efforts in waste management, beautification and overall environmental protection.	villages participating				
	10. Integrate waste management education into the primary and secondary curricula.	Number of grade levels that include waste management	Min of Education			
LESS WASTE GENERATED						
Better data on solid waste generation across all of Guyana available by end of 2015 to establish the national per capita waste generation rate	11. Develop, disseminate and implement a National Waste Characterisation Guideline, and a business waste audit procedure in collaboration with the National Bureau of Standards.	Guideline developed  Number of councils and businesses using the guidelines	SWMA			
	12. Provide NDCs and RDCs with training in the implementation of the guideline, and require the annual submission, and reporting of waste generation and disposal data within each NDC/RDC in collaboration with the Bureau of Statistics.	Number of persons in each NDC/RDC trained  Statistics available at the Bureau of Statistics	SWMA			
National per capita solid waste generation rate decreases annually compared to the 2015 baseline.	13. Complete an evaluation of options to reduce single-use plastic bag consumption, including a legislative ban, plastic bag tax, or a combination of both, and implement the recommendations.	Options report completed and concrete recommendations made	SWMA			
	14. Require the inclusion of waste reduction activities (as a component of overall waste management) in the environmental management plans submitted by new developments.	Waste reduction activities specified in environmental management plans	EPA			
	15. Establish a taskforce of key stakeholders (e.g., Georgetown Chamber of Commerce and	Voluntary waste reduction scheme developed	SWMA			

Targets	Actions (abbreviated version)	Indicators	Lead Agency(ies)	Timeframe	Progress over reporting period	Implementation issues
	Industry, Manufacturing & Services Associations) to develop a voluntary waste reduction scheme for the commercial and industrial sectors with appropriate recognition and incentives for top-performing businesses (such as a 'Green Business Award').	Number of entities participating in the scheme				
	16. Prepare and implement a tax incentive programme that encourages eco-friendly products over non-eco-friendly ones (e.g., higher taxes on plastic bags and lower or no taxes on paper bags would encourage paper bag use).	Tax incentive programme approved by Cabinet and implemented	Guyana Revenue Authority, SWMA			
	17. Provide appropriate tax breaks to those wishing to establish flea markets, second-hand charity shops, etc. where people can trade, buy, or sell unwanted items to avoid or delay those items becoming waste.	Tax break schedule approved by Cabinet and implemented	Guyana Revenue Authority, SWMA			
	18. Strengthen and continue enforcement of product standards including for new and used pneumatic tyres.	Number of product standards developed and enforced	Bureau of Standards, Guyana Revenue Authority			
	19. Develop new national standards for importation of used products (including but not limited to motor vehicles, computers, and laptops) and guidelines for humanitarian donations including, but not limited to, pharmaceuticals.	Number of standards for used products importation developed and enforced	Bureau of Standards, SWMA			
Waste generation in the public sector determined by 2015 and decreases annually.	20. Complete waste audits for the public sector and mandate each public sector agency to develop and implement simple waste reduction and management plans, which must be reported on annually with awards for top-performing agencies.	Number of waste audit reports available	MLGRD, All government agencies			

Targets	Actions (abbreviated version)	Indicators	Lead Agency(ies)	Timeframe	Progress over reporting period	Implementation issues
BETTER RESOURCE RECOVERY						
40 percent of waste generated is recycled, composted, or put to other beneficial uses based on best practices by 2024.	21.	Implement pilot programmes in selected communities for at-source reduction of organic waste through backyard mulching and composting by 2015. Pilot programmes should include the provision of appropriate technical advice to households and communities, in addition to subsidised, locally-manufactured compost bins.	Number of pilot programmes implemented;  Number of participating households  Amount of waste diverted	SWMA		
	22.	Scale-up and expand backyard and community composting programmes at the rate of 3 communities each year commencing in 2016, based on lessons learnt through the pilot programmes.	Number of communities participating in back-yard composting programmes	SWMA		
	23.	Implement a 1-year centralised composting and organic waste collection pilot project in a selected urban community where backyard composting may be difficult or undesirable by 2016. Evaluate the project and implement the recommendations.	Pilot project implemented	SWMA		
Deposit/refund programmes implemented for food and beverage containers, lead acid batteries, used tyres, and other priority waste streams by 2019.	24.	Design and implement a container deposit programme for food and beverage containers of all types (glass, plastics, aluminium, tin, Tetra Pak), and lead acid batteries, with provisions to add other waste types in the future. The design should identify the end markets for the recovered materials and examine the practicality of utilising existing transportation networks to recover waste materials from distant regions.	Container deposit programme developed and implemented;  Quantity of 'containers' recycled	SWMA		
Styrofoam and	25.	Restrict the importation and use of	Legislative ban	SWMA		

Targets	Actions (abbreviated version)	Indicators	Lead Agency(ies)	Timeframe	Progress over reporting period	Implementation issues
other non-compostable disposable food and beverage containers banned by 2015.	Styrofoam and other non-compostable disposable food and beverage containers by 2015.	developed and enforced				
A nation-wide resource recovery system covering the ten regions in place by 2024.	26. Complete a study of options to implement recycling programmes for electronic goods, vehicles, tyres, appliances, and lubricants, with the application of environmental handling fees, and consideration of extended producer responsibility.	Options report completed with concrete recommendations made and implemented	SWMA			
	27. Include product take-back as a mandatory requirement in tenders and contracts for the supply of goods (such as computers, lubricants, and chemical containers) in the public sector.	Number of signed contracts which include mandatory take-back	SWMA, All government agencies			
	28. Develop and implement a 'Clean Schools' Programme, which encourages schools to adopt waste reduction, reuse, and recycling practices and rewards top performers.	Clean School Programme developed and implemented;  Number of schools participating in the programme	SWMA, Min of Education			
	29. Develop and implement a 'Clean Campus' programme targeting waste reduction, reuse, and recycling at the University of Guyana, as well as at technical and vocational institutions across Guyana.	Clean Campus programme developed and implemented  Number of institutions participating	Institutions of higher education			
	30. Require public sector agencies to participate in recycling programmes and to utilise recovered materials (e.g., compost and crushed glass) in their projects	Amount of waste disposed of by public sector agencies	MLGRD, SWMA			

