

# SINT MAARTEN

## SUSTAINABLE SOLID WASTE MANAGEMENT PROJECT



Ministry of Public Housing, Spatial Planning,  
Environment & Infrastructure  
(VROMI)

# CONSULTANCY SERVICES FOR ESTABLISHING INTEGRATED SOLID WASTE MANAGEMENT SYSTEM IN SINT MAARTEN

## COUNTRY SOLID WASTE MANAGEMENT SECTOR ASSESSMENT (CSWMSA)



Sint Maarten, August, 2020  
*Revised, September 04, 2020*

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## Acronyms

|                        |  |
|------------------------|--|
| <b>ANG</b>             | Netherlands Antillean Guilder  |
| <b>CARs</b>            | The States and Islands of the Caribbean Sea, including the West Indies       |
| <b>CARICOM</b>         | Caribbean Community and Common Market  |
| <b>CBO</b>             | Community Based Organizations  |
| <b>C&amp;D</b>         | Construction / Demolition  |
| <b>DBO</b>             | Design – Build - Operate   |
| <b>EDMP</b>            | Emergency Debris Management Project  |
| <b>EHS</b>             | Environmental Health and Safety  |
| <b>EEE</b>             | Electrical Electronic Equipment  |
| <b>EPR</b>             | Extended Producer Responsibility Policy                                      |
| <b>EU</b>              | Europe Union   |
| <b>HHW</b>             | Household Hazardous Waste  |
| <b>GDP</b>             | Gross Domestic Product   |
| <b>GIS</b>             | Geographic Information Systems   |
| <b>GNI</b>             | Gross National Income  |
| <b>HH</b>              | Housetholds  |
| <b>HHW</b>             | Households Ahazardous Waste  |
| <b>IFC</b>             | International Finance Corporation (WBG)                                      |
| <b>ISWMF</b>           | Integrated Solid Waste Management Facility                                   |
| <b>ISWMS</b>           | Integrated Solid Waste Management System                                     |
| <b>MARPOL</b>          | International Convention for the Prevention of Pollution from Ships          |
| <b>MSW</b>             | Municipal Solid Waste  |
| <b>MRF</b>             | Material Recovery Facility   |
| <b>NIMBY</b>           | Not in My Back Yard  |
| <b>NGO</b>             | Non-Governmental Organization  |
| <b>NRRP</b>            | National Recovery & Resilience Plan  |
| <b>NRPB</b>            | National Recovery Program Bureau   |
| <b>PPE</b>             | Personal Protective Equipment  |
| <b>OCT</b>             | Overseas Countries & Territories   |
| <b>O&amp;M</b>         | Operation & Management   |
| <b>US Federal RCRA</b> | Resource Conservation and Recovery Act of 1976 (Waste Disposal)              |
| <b>SIDS</b>            | Small Island Developing States   |
| <b>SXM</b>             | Saint Martin / Sint Maarten  |
| <b>SXM STAT</b>        | Sint Maarten Statistic Department  |
| <b>SWM</b>             | Solid Waste Management   |
| <b>STWMP</b>           | Short-term Waste Management Plan   |
| <b>TA</b>              | Technical Assistance   |
| <b>TOR</b>             | Terms of Reference   |
| <b>UN</b>              | United Nations   |
| <b>UNEP</b>            | United Nations Environment Program   |
| <b>USEPA</b>           | United States Environmental Protection Agency                                |
| <b>VROMI</b>           | Ministry of Public Housing, Spatial Planning, Environment and Infrastructure |
| <b>WB</b>              | World Bank   |
| <b>WEEE</b>            | Waste Electrical Electronic Equipment  |
| <b>WTE</b>             | Waste to Energy  |
| <b>WTS</b>             | Waste Transfer Station   |
| <b>WHO</b>             | World Health Organization  |

# EXECUTIVE SUMMARY



# INTRODUCTION

## Overview

The objective of this solid waste sector assessment report is to complete a status quo analysis of the existing SWM system in Sint Maarten to eventually establish an ISWMS and an Action Plan that accomplishes necessary improvements and overcomes current impediments to developing an environmentally sound, cost-effective solid waste management for the Country.

Sint Maarten is an Overseas Country that is part of the Kingdom of Netherlands as a part of Netherlands Antilles in the Caribbean Region. Consequently, Sint Maarten are dependent on the Netherlands for matters like foreign policy and defense, but are autonomous to a certain degree with their own parliaments in their internal affairs, international trade, and to establish relations with some international establishments and trade organizations. It, with own constitution, is representative parliamentary democracy organized as unitary state. Its administration consists of the Governor, who represent the Kingdom of the Netherlands.

## Background

The country has a population of 40,614 by January 01, 2018, and enjoys rapid economic growth by receiving the tourists of approximately 1,7 million by 2018 from cruise and stay-over arrivals every year while struggling with a weak municipal solid waste (MSW) management system.

According to weighbridge register of MSW landfill in Pond Island from 2009 to 2015, Sint Maarten generates an estimated 128 ths. tonnes per year of waste (about 350 tonnes per day), which is managed by the Ministry of Public Housing, Spatial Planning, Environment and Infrastructure (VROMI). The situation has been exacerbated since the Hurricane Irma hit the island on September 6, 2017 and destructed over 90% of its main infrastructures.

After Hurricane Irma Sint Maarten government accepted the pre-conditions set by Dutch Government for financial support. The Netherlands contracted the International Bank for Reconstruction and Development (the World Bank) as an expert authority on redevelopment to manage the recovery via the “Reconstruction and Resilience Trust Fund” (herein after called the “Trust Fund”), which is comprised of a grant of €470 million. But, according to the National Recovery and Resilience Plan (NRRP) the rebuilding of Sint Maarten would require funding of an estimated US\$ 2.3 billion.

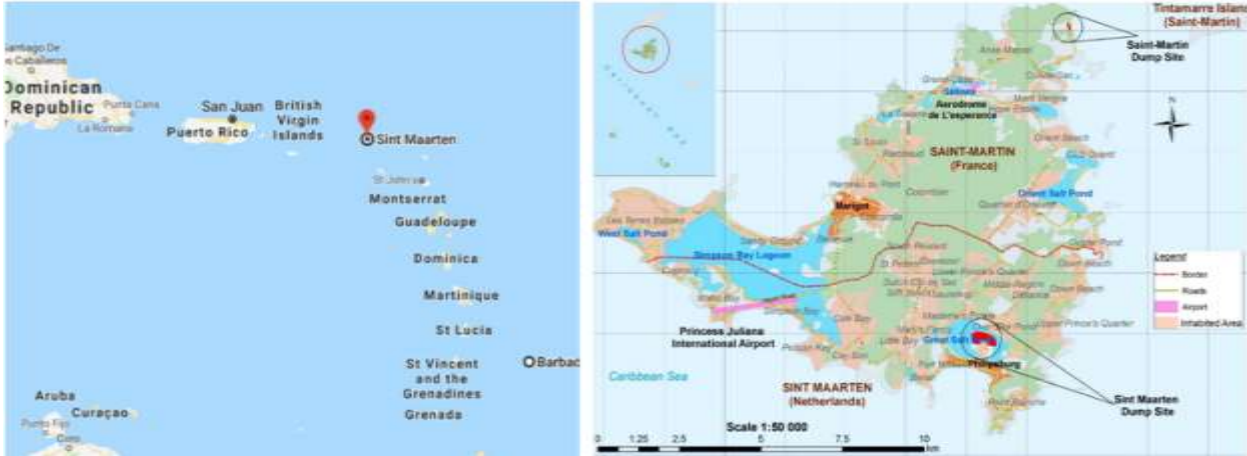
Among other emergency recovery projects that have been planned and currently being implemented, Emergency Debris Management Project with an estimated budget of US\$ 25 million and Long-Term Waste Management Project (this project) with an estimated budget of US\$ 35 million are programmed to be committed.



# COUNTRY SETTINGS

The country shares the same island with French part-Saint Martin with an area called “Collectivity of Saint Martin”. The Sint Maarten occupies the south part of the island. The area of island is 87 sq.km, and divided roughly 60/40 between French Republic (53 sq.km) and Kingdom of Netherlands (34 sq.km). Two parts of the island are roughly equal in population. The division dates to 1648.

## Lesser Antilles & Sint Maarten



The capital of Sint Maarten is Philipsburg, and the largest city is Lower Princess Quarter.

The static population (permanent residence) in January 2017 was slightly higher than 40,000, and at the beginning of 2018 it was 40,614. At the same period, 49% of the population was male and 51% was female. The Sint Maarten’s static population density is 1,194 sq.km by 2018.

## Demography

As there is no uncertainty on the number of tourists both from cruise ships arrivals and stayover arrivals to the country, which is around 2.5 million in any high tourism year when we look at the statistics. Contribution of daily tourist population and undocumented residents to the daily dynamic population the country’s daily dynamic population is assumed to be around 63,000 with high tourism scenario. Employed population consists of 20,850 persons, which is around 51% of the total static population. The male – female split of the Employed population is 53% to 47%, almost half-half. According to SXM STAT, the number of deaths also fluctuates every year. In 2017, 111 males and 61 females died, an overall total of 172 persons. Of every 1000 inhabitants 4.2 persons died. Because of high life expectancies the number of older persons is rising. This is especially notable for females.

Urbanization process in Sint Maarten mimics some other Caribbean SIDS which their economies heavily rely on tourism, tourism related activities, and off-shore finance.



## Socio-economic Setting

Sint Maarten is classified as high-income country by UN and World Bank with nominal per capita GDP of US\$ 26,500, which is slightly higher than regional average (US\$ 20,000). Main economic drivers in the country are: i) tourism and tourism related activities, ii) ports and airport, iii) offshore finance, iv) international trade, marine transport, import/export, v) small scale local industries, mostly are light industries, and vi) weak cultural industries. There is no agricultural activity in the island.

As one of the largest sources of foreign exchange, tourism is a life-blood for the country as in many SIDS' economies in Caribbean region. The tourism sector also has strong linkages with other sectors such as financial services and international commerce and trades.

GNI per capita in the country is around US\$ 29,002, which is almost 50% higher than the regional average (US\$ 19,322). Only 14% of GNI is sourced from industry in Sint Maarten, and 85% form service sector.

However, the island and the similar SIDS in Caribbean Region are experiencing second economic shock after Hurricane Irma with COVID-19 outbreak and limitations applied since March, 2020.

There is only one international airport (Princess Juliana International Airport - PJIA) in the Island. It is located on the Sint Maarten side, and viewed as a major contributor to the Sint Maarten economy. Yearly average passenger capacity of PJIA is around 1.8 million passengers. In 2014 the airport and its users accounted for 60% of Sint Maarten's GDP and 52% of total employment. The airport itself had revenues over USD 59 million in 2014.

The cruise industry in Sint Maarten is one of the fastest growing sectors, but not uniformly seasonal. The cruise port now accommodates six cruise ships through its two piers, with the terminal handling anything from 6,000 to more than 20,000 passengers in a single day. Sint Maarten's cargo handling facilities have grown with the shipping lines calling at the island and it was a natural progression to expand the existing quay. The Captain David Cargo Quay was extended from 270 to 540 meters in 2009 and protection from the sea was achieved with a new breakwater at the southern end of the quay.

At a regional scale the Port of Philipsburg is a service port which connects with both intra-regional hub-ports as well as other service ports in the region, and global hub-ports in Caribbean region.

However, the port of Philipsburg in Sint Maarten is a transshipment hub for CMA-CGM. As OECS ports are looking to add cargo, the transshipment volumes in Philipsburg are a target

The N.V. GEBE is officially owned by the Government of Sint Maarten, which is responsible for electricity generation and distribution in the country. The approximately 20,000 customers of N.V. GEBE are as an average consuming around 1,500 kWh monthly, which is one of the highest consumption figures in the region. The N.V. GEBE is also single provider for drinking water to all Sint Maarten through its desalination plants from sea water in Cay Bay, Point Blanche and Lowlands with reverse osmosis water plants to meet the



daily demands of water consumption in the country. While regional average of domestic electricity tariffs is around US\$ 0.32 in CARICOM region, it is US\$ 0.18 in Sint Maarten.

Apart from GEBE power plant, the major light industries in Sint Maarten primarily focused on rum and beer production and fish products. There are three rum, three brewery factories, and one water distilling and bottling company which also produces sparkling water. Yacht repair and maintenance firms also take important place in industrial activities in Sint Maarten.

Few very small-scale chocolates producers also exist, however, they are importing the chocolate bars mostly from Grenada and Trinidad & Tobago as there is no cacao plantation and big size chocolate bar producer from cacao beans in the country. Activities in cultural industry are also very weak. They are made up few small workshops.

## Legal and Regulatory Setting

The legal base of Saint Martin Island is complicated by its history. For Sint Maarten, there was a history of Dutch civil law with some influence of English common law. The Dutch monarch appoints the Joint Court judges that serve the earlier noted Netherlands Antilles islands, with appeals presented to the Supreme Court at Hague. It is a parliamentary democracy under the constitutional monarchy of the Kingdom. On the other hand, as a country, it appears to be free to create its own laws in keeping with its constitution.

There is no comprehensive solid waste institutional arrangement or regulatory framework at the moment, but the government is aware of this need and has expressed its desire to address it within their SWM Roadmap. Some norms from pre-independence time are still being used and there are piecemeal decrees to address some needs, as well as a draft environmental policy.

However, VROMI has organized recently to be prepared a new draft waste ordinance. It is currently circulated for comments and revisions. The consultant's comments and recommendations for re-arranging the law are presented in Annex 1.

Although Sint Maarten is not bound to comply with solid waste regulation in the European Union, it is generally required to comply with treaties that Netherlands enters into. MARPOL and the Basel Convention on the Transboundary Movement of Wastes are particularly relevant.

The Hong Kong International Convention adopted in 2009 requires that ships being salvaged or recycled following their operational life have all potentially hazardous materials properly handled to not pose any risk to workers or adverse impacts to the environment.

Aside from the abovementioned international treaties that are obligatory as a member of the Kingdom of the Netherlands, the international airport is obligated to follow the international civil aviation organization's standards.



## Institutional Setting

There is no separate Waste Management Authority (WMA) established specifically for waste management in Sint Maarten. Solid waste collection and disposal operations are under the management of Ministry of Public Housing, Spatial Planning, Environment and Infrastructure (VROMI), which also handles infrastructure planning and development.

Environmental permits issuance and enforcement in spatial development and environment are under responsibility of VROMI, it also provides environmental control on solid waste management activities.

Ministry of Health is responsible for regulating and overseeing the medical waste. Social issues are under the management of Ministry of Public Health and Social Development and Labor (VSA), which handles social development, labor, social inclusion and health.

VROMI outsources all SWM activities with open tenders to the contractors. VROMI reports that only five contractors are currently giving services for household and institutions (government departments and schools), and partly commercial waste collection and transport. Wastes from commercial enterprises and ships are not handled by government, and open subscription between the waste generators and private haulers is unregulated. VROMI also operates the landfills with its own staff, however, all machineries and equipment used in the landfills are hired from contractors with rates set by government.

The government is also conducting studies for future disposal and treatment. For purposes of the financial support from external entities for emergency response to the Hurricane Irma disaster, a special government body called the National Recovery Program Bureau (NRPB) reports directly to the office of the Prime Minister. The NRPB coordinates the government agencies and also arranges for the accountable, transparent management of the procurements and actions financed for the recovery activities, see DRM Context).

However, within the current waste management system, VROMI is not able to control the SWM system wholly because it does not have sufficient resources such as budget, human resource and legal infrastructure. Therefore, SWM components of collection/transport and disposal as well as recycling activities remain uncontrolled. The current system does also not support to secure the full-cost recovery of SWM operations.

Although there is no comprehensive solid waste institutional arrangement or regulatory framework at the moment in Sint Maarten, the government is aware of this need and has expressed its desire to address it within their SWM Roadmap. Some norms from pre-independence time are still being used and there are piecemeal decrees to address some needs, as well as a draft environmental policy.

## Disaster Risk Management (DRM) Context

Sint Maarten's disaster management plan was designed to provide both a technical and organizational plan which could deal with the first recovery processes of multiple disaster events in an efficient way. It has been created as a reaction to hurricane Luis, as the previous system in place did not function during the preparation and aftermath phases. The



plan was constructed for the entire Netherlands Antilles between 1995 and 2000 and adapted locally if necessary. In this plan the focus is not on the aspects regarding the technical implementation, but on the administrative, organizational and coordinating aspects when combatting a disaster. The development of this organizational structure could thus be identified as the development of a security apparatus, aiming at focusing on relief and recovery after a disaster.

Shortly after Irma (14th of September) a workgroup has been formed for establishing A National Recovery Plan (NRP). The workgroup produced an interim report focusing on a plan of approach regarding the rebuilding and recovery of St. Maarten. Within this report an analysis was made of the economic impact and actions required for the recovery of the communities and economy.

As a response to help and speed up the recovery on Sint Maarten the Dutch government made available a budget of €550 million. Of this budget seven million was made available to finance projects in the first phase of the recovery. These projects were executed by local and international organizations such as the United Nations Development Program, the Red Cross and UNICEF.

Dutch Government made available a budget of €470 million to assist Sint Maarten. The Netherlands started negotiating with the World Bank if they could be able to play a role within the rebuilding processes on Sint Maarten. The agreement between the Netherlands, Sint Maarten and the World Bank was signed on the 16th of April, 2018.

A steering committee, consisting of representatives of the World Bank, Sint Maarten and the Netherlands, and an Interim Recovery Committee (IRC) have been established as an 'intermediary' between the ministries and the World Bank. The IRC consisted of eight to ten different members, who previously worked for different ministries, and it eventually developed itself into a National Recovery Program Bureau (NRPB).

## Financial Setting

The national budget of the Government of Sint Maarten allocates funds to the various ministries and organizational units as Operational Expenditure Budget to be used for recurring expenses, and as Capital Investment Budget to be used for larger scale 'one-time' project investments. The national budget 2018 of Sint Maarten had a deficit of ANG 197 million (US\$ 110 million) and had a capital investment of ANG 22 million (US\$ 12 million).

A governing program has been developed by the government in 2018. The goal of the government is to act swiftly to improve the quality of life for the people, rebuild a vibrant economy, restore a robust social fabric and promote a resilient sense of community. This governing program addresses the economic and infrastructural reality that the Country is facing. It reflects the objectives and plans of the government to restore and redevelop Sint Maarten.

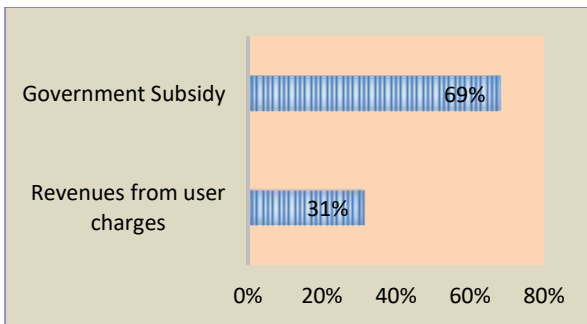


After Hurricane Irma Sint Maarten government accepted the pre-conditions set by Dutch Government for financial support. The Netherlands arranged for the International Bank for Reconstruction and Development (the World Bank) as an expert authority on redevelopment to manage the recovery via the Trust Fund, which is comprised of a grant of €470 million.

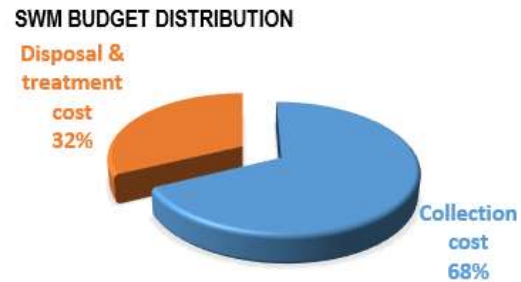
There is no waste collection and disposal tariff set by the government, no user charge for households and institutions (government departments and schools) in the country. There is also no billing system for SWM services. Except commercial waste collection and transport budget, all SWM budget is provided by the government as government subsidy, including collection and transport budget of household and institutional waste, area cleaning waste, and the budget for disposal and treatment.

Waste collectors of household/institutional and area cleaning waste are paid by VROMI from the central government budget. VROMI has no revenue from the waste management activities as there are no tariffs charged to the household/institutional waste generators, and no tipping or gate fee at the entrance of the Pond Island MSW landfill for all waste delivered to the landfill by all waste collectors and haulers, including commercial waste collectors.

According to recent data total estimated SWM budget of Sint Maarten is around US\$ 10.2 million. Almost 69% of total SWM budget is government subsidy (from government budget based on environmental fee, utility fee and occupancy tax from the hotels, resorts and room-share apartments), and estimated 31.32% is provided by commercial waste generators through unregulated waste collectors. Almost 68% of SWM budget goes to collection services, and 32% to disposal and treatment services.



**Current SWM Budget Structure**



**SWM Budget Distribution between Collection and disposal Services**

It should be noted that the government subsidy does not imply that 69% of the SWM budget is fully government subsidy as the government collects funds through different economic instruments such as environmental fee charged through hotels/resorts and room-share apartments, and also occupancy tax charged per room per week at the hotels and resorts.



The recent analyses on available financial data show that O&M cost per ton of full SWM system by 2018 is US\$ 77,98. SWM cost per person per year and month are US\$ 162,16 and US\$ 13.51 respectively.

When these figures are compared with the cost per ton rates in few European countries, per ton O&M cost in Sint Maarten seems too high as it is almost equal to SWM system O&M cost per ton in Germany, Belgium, Ireland and Spain.

If the service level in those countries is considered as a cost level function, it is apparently seen that cost per ton O&M cost of SWM services in Sint Maarten is too high or there is no liable data on SWM budget. The latter is more possible than the first assessment because of the fact that there is no functional weighbridge at the gate of main MSW landfill; VROMI does not have sufficient staff and infrastructure to measure and keep under control the SWM system performance, and suffers from lack of capital for enhancing the performance of the system components.

Nevertheless, no cost recovery is secured within the current financial model, which is not economically viable, and can no longer sustain the SWM system in Sint Maarten.

As the SWM operations in the country is government operation partly, there is no standard budget dedication methodology from the government budget specifically for SWM system, which will provide adequately splitting the budget collected as environmental and utility fees. The budget provided to VROMI is not a resource allocation type budget, but only annual authorization type budget dedication method is applied according to next fiscal year requirements of VROMI, based on its contracts related to SWM and staff work in SWM department as there is no precise financial management framework for SWM operations.

### Economic Instruments, Incentives/Disincentives

As there is no solid waste management fee set by the government for both collection/transport and disposal in Sint Maarten, collection and transport costs of household and institutional waste (government departments and schools) and all disposal costs in both landfills (MSW and Irma) are covered by the government budget. Waste collection and transport fee applied by private waste collectors to commercial and industrial waste generators is collected by the collectors, but the revenue provided by this activity is not included in government budget as they do not pay any tipping or gate fee at the gate of the landfill.

There is also no regulation, which regulates the waste fee for all type of waste generators. Currently, only the following indirect economic instruments are in force in Sint Maarten:

| Indirect Economic Instruments   | Rate<br>US\$ |
|---|--------------|
| Environmental fee, per person per day through hotels, resorts and room-share apartments | 1.50         |
| Utility Fee, per person per day through hotels, resorts and room-share apartments       | 3.00         |

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|   |       |
|---|-------|
| Occupancy Tax, per week at hotels & resorts             | 50.00 |
| Departure tax, for one-off entry payable at the airport | 30.00 |

User charges that are applied by private unregulated waste collectors for waste collection from commercial and industrial waste generators are summarized below:

| Waste Generator  | Rate<br>US\$   |
|--|----------------|
| Small shops & retail business, including industrial workshops per month (est.) | 30.00 - 50.00  |
| Restaurants and bars, per month (est.)   | 80.00 - 150.00 |
| Hotels and resorts, per room per month (est.)                                  | 10.00          |

There is also no deposit refund system or other revenue instruments imposed by the Government. There also exist no incentives which encourage the waste minimization, reuse and source separation in the country, as well as no recycling policy, and other policies which cover the components of an Extended Producer Responsibility (EPR policy).

It should be noted that the government subsidy does not imply that 69% of the SWM budget is fully government subsidy as the government collects funds through different economic instruments such as environmental fee charged through hotels/resorts and room-share apartments, and also occupancy tax charged per room per week at the hotels and resorts.

## WASTE SOURCES & CHARACTERISTICS

Waste types in Sint Maarten are classified under 11 categories depending on their sources for the purposes of this report.

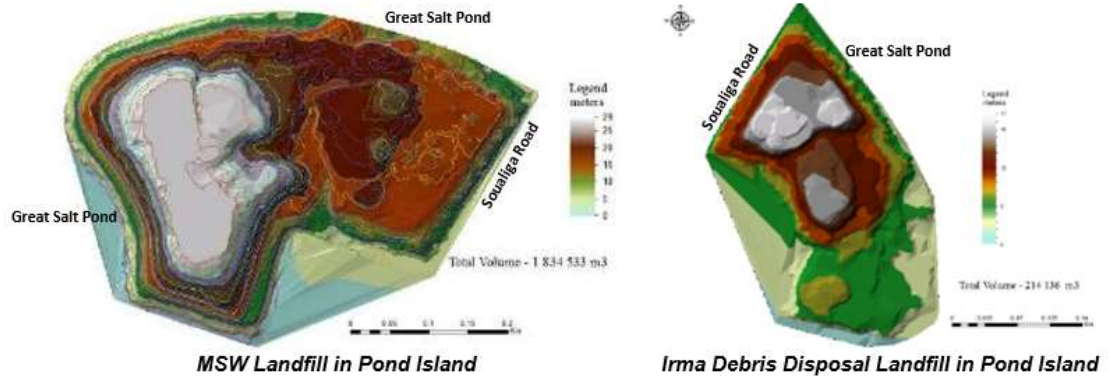
| Waste Types |   |
|-------------|---|
| 1           | Household Waste (residential)   |
| 2           | Commercial Waste (including restaurants, touristic facilities and resorts, and small and large retail markets, grocery stores, entertainment facilities, airport, port facilities and cruise ship wastes)   |
| 3           | Marine and coastal litters from land-based and sea-based sources, i.e., ocean dumping by boats, accidental container spillages, wind blown solid waste, (paper, plastic, etc) from urban areas and waste landfills, and tourism activities in beaches and coastal zones |
| 4           | Institutional Waste (schools, government offices and medical facilities)  |
| 5           | Industrial Waste (non-process and non-hazardous waste from the human activities)  |
| 6           | Mixed Construction and Demolition Waste – Mixed C&D Waste   |
| 7           | Car wrecks/tires  |
| 8           | Medical Waste (non-hazardous waste from the human activities)   |
| 9           | Hazardous Medical Waste   |
| 10          | Hazardous Industrial Waste  |
| 11          | Disaster Waste  |

All studies since almost 10 years on waste generation in Sint Maarten show that this small island country has one of the highest per capita solid waste generation rates (WGR – 3.53 kg/capita/day) in Caribbean SIDS as it is one of the most favorable destination by cruise ships and stayover tourists.

There are two authority disposal facilities in Sint Maarten, however both of them are not equipped with a functional weighbridge that records the weight and other source information on the waste delivered to the landfills. Both are located in Pond Island in Philipsburg, one of them is MSW landfill for accepting all waste types along with municipal waste types. The MSW landfill occupies approximately 16 hectares of land in northwestern part of the Pond Island, and is in service for some 50 years. Its operable life time is almost finished. The current total fill in the landfill is around 1.85 million cubic meters by the end of 2019. The landfill accepts household, institutional, commercial, and industrial waste types without adequate control at the gate due to lack of its landfill entrance facilities and equipment. VROMI reports that the current unfunctional weighbridge in MSW landfill has been installed in 2009, and was functional until end of 2015.

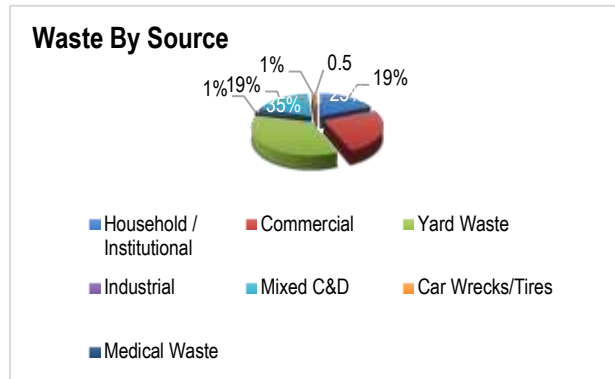
The second one is Irma Debris Disposal (IDD) site that is established after Hurricane Irma for deposition Irma debris (disaster waste). IDD occupies some 6.5 hectares of land, and is located in the northeastern part of Pond Island. It accepts only Irma debris collected. Almost one hectare of the area of the landfill is used by a private recycler as a junk yard for deposition and partly recycling of wrecked vehicles from Irma. Approximately 215,000 cubic meter debris (disaster waste) are placed in the landfill since October, 2017.





Almost all waste types is collected commingled, and disposed to MSW landfill. Currently, there is no functional weighbridge in both landfills.

According to VROMI’s weighbridge register from 2009 to the end of 2015, averagely 19% of waste disposed has come from households and institutions, 25% commercial sources, 35% from area cleaning activities as yard waste, 19% from construction sector as C&D waste. Averaged yearly waste generation is around 127.4 ths. tonnes in the period of 2009-2015.



### Waste Categories

Waste types are categorized as Municipal Solid Waste and Special Waste Types for the purposes of this project, as special waste types listed in the next Table require special attention during collection/transport, and disposal/treatment.

While 57% of waste generated in the country is MSW, 43% is special waste.

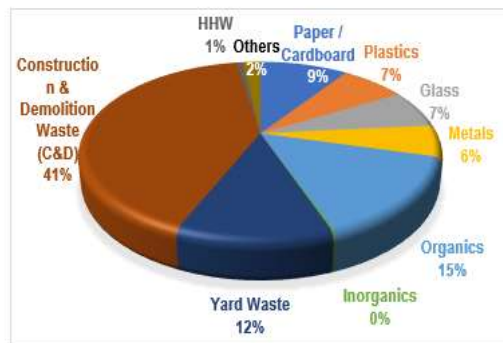
| Mixed Municipal      | Special Waste                        |
|----------------------|--------------------------------------|
| Paper/cardboards     | C&D Waste                            |
| Plastics             | Hazardous Medical Waste              |
| Metals               | WEEE and Durables                    |
| Organic Waste (food) | Car Batteries                        |
| Textile              | Hazardous industrial waste           |
| Tire & Rubber        | <p>Special Waste 43%<br/>MSW 57%</p> |
| Inorganic Fractions  |                                      |
| Yard Waste           |                                      |
| HHW                  |                                      |
| Other waste          |                                      |



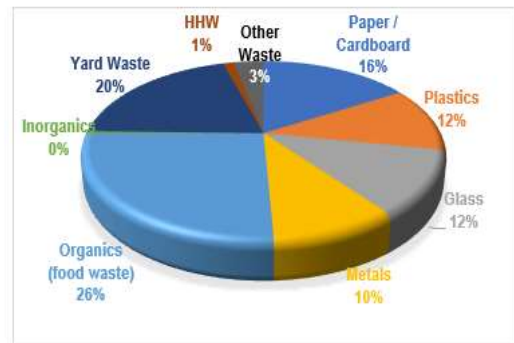
## Waste Composition

The recent (2009) waste characterization survey results show that that 41% of waste generated in the country is C&D waste, 9% paper, 15% organic waste, 12% yard waste, 7% glass, and 7% plastics.

If C&D waste would be separated from the municipal solid waste stream as a separate category assuming that it will be handled and treated separately, the waste composition would be as follows: 16% of the generated waste would be paper & cardboard, 12% plastics, 12% glass, 10% metals, 26% organics, 20% yard waste.

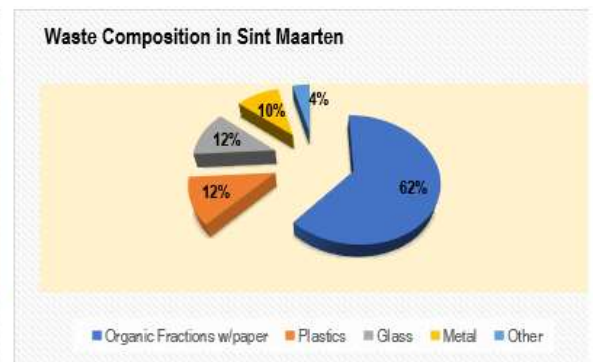
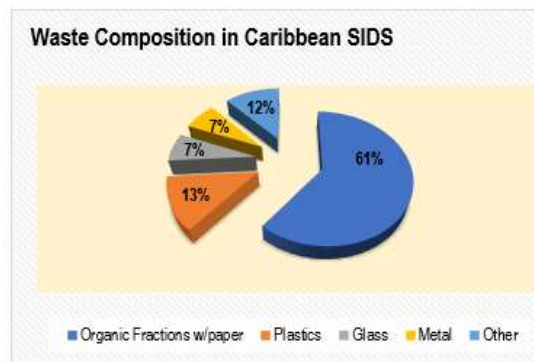


Waste Composition, including C&D Waste



Waste Composition, excluding C&D Waste

The similarity of MSW composition of Sint Maarten with Caribbean SIDS is remarkable. The following comparison shows that MSW composition in Sint Maarten almost mimics the character of waste generated in Caribbean SIDS.



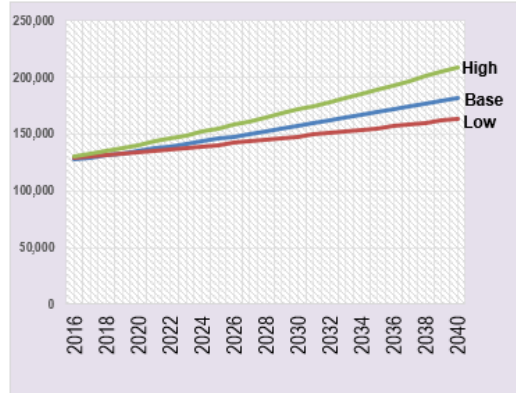
## Waste Generation

Based on analysis of historical data on waste generation, it is assumed that waste generation (including C&D waste) by 2016 in Sint Maarten was around 127.4 thousand tonnes. Estimated and projected waste generation capacity from 2016 to 2040 is given below, assuming that the incremental increase per year will be in parallel with the

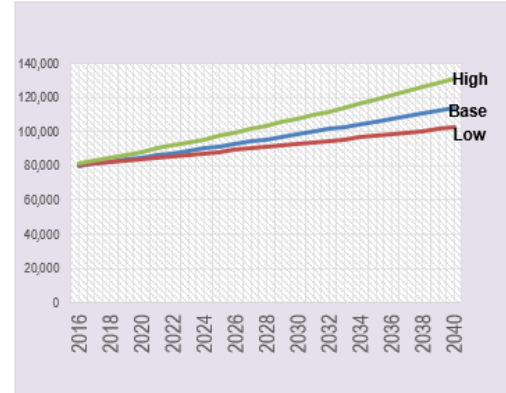
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population growth rate of 1.5% for base case scenario, 1.00% for low case scenario, and 2.0% for high case scenario. It seems that Sint Maarten could have waste generation capacity of 182,103 tonnes per annum by 2040 including C&D and other special waste types.



Waste Projection – C&D Waste Excluded

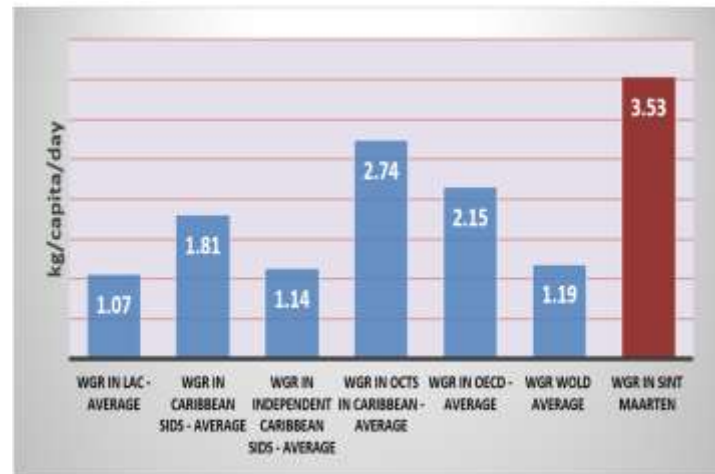


Waste Projection – C&D Waste Excluded

Waste generated by stayover tourism activity is included in this projection, but no ship waste is projected in this projection, except the boats moored in the marinas, as the tourists coming by own boats are using the communal containers for disposing their waste. Waste from commercial establishments and households are collected as mixed waste, and transported to the Pond Island landfill.

### Waste Generation Rate (WGR)

Waste Generation Rate (WGR) has been evaluated for two cases of C&D waste is included or excluded. WGR is 5.99 kg per capita per day, including C&D waste, and 3.53 kg per capita per day excluding C&D waste. As seen in the next Figure, the WGR in Sint Maarten is one of the highest in Caribbean region. However, many of the highest waste generators are the active tourist economies in SIDS like Sint Maarten in Caribbean region.



### Waste Character

According to the results of waste characterization survey conducted in 2009, 41% of the total waste (including C&D waste) generated in the country is C&D waste. However,



47.83%% of C&D waste is formed from wooden fractures. This waste composition of Sint Maarten suggests that the topological distribution of waste generated is 55.70% organic fractions, 21.60% inorganic and inert materials, 7% plastics, 6.90% glass, 5.70% metals. Other small fractions make up 2.80% of total waste generated.

As there is no reliable waste density measurements or surveys previously conducted for Sint Maarten, based on the consultant’s experience worldwide and the literature review, the average MSW densities depending on where it is placed are given below for referencing.

| Waste Compacted / Un-compacted                                       | Density           |
|--|-------------------|
|  | kg/m <sup>3</sup> |
| Mixed MSW in container   | 280 - 300         |
| Messy waste in open truck  | 350 - 400         |
| Compacted mixed waste in truck                                       | 650               |
| Waste in skid containers for hook lift trucks - 3 - 4 m <sup>3</sup> | 350               |
| Compacted waste in landfill  | 1,200             |
| Suitably uncompacted waste in landfill                               | 800 - 850         |

An approximate average calorific value on potential for incineration alternative has been conducted with the sector specific caloric values of combustible fractions for overall waste stream, assuming that all wood fractions from C&D waste will go to the incinerator. The assessment has been conducted on 21 waste fractions. The resulting wet weight low and high calorific value may be around 2,803 and 3,514 kcal/kg respectively.

Analyses on the current waste stream concluded that the potential for;

- material recycling is ~ 44 %
- biological conversion is ~ 47 %
- thermal conversion is ~ 60 %
- mechanical production of RDF/SRF is ~ 48 %



## WASTE MARKET OF SINT MAARTEN

The waste market in Sint Maarten can sustain estimated 100 tonnes per annum recyclable waste, including wood fractions in C&D waste and yard waste) in a normal tourism season. The packages of imported materials increase the amount of recyclable waste generation in Sint Maarten. Almost 64% of the generated waste (approx. 100 tonnes per annum MSW) in total is recyclables with 85% separation & collection efficiency in the country, including wood fractions in C&D waste.

However, any fluctuation on tourist capacity of the country due to natural events and disasters can heavily affect the size waste market.

Market review also shows that packaging waste (paper – 11.81%, plastics - 7.88%, glass – 8.86%, and wood pallets) plays important role on amount of recyclable waste generated in the country. Sint Maarten together with sister islands (Saba and St. Eustatius) consume over 30 million bottles of beer.

Sint Maarten shows many similarities to other SIDS in the region from the perspective of demographics, economic drivers and economic dependency on tourism, tourism related activities and tourism dependent industries, dependence or connections to regional and global market, transport capability and difficulties to haul their processed or semi-processed waste to the regional and global market, dependency on use of fossil fuel for energy, and being exposed to natural disasters such as tropical storms.

Currently, the major players in Sint Maarten waste market are the waste management authority (VROMI), relevant government agencies/authorities, the waste generators, waste recyclers/processors, general public, and non-governmental organizations (NGOs). The airport authority, port authority, and big hotels and resorts should also count as major players in waste management because they are major waste generators in the country.

However, because of the fact that these stakeholders act independently from the main waste management authority (VROMI), and in a disorganized manner, the overall waste management in Sint Maarten is unfortunately unable to be perceived as a cohesive and holistic waste management scheme. As a result, VROMI is solely relegated to performing collection of the solid waste from households/institutions and area cleaning as well as managing landfills within their own limited resources, leaving the collection and transport of commercial waste unregulated.

This situation enables local recyclers to opportunistically seek out the international markets through regional recyclers, bypassing regulations and best practices all the while selling the recyclable fractions in the main waste stream as semi-processed recyclables, since there is no robust enough industrial infrastructure to support a circular economy which revolves around these local recyclers, and also there is no industrial and agricultural base for sustaining material reuse & internal processing of recyclables.



Thus, these local recyclers are compelled to respond to the existing demand within the Caribbean waste market, and they conform their scrap recycling procedures according to hub areas around the Caribbean.

According to Aim Texas consultants' research on regional waste market, estimated 350 – 400 recyclable materials shipments per year leaving Port Philipsburg and arriving of Port Everglades in Florida exclusively, through local and regional Scrap Collectors/Dealers; They accept only scrap metal, car batteries, small amount of plastics and electronic waste, and very small amount of scrap paper. Recovered Paper supply in the region is in fact much lower than either Metal or Plastic Scrap Supply, and no scrap wood and glass demand in regional market.