Targets	Actions (abbreviated version)	Indicators	Lead Agency(ies)	Timeframe	Progress over reporting period	Implementation issues
	and operations					
EFFICIENT AND COST-EFFECTIVE WASTE COLLECTION						
Full cost accounting for waste management is introduced in town councils and NDCs by 2017 to assist in determining the true costs of waste management.	31. Require NDCs, and town councils to introduce full cost accounting for waste management.	Full cost accounting system in place;  Number of councils that can accurately quantify their waste management costs	MLGRD			
An equitable system of charging for waste management (collection, disposal) based on the polluter pays principle is fully introduced by 2020.	32. Complete productivity studies of existing waste collection systems to assess waste collection efficiencies and identify areas for improvement (consistent with recommendations of the Waste Characterisation and Waste Loads and Flow report prepared by Hydroplan).	Productivity studies completed and recommendations implemented	Councils, NDCs, SWMA			
	33. In concert with Strategic Action 36, complete a nation-wide study to determine the most cost-effective centralised arrangements for waste collection and disposal and implement the recommendations.	Assessment report completed and recommendations made and implemented	SWMA			
	34. Assess the feasibility of implementing an EVAT for waste management, compared to the recommendations of the Hydroplan Finance and Cost Recovery Report (Hydroplan, 2011), and implement the recommendations.	Feasibility report completed and recommendations implemented	SWMA			
Waste collection activities are regulated and conducted in	35. Develop, disseminate and enforce national guidelines for waste storage, collection and transportation.	National guidelines finalised and disseminated	SWMA, Bureau of Standards			

Targets	Actions (abbreviated version)	Indicators	Lead Agency(ies)	Timeframe	Progress over reporting period	Implementation issues
accordance with best practices.						
BETTER WASTE INFRASTRUCTURE						
Waste management facilities such as landfills, recycling facilities, and scrap metal yards are designed to eliminate or minimise detrimental public health and environmental impacts, and are licensed and managed in accordance with best practices and approved environmental management plans.	36.	In conjunction with Strategic Action 33, complete a nation-wide study to determine the most cost-effective arrangement of waste disposal sites, and implement the recommendations.	Feasibility report completed and recommendations implemented	SWMA		
	37.	Develop, disseminate and enforce guidelines for the siting, design, operation, closure, rehabilitation, and environmental monitoring of waste management facilities.	Guidelines developed, and disseminated  Number of permitted facilities	SWMA/EPA		
	38.	Prepare individual site operational plans for each waste disposal site currently in operation.	Number of waste disposal sites with operational plans	RDCs, NDCs, Councils		
	39.	Collaborate with a local research institution to conduct a research trial of the Fukuoka Semi-aerobic Landfill Method (Fukuoka Method) at the Lusignan dumpsite and disseminate lessons learnt to RDCs, town councils, and NDCs.	Trial of Fukuoka method completed with dissemination of lessons learnt	SWMA, University of Guyana		
Waste collection and disposal considerations are integrated into new developments.	40.	Strengthen the planning, development consent and consultation process to ensure that requirements for best practice waste management are incorporated into designs of new developments and to ensure that safeguards such as separation distances for landfills and waste management facilities are maintained.	Planning advice/guidelines include best practice waste management techniques  Number of new developments conforming to best waste management techniques	EIA, Central Housing & Planning Authority		

Targets	Actions (abbreviated version)	Indicators	Lead Agency(ies)	Timeframe	Progress over reporting period	Implementation issues
Disused dumpsites are closed in an environmentally sound manner and periodically monitored to minimise detrimental environmental and public health impacts.	41. Establish an inventory of all known dumpsites (rehabilitated or not), complete a qualitative risk assessment of these dumpsites, and budget for the progressive rehabilitation of priority sites (at least 1 site per year).	Inventory and qualitative risk assessment completed	SWMA			
STRENGTHENED HUMAN AND INSTITUTIONAL CAPACITY						
Better clarity and demarcation of the roles and responsibilities of the various agencies involved in solid waste management by December 2015.	42. Complete a review of solid waste management legislation in Guyana to identify and resolve overlaps in roles and responsibilities. Implement the recommendations.	Legislative review report completed and recommendations implemented	Attorney General's Office			
Local talent and expertise in solid waste management available to support relevant agencies/entities and to support implementation of the National Solid Waste Management Strategy.	43. Develop and offer a decentralised solid and hazardous waste management training and certification programme in collaboration with local educational institutions (technical and vocational institutions and/or university). Decentralisation ensures that people in distant regions have the same opportunities and access to training.	Training and certification programme developed;  Number of programme graduates	SWMA, Ministry of Education			
	44. Establish a permanent waste management technical advisory committee to provide technical guidance on implementation of the National Solid Waste Management Strategy. The committee must comprise of nominated experts in solid	Committee convened and adhere to terms of reference	SWMA			

Targets	Actions (abbreviated version)	Indicators	Lead Agency(ies)	Timeframe	Progress over reporting period	Implementation issues
	waste management and closely related fields.					

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