### Recyclers and Recycling Rate in the Market

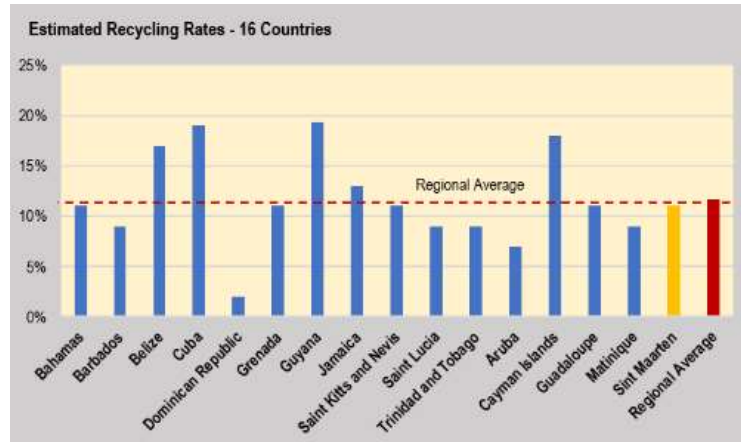
Although exact number of local recyclers (more than 10) is not known as no official records, the major ones are determined by the consultant during surveys and site visits. However, no official or unofficial data has been obtained from the local recyclers since they are very reluctant to interview and give their records. Therefore, the consultant went towards international port records, obtaining bill of lading for the shipments from Philipsburg Port to final stops of shipments.

They are mostly focused on collection, baling the recyclable fractions, and exporting them out of island through or directly out of island. Only very few of them is processing the (small amount of #1 PETE plastic, scrap woods, and glass) in the island. Some restaurants also apply a discount for their customers who bring their own to-go containers. But, their leadership in being an environmentally friendly business inspires other businesses and their customers to care more about the environment and creates a chain reaction of additional businesses and people who will refuse the use of single-use plastics in Sint Maarten.

However, no monitoring is conducted by a government department over all these waste minimization and recycling activities as there is no government policy, which regulates the recycling market in the country.

The estimated recycling rate in Sint Maarten is around 11%, which is slightly below the regional average of 12%, see following Figure. However, regional average is probably higher than 12% as the data and information on recycling in Haiti and Dominic Republic are very scarce.

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The waste market analyses showed that the CARICOM countries like in Sint Maarten, have not sufficient industrial infrastructures which support processing the recyclables in-house or in the region, rather they rely on export of the recyclables as secondary material to the markets/countries that have more developed industrial infrastructures such as USA, China, India, Taiwan, and for small amounts to Canada and European countries. This also means that approximately 85 - 88% of waste ends up in landfills in CARICOM region as in Sint Maarten.



# WASTE MANAGEMENT

## Collection & Transport

Currently, curbside collection is applied in the country, except the large-scale touristic facilities, airport and main port in Point Blanch district. The waste collected is hauled directly to Pond Island MSW landfill in Philipsburg. There is no waste transfer station within the collection system.

All waste collection and transport activities in Sint Maarten are under responsibility of VROMI. The waste collection and transport of household waste (HH waste) and institutional waste including schools are executed by outsourcing the services to private service provider firms with a Terms of Reference (TOR) prepared by VROMI through open tenders for the period from April 01, 2016 to March 31, 2021 (five years).

District cleaning waste activities are also arranged and executed by outsourcing the services to private service providers through open tenders for the period from August 01, 2019 to July 31, 2022 (three years), with the possibility of an extension with a maximum period of two (2) years.

Sint Maarten has been divided into eight (8) waste collection parcels for collection of household waste and commercial/institutional waste, and 13 parcels for collection and transport of district cleaning waste (area cleaning waste) including street sweeping waste and waste from public spaces – roads, sidewalks, drives, alleys, squares, public schools, beaches, public cemeteries, and parks.

Commercial waste is collected by private un-contracted waste collectors in un-regulated form. There is an open subscription system between the waste generators and private haulers for collection and transport of commercial waste. Unregulated and uncontrolled form of commercial waste collection in the country cause informal diversion of recyclable materials from main stream. These private collectors/haulers do also not pay any tipping fee at the gate of the Pond Island MSW landfill.

There are more than 10 private companies, though their numbers are changing time to time, which collect waste from commercial premises, hotels and restaurants, and dispose the waste into the MSW landfill without paying any tipping fee, despite the fact that they collect fee from their customers. The collection fees imposed by private collectors vary according customer's type of business and size.

There is no heavy industry and middle and large-scale industrial activities in Sint Maarten, industry sector comprises of only small-scale workshops (carpenters, blacksmiths, plumbers, car repair shops, etc.). They are using communal roadside containers for disposal of their waste.

However, relatively big size light industrial facilities haul their waste directly to Pond Island MSW landfill with their vehicles without paying any tipping fee.



VRMI reports that there is also no special program to collect / transport and processing the C&D waste in Sint Maarten. C&D waste owners (individuals and/or companies) bring them to the landfill for dumping with their vehicles, and all of them are simply dumped in landfill area.

VRMI also reports that medical waste collection, deposition and processing are currently handled by the medical facilities themselves according to directives of Ministry of Health of Sint Maarten.

There is no special collection program for collection and disposal of WEEE in Sint Maarten. VRMI reports that WEEE owners (individuals and/or companies) bring them to the landfill for dumping with their vehicles, and all of them are simply dumped in landfill area without no fee. There are also no scrap processors which collect those for processing or selling out of the island.

There is also no processor which deals with the car battery processing. Some scrap dealers are collected and export them out of island through regional recyclers.

The hazardous industrial waste eventually ends up in the Pond Island MSW landfill as disposal of this type of waste is not under control in the country despite the fact that the waste law of Sint Maarten has some articles which arrange handling of hazardous industrial waste.

Irma debris is deposited in 2017 without separation of wooden fractions, and some contaminated building materials and concrete parts in IDDS in Pond Island. Auto bodies, large metal fractions are separately collected and accumulated in a metal junk yard nearby IDDS for adequately dismantling the car wrecks. However, due to insufficient equipment for handling of car wrecks accumulated in junk yard, separating, shredding and baling activities still continue. The junk yard is operated by a private contractor.

The government also planned to remove the mixed disaster debris IDDS and junk yard under Emergency Debris Management Project (EDMP) of Sint Maarten.

Effects of COVID-19 on waste collection may be experienced in Sint Maarten in the following form:

- Most collected waste, including recyclables, may be transported to landfills or accumulates at temporary dumps;
- Hazardous materials in waste stream based on increasing of use of plastic-based personal protective equipment (PPE) such as gloves, masks, and disinfectant bottles, as well as packaging materials, may increase during COVID-19.

## Waste Disposal & Treatment

As mentioned earlier, there are two landfills in Pond Island of Philipsburg, one of which MSW landfill is lying at the north-western part of the Pond Island, and second one is Irma Debris Disposal Site (IDDS) is lying at north-eastern part of the island.



The Pond Island has mixed land use practices with administrative, educational, sports, residential, and commercial along with waste disposal sites. The Government House, TELEM Group building, University of Sint Maarten, Little League Baseball Stadium, VROMI's parking lot, residential and commercial buildings nearby the landfill, Carnival Village, and a Soccer Field (occupied by Irma landfill site) are all located in Pond Island.

Both landfills are managed by VROMI by its own staff in limited number. Infrastructure Management Department of VROMI has 20 staff for waste management activities. Of these staff, only 11 of them are employed for solid waste management, including landfill management.

The current waste disposal practices do not meet basic hygiene, sanitation, and ecological requirements. There is practically no waste neutralization and treatment, and they are merely used to amass waste. There is no leachate or gas control and treatment, no groundwater or gas monitoring, there is inappropriate machines/equipment at best, and little or none waste accounting is performed, and there is no compaction activity with an appropriate compactor.

Although open fires are stopped, the hot spots are determined in the Aerial Infrared Thermographic Survey conducted by EE&G Consultants on 2018 and 2019.

## Recycling & Recovery

Currently, waste management is strongly inspired by the waste hierarchy, an influential philosophy in waste and resource management that prioritizes practices ranging from waste prevention to landfill. Adherence to waste hierarchy is also often equated with the least environmental impact and saving of resources. However, application of the priority orders of waste hierarchy requires strong policy support, that is not in place in Sint Maarten. The European Directive 2008/98 EC introduces the "polluter pays principle" and the "extended producer responsibility" along with waste hierarchy priority orders.

The overall waste management in Sint Maarten is unfortunately unable to be perceived as a cohesive and holistic waste management scheme. This situation leaves recycling market unregulated without overseeing. VROMI's Infrastructure Management Department, as single waste management authority in the country, suffers from lack of necessary equipment, human resource, capacity and budget shortage during managing the system. Due to lack of policies and regulations that arrange the recycling market from import to export, absence of robust enough industrial infrastructure to support a circular economy which revolves around the recyclers cause the local recycling market incapable to process the recyclables locally. So that the local recyclers seek out the international markets through regional recyclers, and they are compelled to respond to the existing demand within the Caribbean waste market, and they conform their scrap recycling procedures according to hub areas around the Caribbean.

There is also no material recovery facility (MRF) publicly or privately owned within Sint Maarten waste management scheme in order to separate the recyclable fractions from the main waste stream for preprocessing or processing. The local recycler companies have



only small scrap yards for separating the fractions into specific categories or cleaning or baling them, to sale out of the island.

The consultant observed that there are no incentives and disincentives officially arranged or government programme on waste prevention, minimization and reuse by government ordinances in Sint Maarten. Although weak waste minimization efforts are in place in few hotels, restaurants and resorts, using metallic, glass, and porcelain table wares in cooperation with few local recyclers, these efforts remain weak, and do not have wide coverage. There are also no public awareness campaigns and officially approved programmes, which support the public education on waste prevention and minimization.

However, the efforts of Green SXM (a waste minimization initiatives in both Dutch and French part of the island) on separate collection of reusable plastic fractions is worth to be mentioned. Today several environmental Non-Governmental Organizations, Non-Profit organizations and initiatives active in the environmental sector, presented a collaborative support letter to the members of parliament for the implementation of the ban on single-use plastic bags, plastic straws and Styrofoam initiated by Member of Parliament Sarah Wescot-Williams.

The organizations active in the environmental sector on St. Maarten would like to urge the members of parliament to vote in favor for the proposed legislation to ban single-use plastics in the upcoming public session of Parliament. Nature Foundations St. Maarten, Green initiatives SXM Collaboration, WasteFactory, Waste2Work Foundation, Environmental Protection in the Caribbean, Freegan Food Foundation, Green SXM, Greenbox, Spaceless Gardens and the St. Maarten Pride Foundation have collaboratively showed their support and are looking forward to hearing about a fruitful continuation to implement the single-use plastic ban.

However, there have been no monitoring conducted by a government department over all these waste minimization and recycling activities as there is no government policy, which regulates the recycling market in the country.

Significant efforts for compost production from biodegradable waste fractions (including PLA) come from Green-SXM in both Dutch part and French part of the island. It is promoting aerated static pile compositing and home composting possibilities. Compost production efforts of Green-SXM by use of PLA is in experimental stage as it requires more advanced facilities. Green-SXM has also a pilot aerated compost facility which is an add-as-you-go pile designed and scaled to process the waste created in a restaurant that serves between 400-500 meals a week. Their intention is to make aerated compost accessible to all in the island. However, it lacks a facility in Dutch part. In addition to Green-SXM efforts for compost production and introducing it to all SXM residents, the landfill operator in French side is producing small amount of compost from wood chips mixing them with municipal sewage sludge, and sell to the market for use in homestead lands as no agricultural activity in both Sint Maarten and French part Saint Martin.

Apart from the composting efforts aforementioned, few resort hotels are producing small amount of compost for their needs.



There are currently no recycling incentives in the country as Sint Maarten has no policy and regulation in force, which arrange the recycling market, and recycling market is totally unregulated. Approximately 11% of the waste generated in the country is recycled in 2009. As mentioned in Chapter 2.8.3, pre-processing and exporting the recyclables in the Caribbean waste market are organized by informal recyclers. The recycled materials collected and exported are mostly composed of metals, electronic waste, car batteries, papers, and plastics. The local recycling market is not interested in collection, pre-processing and selling or exporting of scrap woods, car tires, and recyclable fractions of C/D waste. Over 42% of the recycled material is scrap metals (ferrous and non-ferrous) and car batteries, 9 - 10% of them plastics and electronic scrap, 6-7% paper, and over 40% woods which are internally recycled/reused in the country (see Table 2.16).

Only one beer producer (Caribbean Brewing Company) is working with a local recycler company (Meadowlands) to collect and export the scrap beer bottles from the island. It is also developing a campaign for offering all its clients a rebate for all its empty amber colored bottles towards a purchase on the next case. It also plans to coordinate to locate color-coded containers in some points in the country for both collection of its glass containers and create awareness. However, the company's plans are postponed due to Covid-19 outbreak and limitations.

There is no energy recovery from waste either by WTE or gasification in the Pond Island landfill of Sint Maarten. However, National Recovery and Resilience Plan (NRRP) of Sint Maarten specifically states that long-term waste solutions developed are expected to “support the development of Government's roadmap for sustainable solid waste management”, and the list of anticipated cost elements in NRRP specifically includes waste and debris disposal and WTE facilities. NRRP has included a budget of about US\$ 120 million into the NRRP Sanitation and waste management budget for establishing a WTE in the country. The Government Roadmap to a sustainable waste management in the country also foresees that 40% of the waste could be used as feedstock in a WTE. Thus, Short Term plan for establishing ISWMS of Sint Maarten comprised of establishing a WTE with a capacity of 5 - 5,5 MWh (electricity) as an optional facility that may be planned and established within the short-term plan period (until end of 2026).

However, there is an initiative in French part by Verde Company which is operator of the landfill in French part of the island, to establish a WTE in the capacity to meet the demand initially in French part. Verde also proposes to establish an energy recovery facility for Sint Maarten. The planned facility proposes a four stages treatment process and recovery of energy from the municipal waste, passing RDF prepared through a converter for drying and making it free of pathogens, and feeding the smoldering unit with this RDF, to produce Syngas (Synthetic Fuel Gas) at low temperature (350 ° C) and burning it at 800 ° C, which then feeds a power generation unit (engine, turbine) to generate electricity.

Reportedly known that Verde Company also proposed a similar system to be set up in the area of Philipsburg Port with a capacity of 40 Ktonnes per annum for recovering energy from cruise ship waste. However, these discussions seem to be dropped by the wayside due to COVID-19 implications.



## GAP ANALYSIS & RECOMMENDATIONS

Based on works and studies conducted to date, the consultant team completed a comprehensive assessment of the existing SWM conditions that will serve as the starting point for any improvements required to establish an effective solid waste management system for Sint Maarten in the following summary Tables, which provides summaries of assessments / gaps determined, and recommended solutions. Potential solutions will be defined in detail in the Deliverable 4.1 Report of this TA for SWM Strategy and Action Plan in accord with the defined solutions in this report and Short-Term Plan and Pre-Feasibility Studies previously performed.



| A. TECHNICAL SYSTEMS  |  |  |  |
|---|--|--|--|
| Table 1 Waste Collection  |  |  |  |
| Gaps  | Recommended Measures   |  |  |
|   | <i>Technical</i>   | <i>Managerial</i>  | <i>Implementation</i>  |
| <ul style="list-style-type: none"> <li>- Waste collection system is vested with some lackings in the extent of accountabilities of the parties involved.</li> <li>- Only waste collection system for households, institutions, and area cleaning is regulated.</li> <li>- Waste collection form commercial &amp; industrial premises is unregulated.</li> <li>- An open subscription system is in place for collection and transport of waste from the commercial and industrial waste generators.</li> <li>- Significant amount of C&amp;D waste is collected with the municipal waste.</li> <li>- All waste types collected mixedly, and transport to the Pond Island MSW landfill.</li> <li>- Waste collection system is not arranged in a holistic approach., and not integrated with other components of waste management system.</li> <li>- Informal diversion recyclables by waste collectors.</li> <li>- No public awareness of residential waste generator responsibilities in the waste collection system.</li> <li>- No standardization on number of communal containers, and their locations</li> <li>- Waste accumulations at waste collection and communal container locations.</li> <li>- Increased litter in non-tourist residential areas.</li> <li>- The current waste collection and disposal scheme does not contain any measure or application to provide separate collection of different waste types.</li> <li>- No weighing and recording the waste collected.</li> <li>- EHS measures are not observed within the waste collection scheme,</li> <li>- No policy level support for engagement of CBOs in waste collection.</li> <li>- No policy and program support by waste management authority/government for efforts of CBOs, NGOs, and commercial community for separate collection of waste.</li> </ul> | <ul style="list-style-type: none"> <li>- Conduct collection system mapping in order to enable the dedicated routes and service providers for key waste source categories and the potential for dedicated routes that would address wastes most ideally suited for resource recovery,</li> <li>- Conduct collection route optimization and system configuration analysis according to sector specific best practices, to determine the system needs for urgent improvement;</li> <li>- Analyze the possible locations of the color-coded containers that will be placed at different points as a mid-term measure for separate collection of the recyclables at source;</li> <li>- Conduct emergency measures to collect separately with special measures the hazardous waste (gloves, masks, etc.) sourced from COVID-19 implication.</li> </ul> | <ul style="list-style-type: none"> <li>- Examine and draft suggested improvements to the existing household/institutional and area cleaning waste collection contracts for future contracting;</li> <li>- Examine and draft contracts for commercial waste collectors according to the results of collection routing and system configuration analysis;</li> <li>- Develop and implement comprehensive, transparent, equitable, and inclusive contracting and licensing arrangements for all waste collectors of domestic and commercial wastes, where needed to supplement systems already existing.</li> <li>- Study and recommend improvements to existing waste collection contractual instruments where appropriate;</li> </ul> | <ul style="list-style-type: none"> <li>- Develop Waste Fee Framework and Tariff Study for waste collection and transport/transfer.</li> <li>- Establish a waste collection database, and provide access to the public.</li> <li>- Provide policy support by waste management authority/government for efforts of CBOs, NGOs, and commercial community for separate collection of waste.</li> <li>- Provide policy support for EHS measures in waste collection and transport.</li> </ul> |



| <b>Table 2 Waste Disposal &amp; Treatment</b>  |   |  |   |
|--|---|--|---|
| <b>Gaps</b>  | <b>Recommended Measures</b>   |  |   |
|  | <b>Technical</b>  | <b>Managerial</b>  | <b>Implementation</b>   |
| <ul style="list-style-type: none"> <li>- Absence of land adjacent to the landfill suitable for lateral expansion creates problem for MSW landfill operational life;</li> <li>- Access control is not provided at the entrance of both landfills.</li> <li>- Both landfills are not equipped with a functional weighbridge; so that unknown actual waste tonnage.</li> <li>- No lining at the bottom, no adequately graded slopes in both landfills; so that slopes are very steep.</li> <li>- No adequate compaction and grading equipment; so that no adequate compaction and grading in both landfills.</li> <li>- The waste density of about 800 -850 kg per cubic meter in the landfill indicates spaces that contain no waste inside the waste pile. LFG can easily accumulate in these spaces, and oxygen contact with LFG (mainly methane) triggers deep seated fires or shallow sub-surface fires.</li> <li>- Crevasses, fissures close to slopes suggest that there are unstable areas on the landfill slopes.</li> <li>- No leachate collection, treatment and disposal system also exist in both landfills, all leachate is seeping to water table under the landfill.</li> <li>- No guidance and/or method statements for measuring the performances of the contractors.</li> <li>- Perimeter fence is inadequate.</li> <li>- No EHS measures in place in disposal &amp; pre-treatment activities</li> <li>- No measures on avoiding of env. and social impacts of both landfills' daily operations, and monitoring:                         <ul style="list-style-type: none"> <li>o No traffic control at the intersection of Soualiga road with landfill access roads.</li> <li>o No environmental monitoring on leachate seeping or littering to the Great Salt Pond;</li> <li>o Residential/commercial area adjacent to landfill in south and south-east, which is heavily impacted by daily operation of MSW landfill with dispersing of fugitive dust.</li> <li>o People living in residential and commercial area south and south-east of MSW landfill are under slope failure risks that can cause significant damage.</li> </ul> </li> </ul> | <p>Provide and install a mobile weighbridge for the landfill with a suitable software in order to start recording the waste delivered to the landfill;</p> <p>Conduct a comprehensive geotechnical site investigation in MSW landfill in order to have necessary data on characteristics of the landfill, in order to make correct decisions about the behavior of the landfill waste.</p> <p>Procure the landfill equipment for compaction, spreading, earth moving, excavation and fire suppression;</p> <p>Establish a temporary MRF like waste pre-processing facility (TDSR) to pre-process the accumulated scrap tire, wood waste, scrap glass, and yard waste, in order to reduce the volume of these waste types as those occupy lots of space in the landfill;</p> <p>Procure other TDSR equipment for pre-processing the scrap tire accumulated in MSW landfill, wood waste (wood pallets, scarp woods from Irma debris and C&amp;D waste), yard waste, scrap glass, and removing the debris in IDDS.</p> <p>Start the landfill improvement activities, including fire suppression activities according to requirements of Landfill Improvement PFS;</p> <p>Establish a separate C&amp;D waste handling facility.</p> <p>Establish an Integrated Waste Management Facility (ISWMF) in accordance with PFS, which includes an MRF and optional WTS facility;</p> | <p>Take emergency measures for protecting the residential/commercial community south and southeast of the landfill from the potential slope failure during the landfill operation and improvement activities, including resettlement of the people reside in residential/ commercial area;</p> <p>Take measures for mitigating the environmental and social impacts of daily operation of the landfills, including EHS measures.</p> <p>Do not involve any construction, regrading, or interim capping activity in the landfill before completing a detailed geotechnical site investigation and engineering design based on data obtained from the investigation.</p> <p>Provide budget for removal of debris in Irma landfill and</p> <p>Prepare a guidance that complies with best practice applications and EU regulations for landfill management and closure activities;</p> <p>Develop Waste Fee Framework and Tariff Study for waste disposal and treatment.</p> <p>Developing Software Package for Tracking the Waste.</p> <p>Revenues/Expenditures, and Billing, in order to provide cost recovery.</p> <p>Put in effect a programme and schedule immediately to avoid the hazardous waste disposal into both landfills as a result of COVID-19.</p> | <p>Develop a DBO contract prequalification documents with initial contract performance standards adequate to obtain a shortlist of 3 to 5 qualified consortiums to implement the improvement and operation of the MSW landfill initially during Short-Term Plan period (5-7 years).</p> <p>Hire the Contract to properly improve and operate the MSW landfill initially during Short Term Plan period (5-7 years).</p> <p>Develop a short-term Service Contract Tender Document to implement operational arrangements for the facility for separately handling of C&amp;D waste in another place other than MSW landfill;</p> <p>Hire the Contract to properly operate the C&amp;D waste facility and provide pre-processing of all inert recyclable materials; All works and use of Contractor equipment would be covered under the service agreement.</p> <p>Conduct a tender for hiring a contractor for removal of Irma debris; Haul the separated materials to new C&amp;D waste handling facility area, except the fines and sands that are by-product from this activity; Re-use the fines and sands in the MSW landfill operation.</p> <p>Develop a 20-year DBO contract prequalification documents to implement and operate ISWMF sized to address local municipal wastes only, to be built at a location close to MSW landfill.</p> |



| <b>Table 3 Recycling &amp; Recovery</b>  |   |  |  |
|--|---|--|--|
| <b>Gaps</b>  | <b>Recommended Measures</b>   |  |  |
|  | <b>Technical</b>  | <b>Managerial</b>  | <b>Implementation</b>  |
| <ul style="list-style-type: none"> <li>- All recycling market in Sint Maarten is unregulated by a specific resource conservation and recovery policy or ordinance.</li> <li>- There is no robust enough industrial infrastructure to support a circular economy which revolves around these local recyclers, and also there is no industrial and agricultural base for sustaining material reuse &amp; internal processing of recyclables.</li> <li>- There are no incentives and disincentives officially arranged or government programme on waste prevention, minimization and reuse by government ordinance, although few hotels/resorts, bars and restaurants support the waste minimization efforts,</li> <li>- There is no ban on import and use of single-use plastic containers and bags to the island, although there are civil initiatives by few non-governmental organizations on banning of imports and use of single-use plastic bags and food packaging;</li> <li>- There is no regulation on arrangements of separation at source, and separate collection of the recyclables as well as arranging color-coded recyclable bins in public areas, which are important resource conservation measures.</li> <li>- VROMI, as single waste management authority of the country, has no sufficient trained staff and financial resources to enable to control, manage and/or oversee the recycling market in the country as well as to improve networking between recyclers;</li> <li>- No public education and awareness programmes that are applied by the government or waste management authority (VROMI) on waste management.</li> <li>- No energy recovery from the Waste.</li> </ul> | <p>Based on the needs of the recycling community and availability of markets, develop systems of bring back, buy banks, drop off centers, bring banks, or civic amenity centers, etc., as needed to facilitate and encourage recycling;</p> | <p>Enforce the import of food and other materials that are packed with PLA (bioplastics-Polylactic Acid) to the island, and regulate it by policy and ordinance;</p> <p>Improve networking between recyclers and buyers, and support the recyclers and contractors to improve their success in cost recovery from recycling;</p> <p>Create incentives for waste generators to recycle and also reduce their wastes, and give supports to the current initiatives on waste minimization, reuse and recovery activities, including composting activities;</p> <p>Provide policy support, preparing ordinances for energy recovery from the waste in order to regulate the energy recovery from the waste in the country.</p> <p>Coordinate with the waste collectors to improve their cooperation with the recycling agenda, and</p> <p>Provide public education to children, adults, and commercial establishments on the need for and value of recycling</p> | <p>Recycling market should be centrally regulated, which would be set up by a government institution largely as an organization that does data collection, planning, procurement, and financial management;</p> <p>Create a special unit within current or prospective waste management authority to study marketing activities for recyclables;</p> |



| <b>B. ENABLING SYSTEMS</b>  |  |
|---|--|
| <b>Table 4 Legal / Regulatory</b>   |  |
| <b>Gaps</b>   | <b>Recommended Measures</b>  |
| <ul style="list-style-type: none"> <li>- This year, Sint Maarten drafted a new comprehensive national law, which is significantly more robust than the previous law. AIM TEXAS provided review and comment on this draft law (see Annex 1), through the team Attorney, in October 2019. In summary, the comments suggested Gap Analysis to address of the draft law relative to existing laws and systems, to be sure that they are compatible.</li> <li>- Once the solid waste national law is finalized and enacted, there may need to be some changes in municipal ordinances, where they may exist, to make them fully compatible with the new national law. In any case, the new solid waste law would supersede municipal ordinances or codes.</li> </ul>   | <ol style="list-style-type: none"> <li>1. Define the potential involvement of the private sector as agents of government in meeting service needs;</li> <li>2. Describe issues of social inclusion, labor protection, health, safety and environmental protection; arrange for sustainable financial resources;</li> <li>3. Establish incentives;</li> <li>4. Define disincentives and potential for sanctions under the law.</li> <li>5. Legally organize improved control over waste generator behavior, solid waste collection, including commercial waste collection in addition to domestic waste, recycling, and treatment/disposal;</li> <li>6. Finalize development of a country solid waste law to include, for example:                         <ul style="list-style-type: none"> <li>o govern the behavior of waste generators and waste handlers;</li> </ul> </li> <li>7. Develop related regulations under the solid waste law, and create appropriate institutional arrangements with adequate empowerment and free from conflicts of interest to provide regulatory control and enforcement related to the solid waste system;</li> <li>8. Create legally developed standards and regulations on separate collection of recyclables, pre-processing and processing.</li> </ol> |
| <b>Table 5 Institutional</b>  |  |
| <b>Gaps</b>   | <b>Recommended Measures</b>  |
| <p>The major conflict on institutional and regulatory side is that regulatory and operational body are the same institution – VROMI. Along with this major gap, the following gaps are identified within the current institutional arrangements:</p> <ul style="list-style-type: none"> <li>- VROMI has no sufficient staff for adequately managing the SWM system in the country;</li> <li>- Department of Infrastructure Management (DOIM) of VROMI is not only responsible for solid waste management in the country, but also it is responsible to manage the wastewater system and road networks and related activities, although it has separate, but in insufficient number of staff for SWM;</li> <li>- Therefore, DOIM suffers from lack of staff capacity and capability in overall for SWM.</li> </ul> | <ol style="list-style-type: none"> <li>1. Separate assessment is needed for the capability and capacity of Department of Infrastructure Management (DOIM) of VROMI for management of solid waste system in the Country, and discuss challenges to increase its capacity to achieve the quick-win, emergency and short-term measures;</li> <li>2. Train VROMI staff and Waste Management Operators both in collection and disposal sides;</li> <li>3. Implement the activities on developing the proposed government owned waste management authority (ISWMA), its capacity building activities, and support the government in draft arrangements for institutional set up, and organizational and staffing arrangements.</li> <li>4. Actively examine the creation of a new solid waste authority (ISWMA) that would be fully government owned and operate much like the current electricity authority.</li> <li>5. Create improved staffing within a dedicated government unit or authority – Integrated Solid Waste Management Authority – ISWMA - for all types and activities within the solid waste sector</li> </ol>   |



| <b>Table 6 Financial &amp; Economic</b>   |  |
|---|--|
| <b>Gaps</b>   | <b>Recommended Measures</b>  |
| <ul style="list-style-type: none"> <li>- No tariff set by the government and/or waste management authority (VROMI) for waste management activities in the country, including waste collection disposal (tipping fee);</li> <li>- There are only two direct economic instruments in Sint Maarten, which are:                             <ul style="list-style-type: none"> <li>o User charge for only commercial waste generators, and</li> <li>o Government Subsidy.</li> </ul> </li> <li>- There are also 4 types indirect economic instruments, those are: 1) Environmental fee, 2) Municipal (utility) fee, 3) occupancy tax, and 4) Departure tax.</li> <li>- However, it is unclear that the fund provided by the indirect economic instruments is used for SWM system's cost recovery as Sint Maarten does not have clear financial policies; The fund provided by these instruments is also used for recovering of street lighting and other communal services. This in turn, cause to financial shortage for full cost recovery of SWM services, and no cost recovery could be made secure;</li> <li>- An unregulated open subscription fee collection mechanism exists for the commercial waste generators;</li> <li>- Current economic instruments are far from providing a sustainable cost recovery.</li> <li>- The regulations for revenue providing are not directly related to specific services of solid waste management, and billing system exists;</li> <li>- No revenue is transferred to the waste management budget from the recycling activities;</li> <li>- No full cost accounting approach in the financial policies for solid waste management;</li> <li>- No cost recovery is secured within the current financial model;</li> <li>- The other generalized problems are:                             <ul style="list-style-type: none"> <li>o Insufficient financial resources to cover the SWM cost;</li> <li>o No specific SWM spending and budgeting accounts;</li> <li>o SWM Revenue and Costs are not clearly known;</li> <li>o Absence of a SWM Cost Calculation methodology;</li> <li>o Absence of SWM economic and financial performance Indicators;</li> <li>o Absence or low investment in education &amp; communication and in planning &amp; control;</li> </ul> </li> </ul> | <ol style="list-style-type: none"> <li>1. Examine the potential for tariff bundling in a manner that cross subsidies are appropriately established addressing ability to pay and the principle of polluter pays.</li> <li>2. When conducting cost analysis, all phases must be considered, e.g., collection, transportation, landfilling, illegal dumping, area cleaning, street sweeping, material recycling, composting, administration costs, and public education/social inclusion costs, etc.;</li> <li>3. Distribution of the fund should be clearly stated between the solid waste management components;</li> <li>4. Accountability and transparency in the implementation of SWM programmes should be clearly defined in the relevant regulations;</li> <li>5. Tariffs set should be reviewed in every five (5) years, and updated, if necessary, and willingness-to-pay surveys should be iterated once a 5 year;</li> <li>6. Tariffs should be established by an independent authority;</li> <li>7. All financial reports should be complied with international financing standards;</li> <li>8. Data availability should be provided by ensuring access and updating regularly;</li> <li>9. Budget for development of real-time data for planning, research, policy development should be considered during SWM budget calculation;</li> <li>10. Develop a tariff cost recovery mechanism, tied to the framework of the new solid waste law, to enable improved financial support for collection, recycling, and safe treatment/disposal;</li> <li>11. Develop a fully accountable system for tracking expenses and revenues, consistent with government systems planned or being developed for financial management.</li> <li>12. A tool should be developed to calculate SWM costs, taking into account the financial sustainability and performance indicators;</li> <li>13. Relevant financial regulations should be reviewed and updated in accordance with full-cost accounting principles to support financial mechanisms;</li> <li>14. The fees collected for solid waste management should be kept separate from the funds of other services, and should be used only for the development of the sector;</li> </ol> |



| <b>Table 7 Social Inclusion &amp; Public Awareness</b>  |  |
|---|--|
| <b>Gaps</b>   | <b>Recommended Measures</b>  |
| <ul style="list-style-type: none"> <li>- Lack of public and private cooperation and awareness are serious concerns in Sint Maarten as the government does currently not support them fully (except few of them such as Nature Foundation of SM, and etc.) with a government policy and programme, though few civil initiatives listed above are in keen interest to create a clean community in the country;</li> <li>- Although in order to put in effect the public awareness and social inclusion programmes was set forth in recent government programmes, there is no significant achievements for providing environmental consciousness;</li> <li>- Collaborative efforts between VROMI and CBOs/NGOs in waste management are weak;</li> <li>- However, the community organizations and NGOs, which support the recycling activities and waste management, are collaborate mostly formal private companies and other Ministries;</li> </ul> | <ol style="list-style-type: none"> <li>1. Corporate awareness also needs to be developed, which takes some training and perhaps some incentives.</li> <li>2. Hire staff to be community liaison specialists who conduct public information as part of both the VROMI's waste management staff and the new institutional structure for waste management;</li> <li>3. Provide public education of the changes in the legal and regulatory arrangements and the system for managing waste collection and treatment/disposal, in order to clarify roles and responsibilities of all parties, including all waste generators and informal sector recyclers;</li> <li>4. Create a system for handling and tracking complaints and suggestions, and all related responses;</li> <li>5. VROMI Department of Infrastructure Management (DIOM) should create a website for the public to know all requirements, contact points, system schedules and deliverables, fees, and also see the public licensing and contracting arrangements, and this web site could be handed over to new waste management authority in the future, if it is established;</li> <li>6. Provide public education to children, adults, and commercial establishments on the need for and value of recycling;</li> <li>7. Collaborative efforts of CBOs and NGOs which involve in waste management activities should be supported by the main waste management authority (WMA), and policy support is also needed to be in place in accord with the waste management programmes and strategies prepared and applied by VROMI or new ISWMA.</li> <li>8. Conduct awareness programme to enlighten the public on disposing the contaminated PPE materials at haphazard due to COVID-19.</li> </ol> |

| <b>Table 8 Private Sector Involvement</b>   |  |
|---|--|
| <b>Gaps</b>   | <b>Recommended Measures</b>  |
| <ul style="list-style-type: none"> <li>- Private sector involvement in waste management system is partly organized by VROMI in waste collection and transport part of the SWM system in Sint Maarten;</li> <li>- There is no policy and program support to involved private sector in waste management by the waste management authority (VROMI) or government;</li> <li>- They involve in waste management sector for the sake of having clean Sint Maarten by using some rule of thumbs related to waste management, but they are disconnected to a holistically prepared programme.</li> </ul> | <ul style="list-style-type: none"> <li>- Private sector participation and their activities in solid waste management should be overseen, controlled, and regulated by the government without reducing their involvement;</li> <li>- It should be emphasized, however, that these are potential gains, whose realization depends not only on the quality of the private sector actors available, but on the degree of oversight and control retained by the municipal or regional government responsible for the jurisdiction;</li> </ul> |



| <b>C. PHYSICAL RESOURCES – Table 9</b>   |  |
|--|--|
| Gaps   | Recommended Measures   |
| <p><b>1. Natural Resources</b></p> <ul style="list-style-type: none"> <li>- Land scarcity for expansion of existing facilities.</li> <li>- Scarce soil resources for daily cover and top soil.</li> <li>- scarce raw materials (gravel and rocks for crushed aggregate) for different applications in SWM system facility improvements.</li> <li>- Absence of natural water resources.</li> <li>- Energy dependency of the country to fossil fuels.</li> </ul> <p><b>2. Geographic Positioning</b></p> <ul style="list-style-type: none"> <li>- Natural events which cause frequent extensive destruction in the island such as tropical storms and hurricanes with torrential rains, storm surge, tsunamis, earthquakes due to volcanic activities and plate-tectonics.</li> <li>- These events bring additional burden to overcome by the waste management department and service providers.</li> <li>- No resiliency to overcome the problems caused by the natural events. So that waste management in the island is vulnerable to consequences of the natural events.</li> <li>- Vulnerable to the effects of climate change due to extreme weather events, sea level rise, habitat degradation, etc.</li> <li>- Difficulties to connect to transport grid in Caribbean region and sub-regional marine transport routes.</li> <li>- So that transshipment services are more costly.</li> <li>- Remoteness from global markets also leads to high production and trading costs, limiting investment, competitiveness and the scope for integrating global value chains of pre-processed or processed recyclables.</li> </ul> <p><b>3. Economic Resources</b></p> | <ol style="list-style-type: none"> <li>1. The concept of vulnerability combines the likely physical impacts of the hazard (vulnerability), with the ability to manage or adapt to that event/change (resilience). Achieved disaster resilience to natural events would create early preparedness in the waste management in case the natural events occurred.</li> <li>2. Evidence suggests that regional cooperation is critical in helping the country island handles, transports and manages waste effectively as the island is remarkably remote to the regional waste market. Intra-island and inter-island cooperative agreements would also provide economies of scale on SWM operations, then in turn would support the circular economy.</li> <li>3. Conduct continuous programmes for training the SWM staff of solid waste management department and operators/collectors.</li> <li>4. Effective waste management could help improve human health, reduce the environmental footprint, tackle climate change and boost economic growth and employment in the island.</li> </ol> |



|  |  |
|--|--|
| <ul style="list-style-type: none"><li>- No industrial infrastructure to support the internal recycling, which will support a circular economy in the island.</li><li>- This creates a strong dependency to the regional waste recyclers, and the demand of regional and global recycling market.</li><li>- Small domestic market and a narrow natural resource base result in undiversified economy, limits for achieving economies of scale, and reduced scope for private sector development with attendant impacts on economic growth and job creation in the country.</li><li>- The country's economy is highly open, and thus are quickly and strongly affected by global trade and financial volatility and economic downturns.</li><li>- Infrastructure costs, particularly for sustainable energy, communications and transport, are high in the country.</li><li>- Small scale economy and absence of economies of scale are major impediments for attracting domestic and global capital in SWM investments for exploring waste management techniques other than traditional ones.</li></ul> <p><b>4. Human Resources</b></p> <ul style="list-style-type: none"><li>- Lack of human resources and expertise for SWM in the island is a common concern for other SIDS in Caribbean region.</li><li>- It creates stresses on waste governance as in other SIDS in Lesser Antilles.</li><li>- This situation is an impediment on effective use of the resources dedicated for waste management.</li></ul> |  |
|--|--|



***Abdurrahim Tan***

***Team Leader, on behalf of the Strategy Development Team of Sint Maarten Integrated Solid Waste Management System***

*Aim Texas Trading, LLC  
September 04, 2020*



# CH – 1

## INTRODUCTION



## 1. Introduction

### 1.1 Background

Sint Maarten is an autonomous country within the Kingdom of the Netherlands, and is situated in the northeast Caribbean Sea and relies on tourism as its main industry. The country has a population of 40,614 by January 01, 2018<sup>1</sup>, and enjoys rapid economic growth by receiving the tourists of approximately 1,7 million by 2018<sup>2</sup> from cruise and stay-over arrivals every year while struggling with a weak municipal solid waste (MSW) management system.

According to weighbridge register of MSW landfill in Pond Island from 2009 to 2015, Sint Maarten generates an estimated 128 ths. tonnes per year of waste (about 350 tonnes per day), which is managed by the Ministry of Public Housing, Spatial Planning, Environment and Infrastructure (VROMI). The situation has been exacerbated since the Hurricane Irma hit the island on September 6, 2017 and destructed over 90% of its main infrastructures.

After Hurricane Irma Sint Maarten government accepted the pre-conditions set by Dutch Government for financial support. The Netherlands contracted the International Bank for Reconstruction and Development (the World Bank) as an expert authority on redevelopment to manage the recovery via the “Reconstruction and Resilience Trust Fund” (herein after called the “Trust Fund”), which is comprised of a grant of €470 million. But, according to the National Recovery and Resilience Plan (NRRP) the rebuilding of Sint Maarten would require funding of an estimated US\$ 2.3 billion. The objective of the Netherlands’ support to Sint Maarten’s is to “support the material and non-material reconstruction and recovery of St Maarten wherever necessary, so as to restore vital infrastructure and sustainably boost the country’s resilience to the effects of possible future disasters, natural and otherwise”<sup>3</sup>.

Among other emergency recovery projects<sup>4</sup> that have been planned and currently being implemented, Emergency Debris Management Project with an estimated budget of US\$ 25 million and Long-Term Waste Management Project (this project) with an estimated budget of US\$ 35 million are programmed to be committed.

Accordingly, the World Bank has assigned Aim Texas Trading, LLC to establish an Integrated Solid Waste Management System (ISWMS) in April, 2019 for Sint Maarten.

The goal of this TA is to improve preparedness and develop a longer-term sustainable solution to municipal solid waste management in Sint Maarten. This would cover all forms of general non-hazardous residential, institutional, agricultural and commercial waste, and include normal construction/demolition waste, supporting the design of an Integrated Solid Waste Management (ISWMS) in Sint Maarten, through identifying quick-win solutions and long-term elements needed to develop the roadmap for establishing such a system.

Waste management is now identified as one of the top priorities for the country. The government is keenly interested in establishing an integrated solid waste management system (ISWMS) that optimizes the

<sup>1</sup> See SXM STAT; <http://stat.gov.sx/>

<sup>2</sup> See SXM STAT; <http://stat.gov.sx/>

<sup>3</sup> Interim Report for Sint Maarten Trust Fund, April – November 2018, WBG.

<sup>4</sup> Emergency Recovery Project, Emergency Income Support & Training Project, and Hospital Resilience Preparedness Project, Enterprise Recovery project, and Airport Terminal Reconstruction Project..



holistic life-cycle sustainability of the overall system through the support of improved technical systems, optimized outsourcing, appropriate institutional arrangements, supportive legal/regulatory/policy frameworks, and financially sustainable cost recovery arrangements.

## 1.2 Objective of the Solid Waste Sector Assessment Report

The objective of this sector assessment report is to complete a status quo analysis of the existing SWM system in Sint Maarten to eventually establish an ISWMS and an Action Plan that accomplishes necessary improvements and overcomes current impediments to developing an environmentally sound, cost-effective solid waste management for the Country.

## 1.3 Methodology

This Report presents more than the data from the team's field and interview efforts, coupled with data being collected by others previously and in parallel efforts, and their related extrapolation of this data to create a baseline and projections. It completes and synthesizes contextual information available from legal, institutional, economic, social and financial materials available. As such, this report presents all findings that establish the known baseline conditions of the study area.

The work also involved numerous field visits of the consultant's team members for the data collection efforts, and for gaining deep insights on the project area and waste management system in Sint Maarten.

There are no records on waste statistics in Sint Maarten Department of Statistics (STAT). The consultant has reviewed the data and information, report/studies on waste management and waste statistics for the Sint Maarten, French part of the island (SXM), along with the Caribbean region countries, in order to adequately portray and comprehensively assessment of the waste sector of the country.

The main data source for Information on population, economic conditions and inflation rates, and other statistical information was STAT as well as information and data on tourism including stayover arrivals and cruise arrivals to Sint Maarten.

Most of the data compiled for Pond Island MSW Landfill and Irma Landfill were relied on studies and surveys conducted by VROMI on landfills, and others until now. The main data and information source on existing situation of the landfill was the studies conducted by EE&G consultants within the scope of Emergency Debris Management Project (EDMP), that is managed by National Recovery Program Bureau (NRPB) and World Bank.

The literature review included solid waste market research studies for the island and all Caribbean region on recurrent and capital costs of the solid waste management in small island states and the region, in order to have benchmark figures and adequately compare the costs of SWM services.

Information and data on project area setting are mainly sourced from reviewing of general information publicly published, local press, official statistics, and web sites of the Sint Maarten government departments, including historical information found from different sources, studies and investigations conducted on behalf of VROMI on waste characterization, waste collection and disposal/treatment, landfill operations, spatial development, land use, area zoning and urban development in the last 15 years.



Data and information on institutional and legal issues, structure, and ordinances have been gathered both through interviews with government officials and Sint Maarten laws and regulations collected through internet and directly provided by the government departments, in particular from VROMI.

All information collected and gathered are compared with the information for other islands and countries in the region.

## 1.4 Report Structure

**Chapter 2** gives detailed explanations on background settings of project area with the aspects related to solid waste management.

**Chapter 3** outlines the waste management in the country, determining gaps within the current SWM system, and gives recommendations.

**Chapter 4** assesses legal and regulatory infrastructure with regard to SWM, and determining gaps, and gives the recommendations.

**Chapter 5** assesses the financial and economic infrastructure with regard to SWM, determining gaps, and gives recommendations.

**Chapter 6** analyzes the physical and natural resources of the country with regard to SWM, determining gaps, and gives recommendations.

**Chapter 7** analyzes the social inclusion, public awareness, and private sector involvement in waste management sector in the country, determining gaps, and gives recommendations.

**Chapter 8** concludes the report findings, summarizing the gaps and consultant's recommendations.

**Chapter 9** summarizes the options and activities for effectuating ISWMS of Sint Maarten.

**Annex 1** assesses the legal / regulatory and institutional situation in detail, giving recommendations, and assess the new SWM law drafted recently by VROMI giving recommendations.

**Annex 2** assesses the Extended Producer Responsibility (EPR).

## References



# CH – 2

## BACKGROUND SETTING



## 2. Background Setting

As mentioned earlier Sint Maarten is an Overseas Country that is part of the Kingdom of Netherlands as a part of Netherlands Antilles in the Caribbean Region. Consequently, Sint Maarten are dependent on the Netherlands for matters like foreign policy and defense, but are autonomous to a certain degree with their own parliaments in their internal affairs, international trade, and to establish relations with some international establishments and trade organizations. It, with own constitution, is representative parliamentary democracy organized as unitary state. Its administration consists of the Governor, who represent the Kingdom of the Netherlands.

### 2.1 Project Area Physical Setting

The country shares the same island with French part-Saint Martin with an area called “Collectivity of Saint Martin”. The Sint Maarten occupies the south part of the island. The area of island is 87 sq.km, and divided roughly 60/40 between French Republic (53 sq.km) and Kingdom of Netherlands (34 sq.km). Two parts of the island are roughly equal in population. The division dates to 1648.



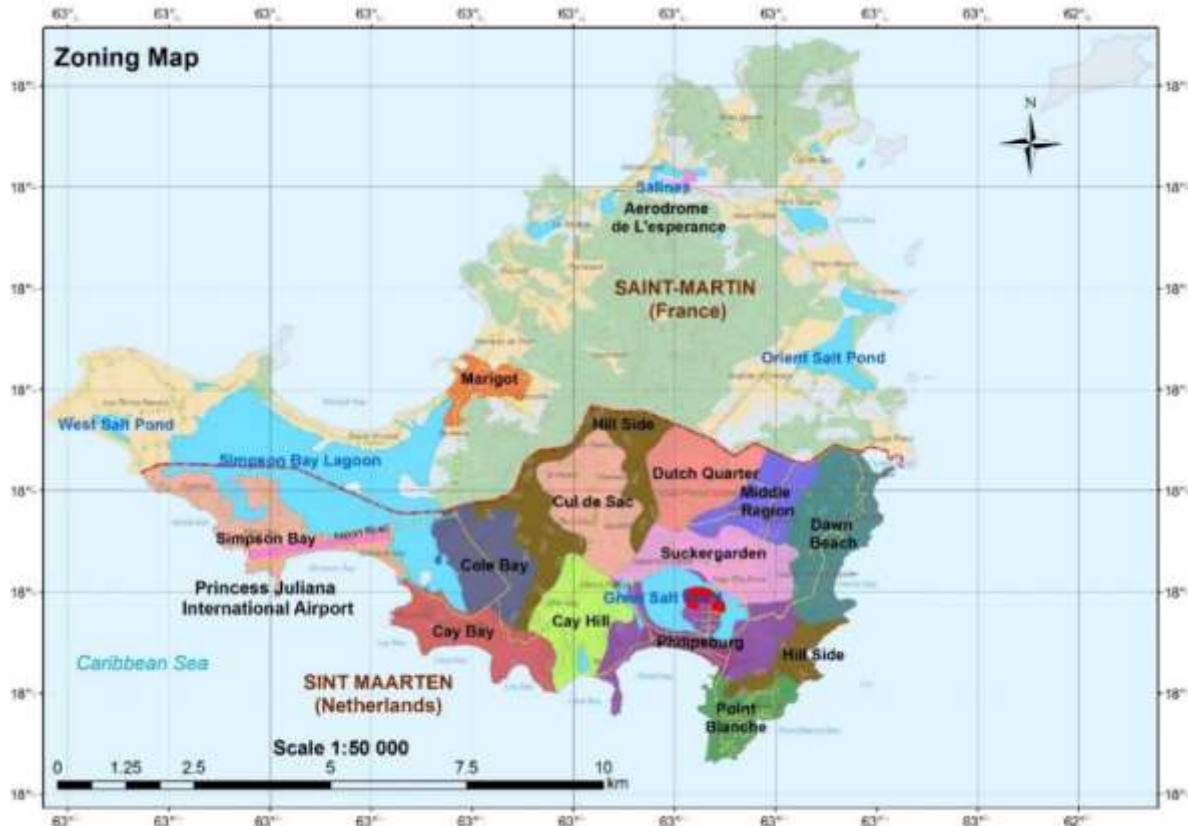
**Figure 2.1: Lesser Antilles & Sint Maarten**

Collectively, the two territories are also known as “St-Martin / St Maarten” and mostly “SXM”, and hereinafter called as “SXM” to refer the Sint Maarten. The capital of Sint Maarten is Philipsburg, and the largest city is Lower Princess Quarter.

Common land use designations that can be found in development plans include residential use, business use, industrial use, recreational use, public facilities, as well as designation of land for environment and nature conservation.

The government of Sint Maarten has developed a draft zoning plan between 2013 and 2016 based on the National Ordinance on spatial development planning, preparing 13 separate zoning plans both for public and private lands.





**Figure 2.2: Zoning Plan of Sint Maarten**

A private individual or a legal entity can be an owner of real estate property in St. Maarten. The owner of real estate property has the absolute right to that property, i.e. the right to freely enjoy and dispose of that particular property.

## 2.2 Demography

The static population (permanent residence) in January 2017 was slightly higher than 40,000, and at the beginning of 2018 it was 40,614. At the same period, 49% of the population was male and 51% was female. The Sint Maarten’s static population density is 1,194 sq.km by 2018. According to the 2011 Census, the population was distributed as follows:

**Table 2.1: Population Density by Zones (Districts)**

| Zone (District)        | Population Density |
|------------------------|--------------------|
| Simpson Bay            | 2.1%               |
| Lower Princes Quarter  | 25.7%              |
| Cul-de-Sac             | 24.4%              |
| Cole Bay               | 21.3%              |
| Little Bay             | 9%                 |
| Upper Princess Quarter | 11.4%              |
| Lowlands               | 1.4%               |
| Philipsburg            | 4.8%               |

Source: AZ STAT (<http://stat.gov.sx/>)



The Figure 2.3 also shows that the permanent residence increased dramatically after 1960 due to up growth of tourism activities and developing of tourism infrastructure. So, the island became one of the islands most visited among the Windward Islands after 1990.

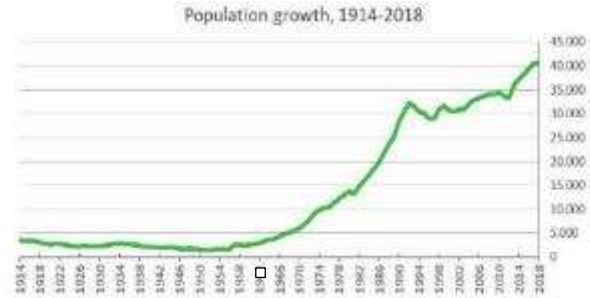


Figure 2.3 Population Growth between 1914 and 2018

The population change from 2017 to 2018 is less than 1.1%<sup>1</sup>. This is largely due to the fact that net migration for 2017 was negative, meaning that more persons emigrated out of St. Maarten than immigrated into St. Maarten. Most immigrants came from the Dominican Republic. Other important sending countries are the Netherlands, France and Jamaica. Most emigrants left to the Netherlands. In the months July and August 280 persons left to the Netherlands. Other important destinations were the other islands of the former Dutch Antilles and the United States of America.

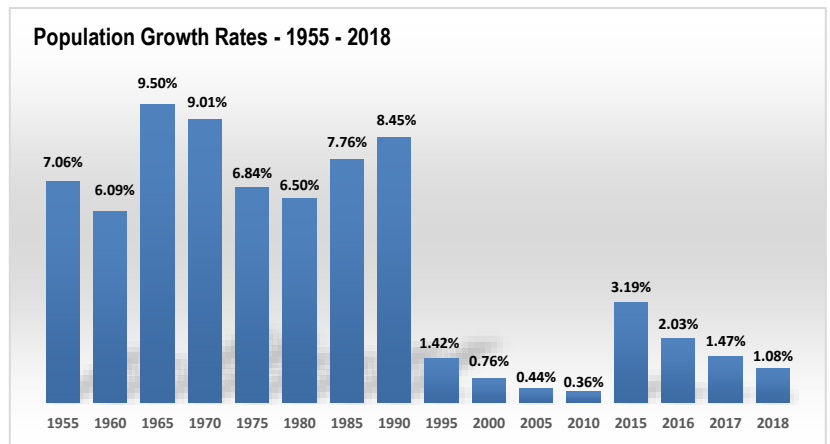


Figure 2.4: Population Growth Trend in Sint Maarten

According to SXM STAT, the number of deaths also fluctuates every year. In 2017, 111 males and 61 females died, an overall total of 172 persons. Of every 1000 inhabitants 4.2 persons died. Because of high life expectancies the number of older persons is rising. This is especially notable for females.

The Figure 2.5 also shows that permanent residence population growth trend in the last 25 years, and stabilization the population growth after 1995.

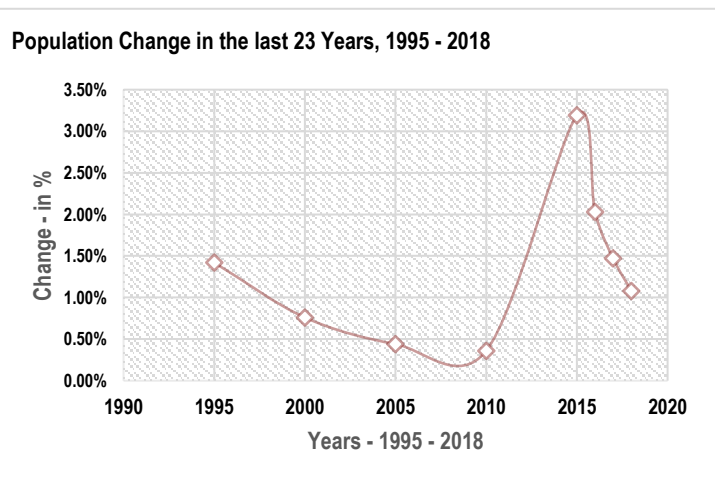


Figure 2.5: Population Change in the last 23 Years, 1995 – 2018

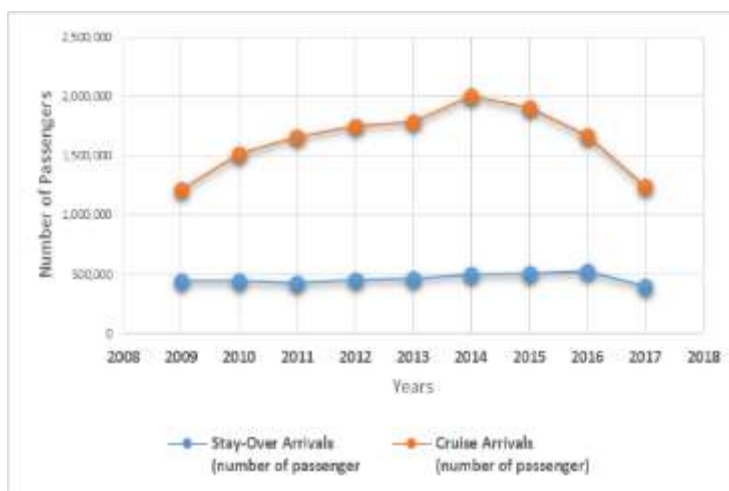
The average population growth rate in the last 23 years is realized 1.34% per year. Therefore, the consultant has accepted an average 1.5% (base case scenario) population growth rate per year for base case scenario will be rationale for Sint Maarten during projections for the next 20 years as this assumption is supported by the scarcity of the land resources of Sint Maarten. The growth rate is assumed as 1.00 for low case

<sup>1</sup> Waste Data Report, Aim Texas, October, 2019.



scenario, and 2.00 for high case scenario. Daily dynamic population of Sint Maarten is much higher than the static population, which affects waste generation significantly in the Country because of the daily excursion organizations of the cruise passengers and stayover tourism.

According to Sint Maarten STAT, stayover tourist population in the first six months of 2018 is 74,474, and number of cruise passengers who visit Sint Maarten in the first two quarters of 2018 is 733,666. The following Figure shows the stay-over and cruise passenger arrival to Sint Maarten in the last 10 years. As seen in the Figure below, both stay-over and cruise arrivals have decreased considerably in 2017 due to Irma Hurricane damages, but, the country seems to reach its touristic potential before Irma in the next couple of years as the number of cruise arrivals have reached to 733k passengers within the first two quarters of 2018.



**Figure 2.6: Stay-Over and Cruise Arrivals (Passengers)**  
(Waste Data Report, Aim Texas, October, 2019)

As there is no uncertainty on the number of tourists both from cruise ships arrivals and stayover arrivals to the country, which is around 2.5 million in any high tourism year when we look at the statistics. This transposes that, with a conservative approach, the contribution of tourist population to the daily dynamic population can only be around 6,000. This figure can also be correlated with the number of hotel and timeshare rooms in the country, which is around 4,115, with an occupancy rate of 70%. This also transposes that the contribution of stayover tourists to the daily dynamic population can only be around 3,000. [Contribution of undocumented residents](#) to the daily dynamic population is obvious in the country, and it may be around 12,000 (following analysis).

**Table 2.2: Estimated Dynamic Daily Population by 2020**

| Indicators  | Dynamic Daily Population |
|---|--------------------------|
| Static population – high case, see Table 2.3  | 42,225                   |
| Contribution from Cruise arrivals (2 million / 365), high tourism                                   | 5,479                    |
| Contribution from Stayover (4117 * 70%), high tourism   | 2,882                    |
| <a href="#">Contribution of undocumented residents</a> (as much as half of the employed population) | 12,000                   |
| <b>Total Daily Dynamic Population</b>   | <b>62,586</b>            |

Source: SXM STAT Statistics and Labor Force Survey, 2019<sup>2</sup>, and Consultant's estimations (Waste Data Report, Oct, 2019).

<sup>2</sup> SXM STAT, *Statistics and Labour Force Survey, 2019*  
([http://stat.gov.sx/downloads/LFS/Results\\_STAT\\_Labour\\_Force\\_Survey\\_2018.pdf](http://stat.gov.sx/downloads/LFS/Results_STAT_Labour_Force_Survey_2018.pdf))



Considering the high number of tourist arrivals by cruise ships and stayover arrivals, significant illegal residents, following static and dynamic population estimation is developed by the consultant.

**Table 2.3: Population Projection, 2020 - 2038**

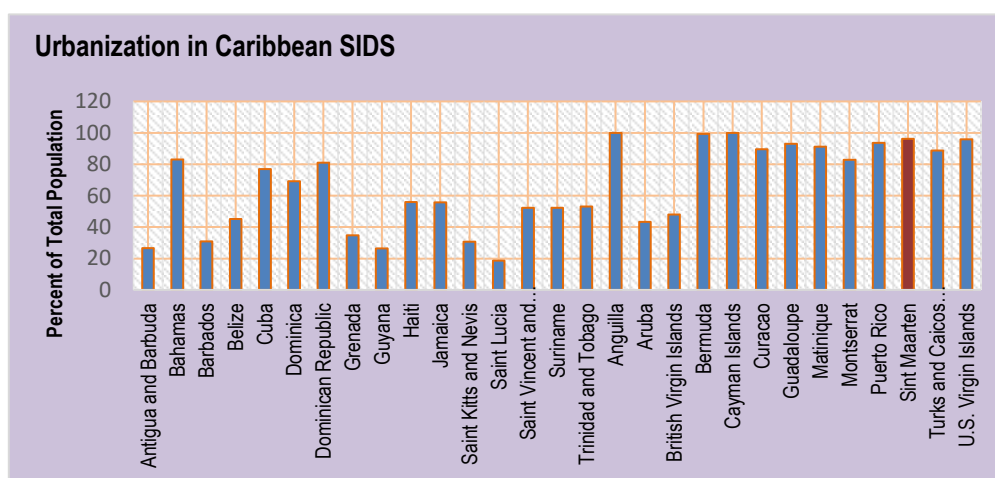
| Years | Base case scenario - GR - 1.5% per year |         | Low case scenario - GR - 1.0% per year |         | High case scenario - GR - 2.0% per year |         |
|-------|---|---------|--|---------|---|---------|
|       | Static                                  | Dynamic | Static                                 | Dynamic | Static                                  | Dynamic |
| 2020  | 41,842                                  | 63,000  | 41,430                                 | 63,000  | 42,255                                  | 63,000  |
| 2025  | 45,075                                  | 67,869  | 43,544                                 | 66,214  | 46,653                                  | 69,557  |
| 2030  | 48,559                                  | 73,114  | 45,765                                 | 69,591  | 51,508                                  | 76,797  |
| 2035  | 52,312                                  | 78,765  | 48,099                                 | 73,141  | 56,869                                  | 84,790  |
| 2038  | 54,701                                  | 82,362  | 49,557                                 | 75,357  | 60,350                                  | 89,980  |

Source: Waste Data Report, Aim Texas, October, 2019.

Employed population consists of 20,850 persons, which is around 51% of the total static population. The male – female split of the Employed population is 53% to 47%, almost half-half.

A majority of the population aged 15 to 74 years on the Dutch Caribbean Islands are in paid work. The labor participation rate is highest on Bonaire (70 percent), followed by St. Maarten and St. Eustatius (both 66 percent) and lowest on Curaçao (53 percent). Employed population consists of 20,850 persons, which is around 51% of the total static population. The male – female split of the Employed population is 53% to 47%, almost half-half.

Urbanization process in Sint Maarten mimics some other Caribbean SIDS which their economies heavily rely on tourism, tourism related activities, and off-shore finance. Few SIDS in Caribbean region are almost completely urban; e.g., Cayman Islands and Anguilla – 100%, and Bermuda 99%; Sint Maarten, Puerto Rico, and US Virgin Islands are urbanized over 94%, and Bahamas 83%, while many have over from 40 to 70% of their population living in rural areas (i.e., Antigua and Barbuda, Barbados, Belize, Grenada, Guyana, Haiti, Jamaica, St. Lucia, St. Vincent and Grenadines, Suriname, Trinidad and Tobago, Aruba, and British Virgin Islands).



**Figure 2.7: Urbanization in Caribbean SIDS**



## 2.3 Socio-economic Setting

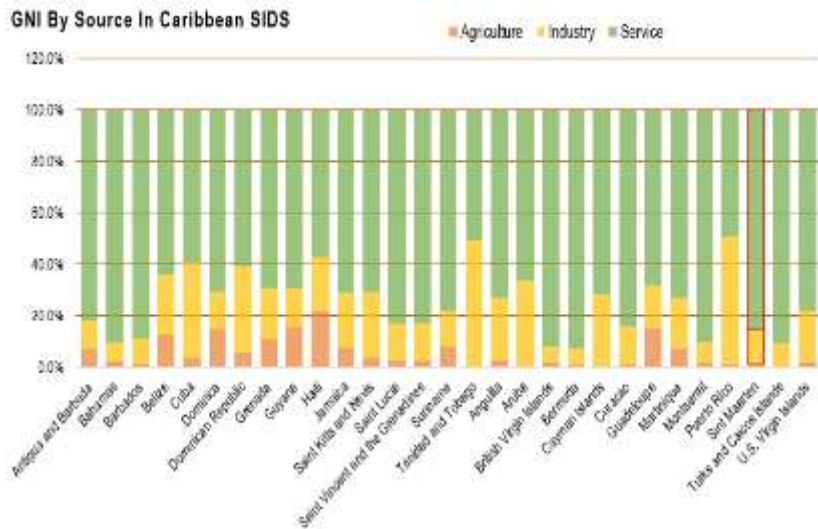
Sint Maarten is classified as high-income country by UN and World Bank with nominal per capita GDP of US\$ 26,500, which is slightly higher than regional average (US\$ 20,000). However, GDP doesn't reflect the true economic capacity of the population. Many of the residents are simply employees in the tourist facilities that are owned offshore and often managed by special staff brought in by the owner. Many of the tourist book packages with hotels and cruise ships, and those bookings are commonly done in other countries, and much of the ownership of the hotels and ships is in other countries, with the income accruing to the companies in those countries. Main economic drivers in the country are:

- Tourism and tourism related activities
- Ports and Airports
- Offshore Finance
- International trade, marine transport, import/export
- Small scale local industries, mostly are light industries, and
- Weak cultural industries

As one of the largest sources of foreign exchange, tourism is a life-blood for the country as in many SIDS' economies in Caribbean region. The tourism sector also has strong linkages with other sectors such as financial services and international commerce and trades.

GNI per capita in the country is around US\$ 29,002, which is almost 50% higher than the regional average (US\$ 19,322). Only 14% of GNI is sourced from industry in Sint Maarten, and 85% form service sector.

This creates a very strong fragility on the country's economy, and high dependency to international market. From this perspective the country's economy is more vulnerable to economic shocks and natural hazards than the continental countries and some SIDS and OCTs in Caribbean region such as Dominican Republic, Haiti, Trinidad and Tobago, Cuba, Belize, Aruba, Puerto Rico, Guadeloupe, Grenada, and Guyana, see following Figure. The increased frequency and intensity of the storm events that may result from climate change will also have effects on both the economy and the environment of Sint Maarten as seen in the periods after Hurricanes and during COVID-19 outbreak.



**Figure 2.8: GNI by Source in Caribbean SIDS**  
(Aim Texas, Regional Waste Market Review Report, June, 2020)

The nominal per capita GDP in Sint Maarten is slightly higher than regional average.



Openness and high trade dependence of the country is one of the most important factors, which poses a challenge to waste management. In addition to growing rates of solid waste generation per capita, stop-over tourists are reported to generate at least twice the amount of waste as local residents, while cruise ship passengers generate up to four times the amount generated by local residents.

Before the hurricanes there were a total of 4,115 hotel and timeshare rooms on the Dutch side.

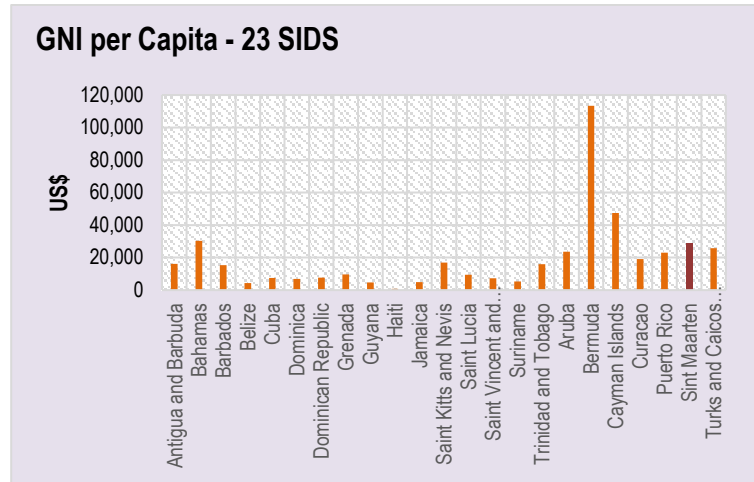


Figure 2.9: Comparison of Per Capita GNI in Sint Maarten

As of October 2018, the occupancy rate approached 65 percent in the first half of 2019. Damages to the main airport and hotels have significantly reduced the number of overnight tourist arrivals and the airport is running at 60 percent throughput of the pre-hurricane levels (for both landing slots and passenger throughput) in the first half of 2019, though cruise arrivals are now resuming to pre-hurricane levels. However, the island and the similar SIDS in Caribbean Region are experiencing second economic shock after Hurricane Irma with COVID-19 outbreak and limitations applied since March, 2020.

There is no agricultural activity in the island. It remained the most important economic activity until around 1960. Many areas in the valleys, which have historically been used for agriculture, have recently been released for housing construction. More recently, construction projects have been encroaching on the remaining mountain forest.

In the absence of a national poverty line for Sint Maarten, a UNDP benchmark for poverty based on minimum wage<sup>3</sup> indicates that 26.87 percent of households (approximately 3,762 households) are poor and live on revenues at or below the minimum wage (NAF 1.530.53 or approximately US\$850 per month in 2017). Although little is known about the distribution of disaster impacts and their effect on vulnerable groups in Sint Maarten, international experience indicates that the poorest and most vulnerable groups are likely disproportionately affected by the disaster, including Sint Maarten’s large number of female-headed households (38.7 percent of all households), who depend on the income of women post hurricane.

The 12-month average of consumer prices in October 2017 is 1.9%. This represents an increase of 2.0 percent when compared to average prices in the same period.

There is only one international airport (Princess Juliana International Airport - PJIA) in the Island. It is located on the Sint Maarten side, and viewed as a major contributor to the Sint Maarten economy. In 2014 the airport and its users accounted for 60% of Sint Maarten’s GDP and 52% of total employment. The airport itself had revenues over USD 59 million in 2014. Yearly average passenger capacity of PJIA is around 1.8 million passengers.

<sup>3</sup> Developed by UNDP in 2015.



Sint Maarten Harbor Group of Companies, a government-owned group of 12 companies responsible for most of the island's maritime activities. The Group operates and has responsibility for the Dr. A.C. Wathey Cruise & Cargo Facility at Point Blanche, the Harbor Pointe Village, the Captain Hodge Pier in Philipsburg, the fuel station at Great Bay and the Simpson Bay Lagoon Authority, which is responsible for the Simpson Bay Bridge. The Group has diversified its activities into real estate ownership and port consultancy as well as owning and operating the port's two mobile harbor cranes.

The cruise port now accommodates six cruise ships through its two piers, with the terminal handling anything from 6,000 to more than 20,000 passengers in a single day. The cruise port also has a cruise village for this purpose. The cruise industry in Sint Maarten is one of the fastest growing sector, but not uniformly seasonal.

Sint Maarten's cargo handling facilities have grown with the shipping lines calling at the island and it was a natural progression to expand the existing quay. The Captain David Cargo Quay was extended from 270 to 540 meters in 2009 and protection from the sea was achieved with a new breakwater at the southern end of the quay.

The Cruise Port has no appropriate waste receiving facility which meets the MARPOL's requirements for accepting the waste from the cruise ships. However, waste oil and black water removal and glass recycling services are available in the port<sup>4</sup>. At a regional scale the Port of Philipsburg is a service port which connects with both intra-regional hub-ports as well as other service ports in the region, and global hub-ports in Caribbean region.

However, the port of Philipsburg in Sint Maarten is a transshipment hub for CMA-CGM. As OECS ports are looking to add cargo, the transshipment volumes in Philipsburg are a target<sup>5</sup>.

The N.V. GEBE<sup>6</sup> is officially owned by the Government of Sint Maarten, which is responsible for electricity generation and distribution in the country. The approximately 20,000 customers of N.V. GEBE are as an average consuming around 1,500 kWh monthly, which is one of the highest consumption figures in the region. When looking at the average peak demand of around 50 MW during the weekdays the average peak is 3 kW per customer, the average load at the evening hours is 43 MW, which is 2.5 kW per customer.

N.V. GEBE has 3 categories of customers: domestic, commercial and large consumers: the average electricity bill for domestic consumers is  $\pm$  USD 200 per month per household. The electricity at N.V. GEBE is produced by diesel-generator sets by use of mainly fossil fuel, using mainly Heavy Fuel Oil (HFO). The GEBE power plant is located in Cay Bay.

The N.V. GEBE is also single provider for drinking water to all Sint Maarten through its desalination plants from sea water in Cay Bay, Point Blanche and Lowlands with reverse osmosis water plants to meet the daily demands of water consumption in the country.

<sup>4</sup> Sint Maarten Harbour Group of Companies publication, 2012.

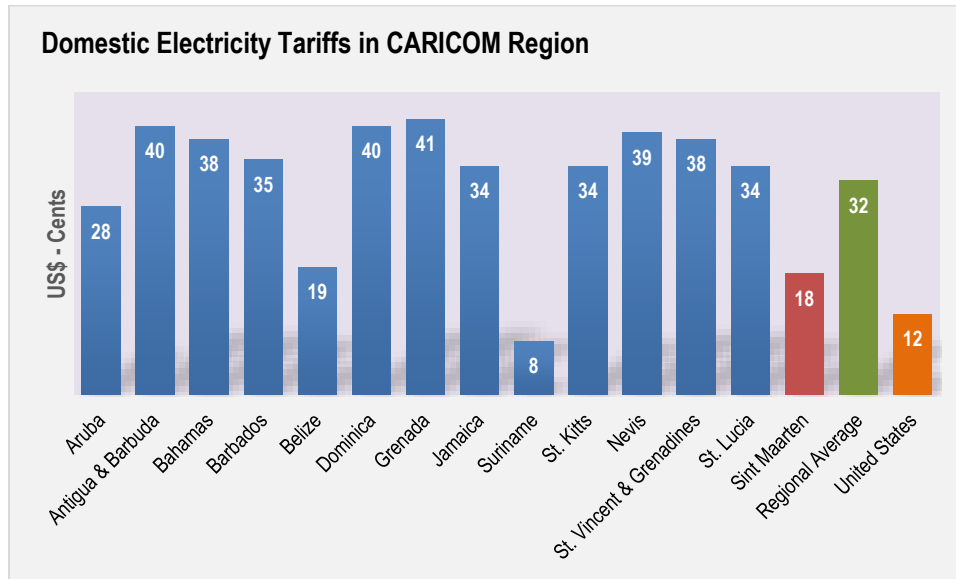
<sup>5</sup> Caribbean Ports Services Industry, Towards the Efficiency Frontier, CDB, 2019.

<sup>6</sup> Gemeenschappelijk Elektriciteitsbedrijf Bovenwindse Eilanden (GEBE)



Energy challenges constrain sustainable economic development in Sint Maarten as in most Caribbean SIDS as the country heavily depends on imported fossil fuels. However, the government is aware of importance of identifying energy-system resilience and renewable energy deployment as the key goals in energy transition, and this issue has already taken the first place in energy policy of Sint Maarten as CARICOM has set a regional target of 47% renewable energy contribution to total electricity generation by 2027.

While regional average of domestic electricity tariffs is around US\$ 0.32 in CARICOM region, it is US\$ 0.18 in Sint Maarten. The following Figure compares the electricity tariffs in the CARICOM region.



**Figure 2.10: Domestic Electricity Tariffs – United States and 13 CARICOM Countries – US\$**

(Based on Consultant’s own investigation and IMF Working Paper, No. WP/16/53. Washington, D.C., International Monetary Fund (IMF), 2016.)

### 2.3.1 Major Industries in Sint Maarten

Apart from GEBE power plant, the major light industries in Sint Maarten primarily focused on rum and beer production and fish products. There are three rum, three brewery factories, and one water distilling and bottling company which also produces sparkling water. Yacht repair and maintenance firms also take important place in industrial activities in Sint Maarten.

**Table 2.4: Major Light Industrial Companies in Sint Maarten**

| Companies                 | Productions                |
|---------------------------|----------------------------|
| Caribbean Brewing Company | Beer production since 2019 |
| SXM Beer                  | Beer Production since 1996 |
| Pelikan Brewery           | Beer Production since 2017 |
| Topper’s Rhum Distillery  | Rhum Production since 2008 |
| Sint Maarten Guavaberry   | Rhum Production            |



|   |  |
|---|--|
| Sint Maarten Distillery                 | Rhum Production  |
| Heavenly Water                          | Distilled Water, Sparkling Water                                       |
| Sint Maarten Concrete                   | Crushed Material and Batching Concrete production                      |
| FKG - Yacht rigging, marine fabricating | Yacht Repair, rebuild, and manufacture new parts, rigging and redesign |
| Ship XM Boat Repair                     | Catamaran, Yacht and Boat Repair                                       |
| IMM                                     | Yacht refit and repair   |
| Polypat Caraibs                         | Boat Repair Maintenance  |
| Sint Maarten Shipyard N.V.              | Yacht refit and repair   |
| Maintec                                 | Yacht refit and repair   |
| J. M. C. Marina & Boatyard              | Yacht refit and repair   |
| Bobby's Airport Road Shipyard           | Yacht refit and repair   |
| Mega Yard                               | Yacht refit and repair   |

Few very small-scale chocolates producers also exist, however, they are importing the chocolate bars mostly from Grenada and Trinidad & Tobago as there is no cacao plantation and bid size chocolate bar producer from cacao beans in the country. Activities in cultural industry are also very weak. They are made up few small workshops.

## 2.4 Legal/Regulatory and Institutional Setting

The summary assessment on legal/regulatory and institutional settings in the country is given in the following chapters, and detailed assessment and comments are given in Annex 1.

### 2.4.1 Legal/Regulatory Setting

The legal base of Saint Martin Island is complicated by its history. For Sint Maarten, there was a history of Dutch civil law with some influence of English common law. The Dutch monarch appoints the Joint Court judges that serve the earlier noted Netherlands Antilles islands, with appeals presented to the Supreme Court at Hague. It is a parliamentary democracy under the constitutional monarchy of the Kingdom. On the other hand, as a country, it appears to be free to create its own laws in keeping with its constitution. On the French part of the island, French law applies, as well as the umbrella laws and regulations of the European Union. The approaches, siting criteria, design and operating standards vary widely, depending on which legal context applies if the country works alone, and becomes more complex if it collaborates with the very different legal framework of the French part of the island. There is no comprehensive solid waste institutional arrangement or regulatory framework at the moment, but the government is aware of this need and has expressed its desire to address it within their SWM Roadmap. Some norms from pre-independence time are still being used and there are piecemeal decrees to address some needs, as well as a draft environmental policy.



However, VROMI has organized recently to be prepared a new draft waste ordinance. It is currently circulated for comments and revisions. The consultant's comments and recommendations for re-arranging the law are presented in Annex 1.

Although Sint Maarten is not bound to comply with solid waste regulation in the European Union, it is generally required to comply with treaties that Netherlands enters into. MARPOL and the Basel Convention on the Transboundary Movement of Wastes are particularly relevant.

MARPOL Annex V covers all wastes from ship...any kind and size of ships. It has been in force since 1988. It prohibits discharge of waste to the sea, except for certain allowable releases of food wastes in some waters, cleaning fluids and animal carcasses. For the success of the protocol, ports are expected to provide facilities to safely off-load and dispose of ship wastes.

The Basel Convention controls movement of wastes and makes special arrangements for how hazardous wastes shall be handled along with related manifest systems. How the Basel Convention relates to movement of wastes within the French side of the island and its home country of France warrants some review, and how movement is allowed within the European Union for wastes, as well as related recyclables and recovered resources from wastes. The unique differences between the independent country of Sint Maarten and the French side of the island, especially with the very open borders between the two, require some careful examination.

The Hong Kong International Convention adopted in 2009 requires that ships being salvaged or recycled following their operational life have all potentially hazardous materials properly handled to not pose any risk to workers or adverse impacts to the environment. Also, all ships are to have emergency preparedness procedures, training, and plans to avoid incidents, including fires and spills.

Aside from the abovementioned international treaties that are obligatory as a member of the Kingdom of the Netherlands, the international airport is obligated to follow the international civil aviation organization's standards. One aspect of these standards requires the management of waste so that it does not encourage bird strike within the aerodrome or wildlife on the runway.

## 2.4.2 Institutional Setting

There is no separate Waste Management Authority (WMA) established specifically for waste management in Sint Maarten. Solid waste collection and disposal operations are under the management of Ministry of Public Housing, Spatial Planning, Environment and Infrastructure (VROMI), which also handles infrastructure planning and development.

Environmental permits issuance and enforcement in spatial development and environment are under responsibility of VROMI, it also provides environmental control on solid waste management activities<sup>7</sup>.

Ministry of Health is responsible for regulating and overseeing the medical waste. Social issues are under the management of Ministry of Public Health and Social Development and Labor (VSA), which handles social development, labor, social inclusion and health.

VROMI outsources all SWM activities with open tenders to the contractors. The procedures and jurisdictional areas of collection contractors are given in Chapter 3. However, VROMI reports that only five

<sup>7</sup> <http://www.sintmaartengov.org/government/VROMI/Pages/About.aspx>



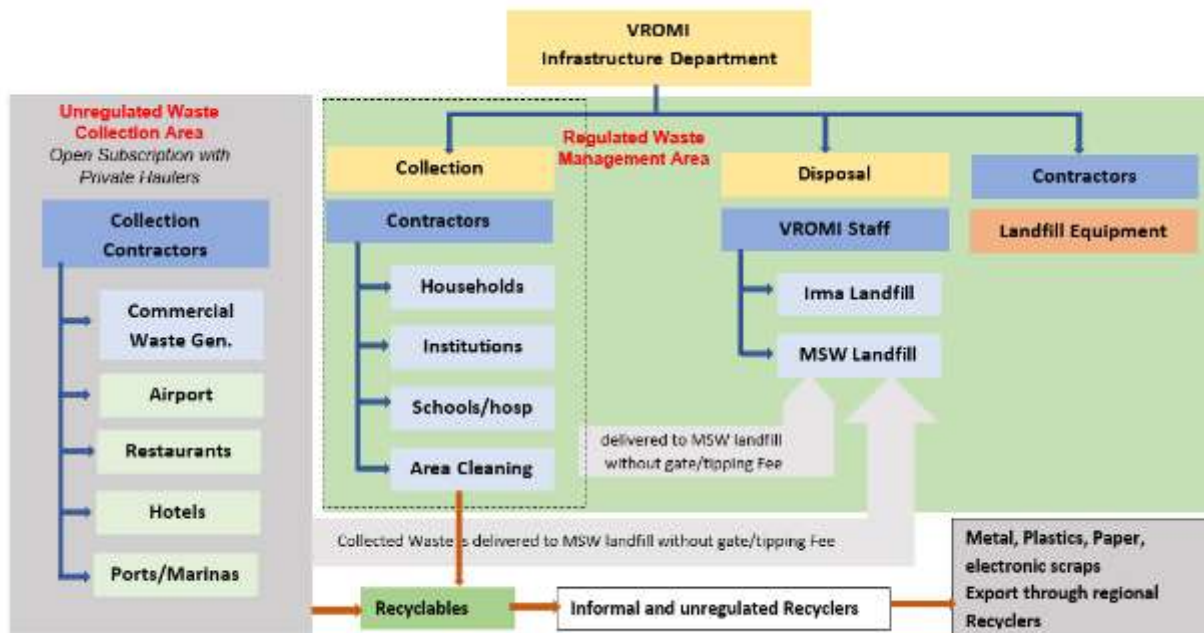
contractors are currently giving services for household and institutions (government departments and schools), and partly commercial waste collection and transport.

Wastes from commercial enterprises and ships are not handled by government, and open subscription between the waste generators and private haulers is unregulated.

VROMI also operates the landfills with its own staff, however, all machineries and equipment used in the landfills are hired from contractors with rates set by government.

The government is also conducting studies for future disposal and treatment. For purposes of the financial support from external entities for emergency response to the Hurricane Irma disaster, a special government body called the National Recovery Program Bureau (NRPB) reports directly to the office of the Prime Minister. The NRPB coordinates the government agencies and also arranges for the accountable, transparent management of the procurements and actions financed for the recovery activities. [See following Chapter.](#)

The following Figure shows the current waste management system in the Country.



**Figure 2.11: Sint Maarten Current Waste Management System**

However, within the current waste management system, VROMI is not able to control the SWM system wholly because it does not have sufficient resources such as budget, human resource and legal infrastructure. Therefore, SWM components of collection/transport and disposal as well as recycling activities remain uncontrolled. The current system does also not support to secure the full-cost recovery of SWM operations.

Although there is no comprehensive solid waste institutional arrangement or regulatory framework at the moment in Sint Maarten, the government is aware of this need and has expressed its desire to address it



within their SWM Roadmap. Some norms from pre-independence time are still being used and there are piecemeal decrees to address some needs, as well as a draft environmental policy.

### 2.4.3 Disaster Risk Management Context

On the 6th of September 2017, a category 5+ hurricane hit the Caribbean region including Sint Maarten. It started on the 30th of August 2017, when a tropical storm developed into a hurricane nearby the Republic of Cabo Verde, an archipelago within the central Atlantic Ocean. This hurricane (named Irma) progressed rapidly after one day into a category three hurricane and later into a category five hurricane on the 4th of September. Two days later, on the 6th, Irma reached Antigua and Barbuda and later that day it reached the island of Sint Maarten, causing tremendous damage.

Transportation to, from and on the island was hard due to the severely damaged infrastructure. Communication to and from the island was difficult due to the fact that communication networks were badly damaged and could not be used anymore. Only after a few days after Irma passed, communication networks started to operate again. It then became more clear what damage Irma has made on St. Maarten. Over 70% of the infrastructure had been destroyed on the southern Dutch side.

It was estimated that the total damage caused by Irma was around 65 billion US dollars (Daniell et al., 2017) of which around 2.7 billion US dollars was the estimated amount on St. Maarten (Government of St. Maarten, 2018). Over 90% of housing was damaged of which around one third was completely destroyed (Netherlands Red Cross, 2017).

Although several precautions were made in order to limit the amount of damage done, it was still immense. Examples of these precautions were sending out radio messages in order to warn the inhabitants for the approaching hurricane and to warn them to make sure that they would have a food supply in the homes, or certain awareness campaigns aiming at again warning the population. Certain preparations start from the beginning of each hurricane season (June).

### Disaster Governance

Sint Maarten's disaster management plan was designed to provide both a technical and organizational plan which could deal with the first recovery processes of multiple disaster events in an efficient way. It has been created as a reaction to hurricane Luis, as the previous system in place did not function during the preparation and aftermath phases. The plan was constructed for the entire Netherlands Antilles between 1995 and 2000 and adapted locally if necessary.

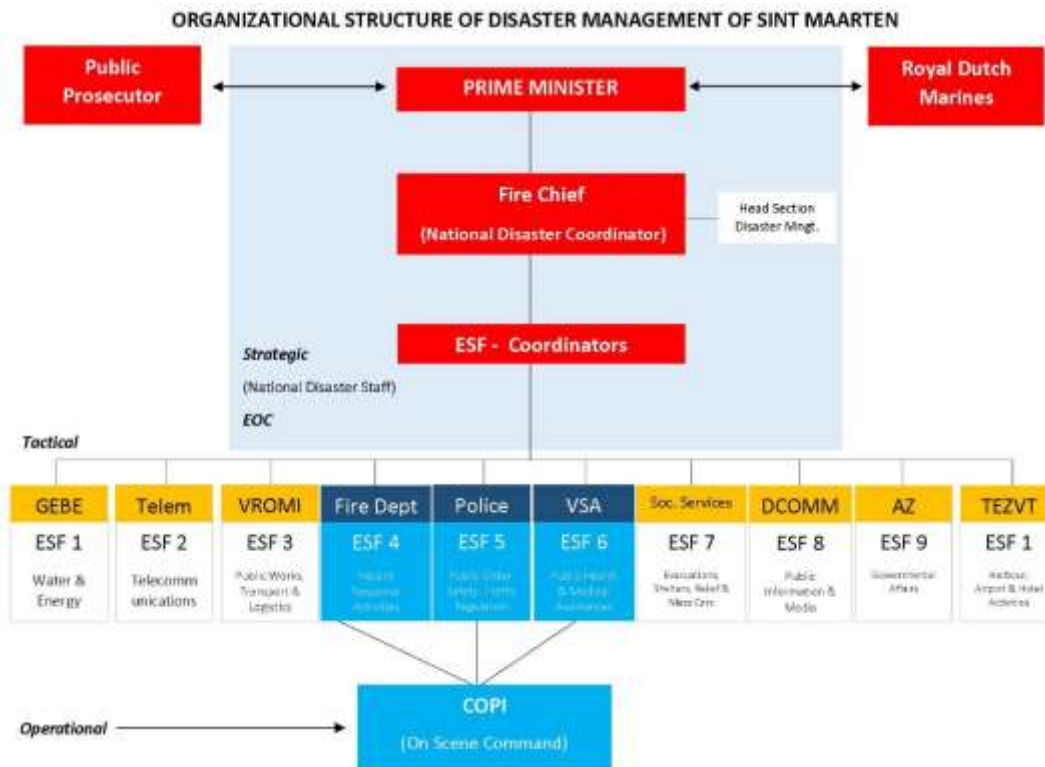
The disaster plan is an organizational plan, in which in a general sense is indicated how in the case of a disaster or a threatening disaster should be acted in order to generate an effective response to the disaster or major accident and its consequences, or to even prevent a disaster. In this plan the focus is not on the aspects regarding the technical implementation, but on the administrative, organizational and coordinating aspects when combatting a disaster.

It thus provides an organizational plan on how Sint Maarten should prepare for and respond to a possible disaster, see following Figure. The PM has the supreme command and is both responsible for the cohesion between the different actions plans present within the different Emergency Support Function (ESF) groups and for the training of the staff members involved in the disaster management process.



As indicated in the following Figure, the different ESFs form the tactical level of the disaster management plan. There is however also an operational level within the structure. This consists of three ESFs; the Fire Department, Police Department and the Ministry of Public Health, Social Development and Labor. These three ESFs are together forming the COPI (in Dutch Commando Plaats Incident) and they are responsible; for carrying on-site operational management regarding the response to the disaster or major accident; coordination of the deployment of the control units in the immediate vicinity of the accident; taking measures aimed at preventing and limiting victims at the scene of the incident/disaster; providing assistance to victims; and providing information regarding the response to the disaster or major accident. Thus, the COPI is responsible for operationalizing the disaster management practices in the case of a disaster or major accident.

The development of this organizational structure could thus be identified as the development of a security apparatus, aiming at focusing on relief and recovery after a disaster.



**Figure 2.12: Organizational Structure of Disaster Management of Sint Maarten**  
(Government of Sint Maarten, 2018)



## **Response After IRMA**

### **First Emergency Response**

The first emergency response to assist the inhabitants was not very structured and there were quite a few issues which hindered this process. One of them was that due to the hurricane all communication measurements were destroyed, and the electricity network was down as well, which resulted in communication from and to the island being very limited and difficult. This because the airport and harbour were severely damaged and were not fully ready for usage for a couple of days. The landing strip and terminals of the airport were completely destroyed and the same happened to the harbour as most of the cranes were severely damaged, resulting in not being operational to support the first incoming emergency aid.

To tackle these issues the priority of the Dutch Army was at that time to help reconstruct critical infrastructure, to make sure humanitarian aid could reach the island. This was especially of importance shortly after Irma, as many people had started looting from stores. Even stores which were not damaged during the hurricane were damaged afterwards due to looting.

Another organization providing first emergency aid directly after Irma was the St. Maarten department of the Dutch Red Cross. As stated previously, they prepared their volunteers for Irma and made sure that they could go out straight after it has passed. Next to the Red Cross, other organizations such as Cordaid, Samaritan Purse, Caritas International, UNICEF, United Nations and K1 Britannia provided emergency aid and assistance.

However well meaning, certain issues arose, as there was a lack of coordination between the local government and these organizations.

### **National Recovery Plan**

Shortly after Irma (14th of September) a workgroup has been formed for establishing A National Recovery Plan (NRP). The workgroup produced an interim report focusing on a plan of approach regarding the rebuilding and recovery of St. Maarten. Within this report an analysis was made of the economic impact and actions required for the recovery of the communities and economy.

The NRP estimated that the budget of the government would have a shortfall, and this would be catastrophic for the funds needed for the recovery processes necessary to restore and rebuild the island again, especially as the estimated total damage was around US\$2.7 billion (Government of Sint Maarten, 2018).

As a response to help and speed up the recovery on Sint Maarten the Dutch government made available a budget of €550 million. Of this budget seven million was made available to finance projects in the first phase of the recovery. These projects were executed by local and international organizations such as the United Nations Development Program, the Red Cross and UNICEF.



## Long Term Response

As a response to Irma the Dutch Government made available a budget of €470 million to assist Sint Maarten. The Dutch Government however posed two conditions to which the Sint Maarten Government had to agree in order to receive the trust fund. These two conditions were the following:

1. The establishment of an anti-corruption body for the supervision of the integrity of the government. This with the goal of promoting the transparency and reliability of public administration;
2. The Dutch Government (Dutch Royal Marechaussee and the Dutch Douane) would take over the border control on Sint Maarten. This in order to regulate the criminality and migration issues regarding the border control.

Simultaneously the Netherlands started negotiating with the World Bank if they could be able to play a role within the rebuilding processes on Sint Maarten. The agreement between the Netherlands, Sint Maarten and the World Bank was signed on the 16th of April, 2018. This agreement entailed that the World Bank would administer the trust fund and will execute projects, and that the Sint Maarten government will also submit projects to the World Bank. A steering committee, consisting of representatives of the World Bank, Sint Maarten and the Netherlands, would decide in consensus if these projects will be executed.

The World Bank also provided their expertise regarding the rebuilding and recovery processes, even before the actual grand agreement was signed. This knowledge was used, together with the expertise of the employees of the Sint Maarten government, to develop a National Recovery and Resilience Plan (NRRP). According to the National Recovery and Resilience Plan (NRRP) the rebuilding of Sint Maarten would require funding of an estimated US\$ 2.3 billion. The objective of the Netherlands' support to Sint Maarten is to "support the material and non-material reconstruction and recovery of St Maarten wherever necessary, so as to restore vital infrastructure and sustainably boost the country's resilience to the effects of possible future disasters, natural and otherwise"<sup>8</sup>. The guiding principles of the Trust Fund Use are set out by the Netherlands in the Appendix of the Administration Agreement.

As of November 30, 2018, the Netherlands has transferred at total of US\$305.7 million (EUR 262 million equivalent) to the Trust Fund. The first tranche of US\$134.4 million (EUR 112 million equivalent) was received on April 27, 2018 and the second tranche of US\$175 million (EUR 150 million equivalent) was received on November 5, 2018. By end December 2018, US\$162.7 million or 53% of the transferred resources are expected to be approved for projects in Sint Maarten<sup>5</sup>. Among other emergency recovery projects<sup>9</sup> that have been planned and currently being implemented, Emergency Debris Management Project with an estimated budget of US\$ 25 million and Long-Term Waste Management Project (this project) with an estimated budget of US\$ 35 million are programmed to be committed.

This Interim Recovery Committee (IRC) is focusing on issues such as project management, the financial state, and the legal status all in order to make sure that the current different activities and projects are executed 'smoothly'. It can therefore be seen as a sort of 'intermediary' between the ministries and the World Bank, focusing on facilitating the collaboration between the two. The IRC consisted of eight to ten

<sup>8</sup> Interim Report for Sint Maarten Trust Fund, April – November 2018, WBG.

<sup>9</sup> Emergency Recovery Project, Emergency Income Support & Training Project, and Hospital Resilience Preparedness Project, Enterprise Recovery project, and Airport Terminal Reconstruction Project..



different members, who previously worked for different ministries, and it eventually developed itself into a National Recovery Program Bureau (NRPB). See following Figure.

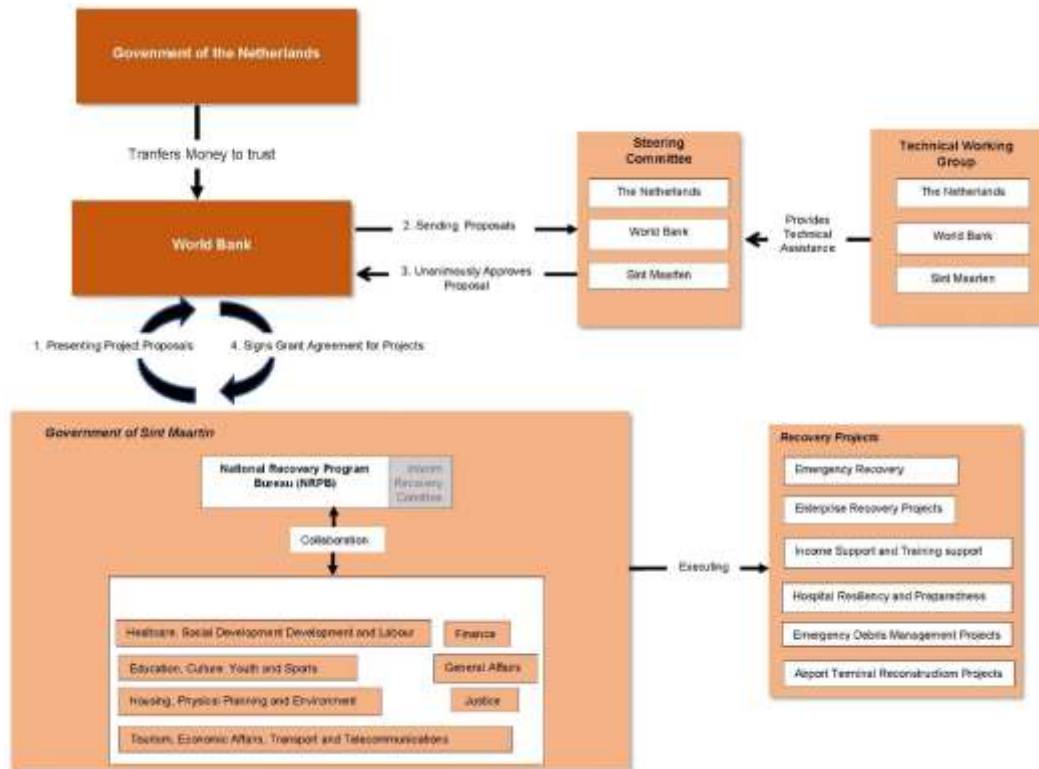


Figure 2.13: Trust Fund Governance Structure

## 2.5 Financial Setting

Currently, as VROMI is the responsible government body from the solid waste services and management of the Pond Island Landfills (MSW and Irma), the reports reviewed included the operational expenditure budget of VROMI. The Ministry plan 2015 – 2018 shows that the finances needed to realize the strategic objectives of the Ministry are secured from various sources. The national budget of the Government of Sint Maarten allocates funds to the various ministries and organizational units as Operational Expenditure Budget to be used for recurring expenses, and as Capital Investment Budget to be used for larger scale 'one-time' project investments.

The national budget 2018 of Sint Maarten had a deficit of ANG 197 million (US\$ 110 million) and had a capital investment of ANG 22 million (US\$ 12 million).

According to current VROMI Ministry plans, capital investments are realized through the support of External Donor Funding, which can comprise local donors as well as international donors.

A governing program has been developed by the government in 2018. The goal of the government is to act swiftly to improve the quality of life for the people, rebuild a vibrant economy, restore a robust social fabric and promote a resilient sense of community. This governing program addresses the economic and



infrastructural reality that the Country is facing. It reflects the objectives and plans of the government to restore and redevelop Sint Maarten <sup>10</sup>.

As mentioned in Chapter 2.4.3, after Hurricane Irma Sint Maarten government accepted the pre-conditions set by Dutch Government for financial support. The Netherlands arranged for the International Bank for Reconstruction and Development (the World Bank) as an expert authority on redevelopment to manage the recovery via the Trust Fund, which is comprised of a grant of €470 million. According to the National Recovery and Resilience Plan (NRRP) the rebuilding of Sint Maarten would require funding of an estimated US\$ 2.3 billion. The objective of the Netherlands' support to Sint Maarten's is to "support the material and non-material reconstruction and recovery of St Maarten wherever necessary, so as to restore vital infrastructure and sustainably boost the country's resilience to the effects of possible future disasters, natural and otherwise". The guiding principles of the Trust Fund Use are set out by the Netherlands in the Appendix of the Administration Agreement.

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There is no waste collection and disposal tariff set by the government. Assessment of the issue of cost recovery depends on whether ship waste will be included in the plan or not, and whether additional tariffs can be generated from such inclusion.

Ideally, tariffs from the ships would more than cover their direct costs to receive service, and provide enough to cover the additional costs of municipal service that includes cleaning up after the disembark from the ships. This will require sitting down with the accounting officials of VROMI, as well as stakeholders representing the ship owners, to go over details, and obtain a full view of expenditures and revenues.

## 2.6 Economic Instruments, Incentives/Disincentives

As there is no solid waste management fee set by the government for both collection/transport and disposal in Sint Maarten, collection and transport costs of household and institutional waste (government departments and schools) and all disposal costs in both landfills (MSW and Irma) are covered by the government budget. There is either no tipping fee for waste collectors/haulers at the gate of the MSW landfill in Pond Island of Philipsburg or service charge collected from the waste generators. There is also no regulation, which regulates the waste fee for all type of waste generators.

There is no environmental levy in Sint Maarten. There is only environmental fee of US\$ 1.50, and US\$ 3.00 utility fee per person per day, charged through hotels, resorts and room-share apartments. Apart from

<sup>10</sup> Governing Program 2018 – 2022.

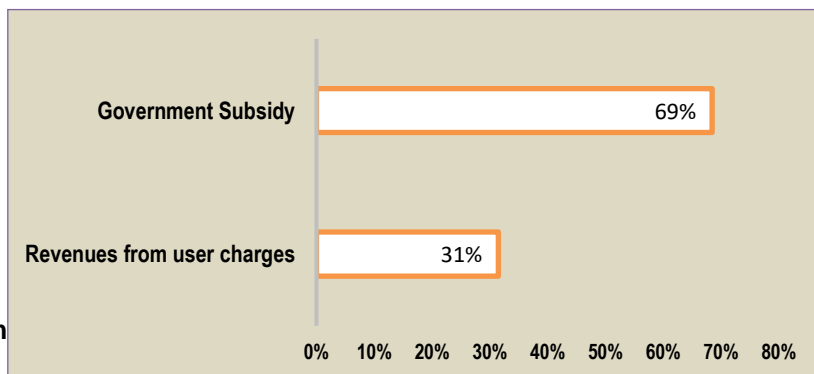
<sup>11</sup> Emergency Recovery Project, Emergency Income Support & Training Project, and Hospital Resilience Preparedness Project, Enterprise Recovery project, and Airport Terminal Reconstruction Project..



these, there is also a Government occupancy tax of US\$ 50.00 per unit (room) per week at the hotels and resorts. In addition, there is a departure tax of US\$ 30.00 per person for one-off entry payable at the airport.

There are more than 10 private companies, though their numbers are changing time to time, which collect waste from commercial premises, hotels and restaurants, and dispose the waste into the MSW landfill without paying any tipping fee, despite the fact that they collect fee from their customers. The collection fees imposed by private collectors vary between US\$ 30 - 50.00 per month for a small shop of retail business and US\$ 80 – 150.00 per month of restaurants and bars. Hotels and resorts are paying a collection fee of approximately US\$ 10.00 per room per month depending of agreements with the waste collectors.

According to recent data total estimated SWM budget of Sint Maarten is around US\$ 10.2 million, 69% of which is subsidized by the Government, and approximately 31% is covered by the user charges collected by private waste collectors.



**Figure 2.14: Current SWM System Revenue Structure**

It should be noted that the government subsidy does not imply that 69% of the SWM budget is fully government subsidy as the government collects funds through different economic instruments such as environmental fee charged through hotels/resorts and room-share apartments, and also occupancy tax charged per room per week at the hotels and resorts.

There also exist no incentives which encourage the waste minimization, reuse and source separation in the country. There is also no deposit refund system or other revenue instruments imposed by the Government for covering the external costs of environmental implications, as well as no recycling policy, and other policies which cover the components of an Extended Producer Responsibility (EPR policy).

Unlike any other SIDS in the region, Sint Maarten enjoys a Duty-Free status with no import or export taxes. This allows for the tariff free importation of raw materials for construction and manufacturing as well as tax free exportation of finished goods to be sold in foreign markets.

## 2.7 Waste Sources and Characteristics

Waste types in Sint Maarten are classified under 11 categories depending on their sources for the purposes of this report.

**Table 2.5: Waste Types Generated in Sint Maarten**

| Waste Type                      | Contents   |
|---------------------------------|--|
| 1 Household Waste (residential) | paper and cardboard, glass, plastics, metals, organic waste, baby diapers, yard waste, household hazardous waste – HHW (expired batteries, containers of paints, solvents, etc.), and bulky waste; |



|    |   |  |
|----|---|--|
| 2  | Commercial Waste (including restaurants, touristic facilities and resorts, and small and large retail markets, grocery stores, entertainment facilities, airport, port facilities and cruise ship wastes)   | packaging waste (paper, cardboards, plastics), organic waste, glass, metals, yard waste, wooden pallets, wooden and plastic crates, small hazardous and bulky waste  |
| 3  | Marine and coastal litters from land-based and sea-based sources, i.e., ocean dumping by boats, accidental container spillages, wind blown solid waste, (paper, plastic, etc) from urban areas and waste landfills, and tourism activities in beaches and coastal zones | Plastics items, paper  |
| 4  | Institutional Waste (schools, government offices and medical facilities)  | Although similar to household waste, some extra fractions of paper, yard waste, glass, metal, and plastics can be expected.  |
| 5  | Industrial Waste (non-process and non-hazardous waste from the human activities)  | paper and cardboard, organic waste, glass, plastics, wooden pallets  |
| 6  | Mixed Construction and Demolition Waste – Mixed C&D Waste   | woods, concrete parts, gyps and gypsum boards, left-over construction chemicals, gravels, sands, scap metals and other left-over construction materials, and hazardous contaminated fractions such as contaminated soils with oils and grease, left over paints and solvents, coating and lining materials   |
| 7  | Car wrecks/tires  | Comprised of whole or parts of cars including tires, Generally, all l/waste are directed to dispose any metal at a scrap metal facility (nearby Irma landfill)   |
| 8  | Medical Waste (non-hazardous waste from the human activities)   | paper and cardboard, glass, plastics, organic waste (food left overs and kitchen waste)  |
| 9  | Hazardous Medical Waste   | Left over medicines, used syringes, other chemical or non-chemical consumables that are used for medical treatments and surgeries, PPE used for COVID-19 implication   |
| 10 | Hazardous Industrial Waste  | Industrial process waste, includes process wastages and some chemicals left from the processes.  |
| 11 | Disaster Waste  | solid and liquid waste generated from a disaster such as tropical storms, storm surge, hurricanes, earthquake, includes concrete, steel, wood, clay and tar elements from damaged buildings and infra-structures; household furnishings; parts from the power and telephone grids such as electrical poles, wire, electronic equipment, transformers; parts from water and sewage distribution systems; natural debris such as clay, mud, trees, branches, bushes, palm tree leaves; chemicals, dyes and other raw materials from industries and workshops; waste from relief operations; damaged boats, cars, buses, bicycles; waste from disaster settlements and camps including food waste, packaging materials, excreta and other wastes from relief supplies; household cleaners; paint, varnish and solvents; and healthcare waste. |

Source: Consultant's own assessment.

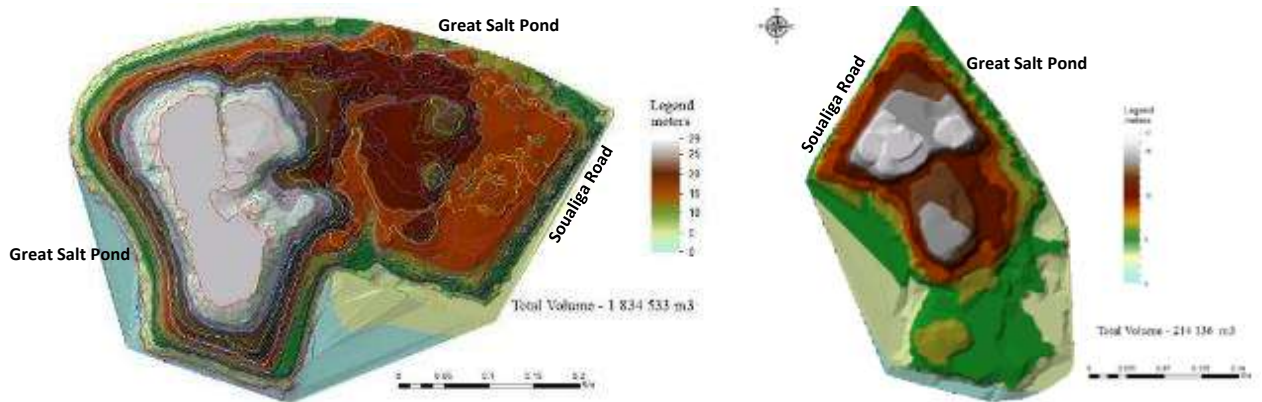
All studies since almost 10 years on waste generation in Sint Maarten show that this small island country has one of the highest per capita solid waste generation rates (WGR – 3.53 kg/capita/day) in Caribbean SIDS as it is one of the most favorable destination by cruise ships and stayover tourists.

There are two authority disposal facilities in Sint Maarten, however both of them are not equipped with a functional weighbridge that records the weight and other source information on the waste delivered to the landfills. Both are located in Pond Island in Philipsburg, one of them is MSW landfill for accepting all waste types along with municipal waste types. The second one is Irma Debris Disposal (IDD) site that is established after Hurricane Irma for deposition Irma debris (disaster waste). IDD occupies some 6.5 hectares of land, and is located in the northeastern part of Pond Island. It accepts only Irma debris collected. Almost one hectare of the area of the landfill is used by a private recycler as a junk yard for deposition and partly recycling of wrecked vehicles from Irma.



The MSW landfill occupies approximately 16 hectares of land in northwestern part of the Pond Island, and is in service for some 50 years. Its operable life time is almost finished. The current total fill in the landfill is around 1.85 million cubic meters by the end of 2019. The landfill accepts household, institutional, commercial, and industrial waste types without adequate control at the gate due to lack of its landfill entrance facilities and equipment. VROMI reports that the current unfunctional weighbridge in MSW landfill has been installed in 2009, and was functional until end of 2015.

According to the report of EE&G consultants on debris amount deposited in Irma landfill, approximately 215,000 cubic meter debris (disaster waste) are placed in the landfill since October, 2017.



MSW Landfill in Pond Island

Irma Debris Disposal Landfill in Pond Island

Figure 2.15: Landfills in Pond Island

According to VROMI’s weighbridge register from 2009 to the end of 2015, averagely 19% of waste disposed has come from households and institutions, 25% commercial sources, 35% from area cleaning activities as yard waste, 19% from construction sector as C&D waste. Averaged yearly waste generation is around 127.4 ths. tonnes in the period of 2009-2015.

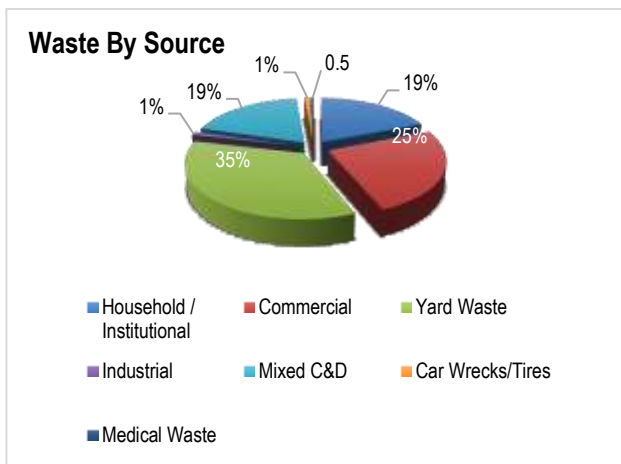


Figure 2.16: Waste Generation by Source

Waste from mooring yachts, fishing boats, and regional ferries are all treated as domestic waste, and assumed that they are included into household and commercial waste categories. In the weighbridge register belongs to the period from 2009 to 2015 it is noticed that very small amount of cruise ship waste (0.36%) has been accepted for disposal in the landfill.

Hazardous medical waste is also included in the “Medical Waste Category” as all hazardous medical waste were hauled to the Pond Island MSW landfill until the end of 2018, and incinerated with an inappropriate method in an incinerator that was simply a cylindrical tank placed on top of landfill. This application stopped upon caveat of WB team. VROMI reports that the landfill does not accept hazardous medical waste since 2018. Ministry of Health is responsible for regulating and overseeing the medical waste.



Similarly, hazardous industrial waste is possibly included in industrial waste category in the weighbridge register of VROMI because there is no other landfill in island for disposal of them. All waste collected from industrial facilities in the island are currently accepted by Pond Island MSW landfill. There is no legal enforcement which inhibits to dispose of hazardous industrial waste to MSW landfill with other waste types.

No adequate compaction is achieved in both landfills as VROMI does not have suitable machineries and equipment for waste compaction and daily cover/capping the waste received by the landfill. It has only five staff for landfill management. This situation shows that VROMI has also no sufficient resources for improving the adequate waste management as well as financial resources as there is no financial framework specifically arranged and designed for waste management.

Household and institutional waste are coming mainly from households, small scale commercial retail businesses among the neighborhoods, and government institutions/departments, schools and universities, and only 29-30% of this waste type is composed of organic waste<sup>12</sup>. Some hotels and resorts compact their waste in a special container (excluding construction and some small fractions that cannot be compacted), and delivered to waste collectors. Yard waste contains mostly tree trimmings, grass clippings, and in part bush and tree branches. Significant part of the yard waste is coming from area cleaning activities that are organized by VROMI, outsourcing the private service contractors.

The household and institutional waste is collected and transported to the Pond Island MSW landfill by five private collectors contracted by VROMI. However, this waste type also contains household hazardous waste (HHW) and hazardous construction chemicals (left over paints, thinners, bituminous materials, and etc.) mixed with general construction waste.

All commercial and industrial waste are collected by unregulated private collectors with tariffs agreed mutually by private collectors and customers, and they deliver the waste to the landfill without any fee. Some big waste generators such as big commodity stores and industrial waste generators haul directly their waste to the landfill with their vehicles without paying any tipping fee.

### 2.7.1 Waste Composition

The regular and single waste characterization survey in Sint Maarten has been conducted by R. W. Beck consultants in 2009. According to this study, the waste composition within the average aggregated waste stream by 2009 in Sint Maarten is below. Although the survey has been done within a one-month period and the results have not represented seasonal variations on waste composition, it is the first and single waste characterization survey conducted with appropriate methodology. The survey has been conducted on 10 waste fraction groups.

The consultant re-analyzed the waste characterization survey results. Figure 2.13 and 2.14 show waste composition, including and excluding C&D waste by fraction groups, based on waste characterization survey conducted in 2009. The survey results in Figure 2.14 show that 41% of waste generated in the country is C&D waste, 9% paper, 15% organic waste, 12% yard waste, 7% glass, and 7% plastics.

If C&D waste would be separated from the municipal solid waste stream as a separate category assuming that it will be handled and treated separately, the waste composition would be as follows: 16% of the

<sup>12</sup> Waste Characterization Survey Results, R.W. Beck, 2010.

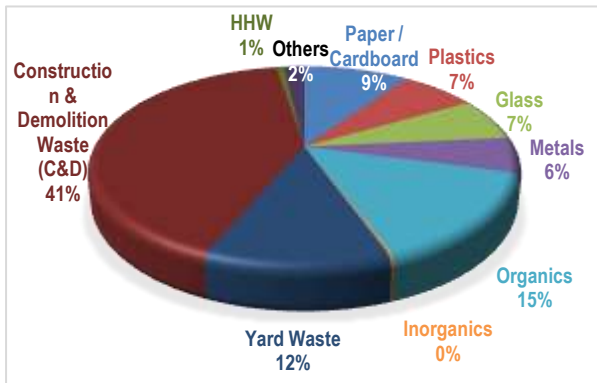


generated waste would be paper & cardboard, 12% plastics, 12% glass, 10% metals, 26% organics, 20% yard waste, see Figure 2.15.

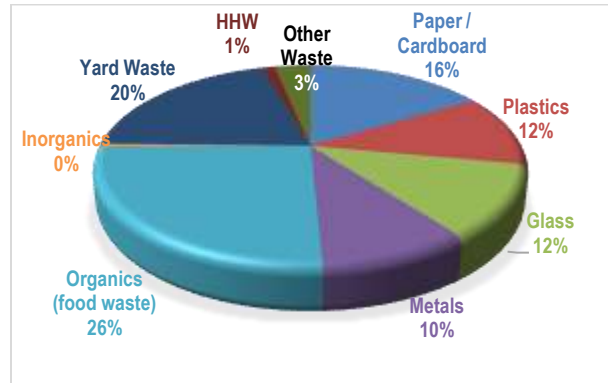
**Table 2.6: Waste Composition in Sint Maarten**

| Waste Composition, including C&D Waste |                       |                               | Waste Composition, excluding C&D Waste |                       |                               |
|--|-----------------------|-------------------------------|--|-----------------------|-------------------------------|
| Material Group                         |                       | Percent of Disposed Waste - % | Material Group                         |                       | Percent of Disposed Waste - % |
| 1                                      | Paper / Cardboard     | 9.6%                          | 1                                      | Paper / Cardboard     | 16.3%                         |
| 2                                      | Plastics              | 7.0%                          | 2                                      | Plastics              | 11.7%                         |
| 3                                      | Glass                 | 6.9%                          | 3                                      | Glass                 | 11.7%                         |
| 4                                      | Metals                | 5.7%                          | 4                                      | Metals                | 9.6%                          |
| 5                                      | Organics (food waste) | 15.1%                         | 5                                      | Organics (food waste) | 25.7%                         |
| 6                                      | Inorganics            | 0.2%                          | 6                                      | Inorganics            | 0.4%                          |
| 7                                      | Yard Waste            | 11.9%                         | 7                                      | Yard Waste            | 20.2%                         |
| 8                                      | C&D waste             | 41.0%                         | 8                                      | HHW                   | 1.1%                          |
| 9                                      | HHW                   | 0.7%                          | 9                                      | Other Waste           | 3.3%                          |
| 10                                     | Other Waste           | 1.9%                          | -                                      | -                     | -                             |
| <b>Total</b>                           |                       | <b>100.0%</b>                 | <b>Total</b>                           |                       | <b>100.0%</b>                 |

*Source: Consultant's evaluation based on R. W. Beck Waste Characterization Survey, 2009*



**Figure 2.17: Waste Composition, including C&D Waste**




**Figure 2.18: Waste Composition, excluding C&D Waste**



Waste types are categorized as Municipal Solid Waste and Special Waste Types for the purposes of this project as special waste types listed below require special attention during collection/transport, and disposal/treatment. C&D waste can contain hazardous construction chemicals which require special care, and industrial waste also requires special treatment techniques according to its industrial processes. WEEE and durables also require different collection and treatment/disposal processes, so those should be handled separately out of the municipal waste stream.

**Table 2.7: Municipal Waste and Special Waste Categories**

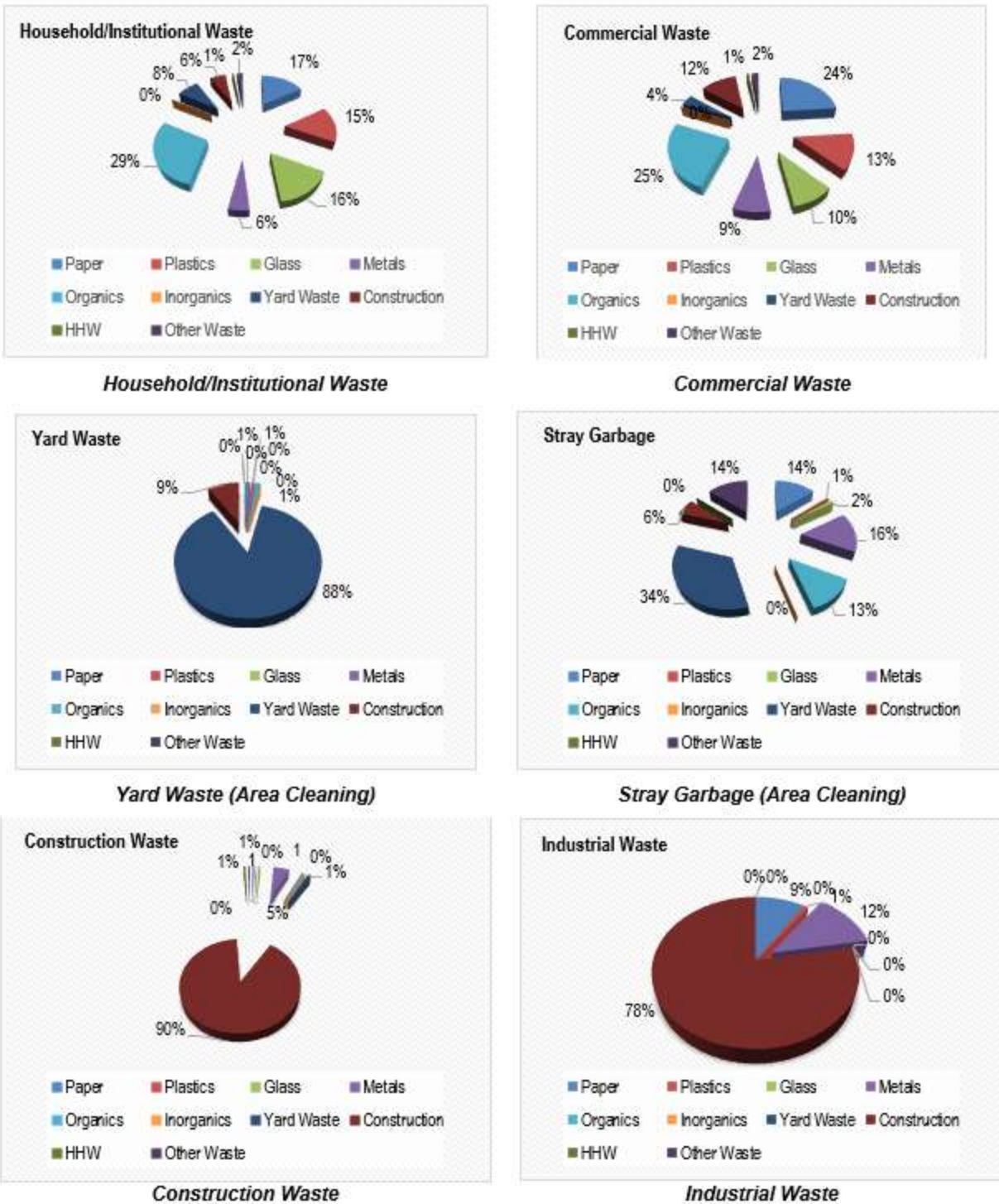
| Mixed Municipal      | Special Waste  |
|----------------------|--|
| Paper/cardboards     | C&D Waste  |
| Plastics             | Hazardous Medical Waste  |
| Metals               | WEEE and Durables  |
| Organic Waste (food) | Car Batteries  |
| Textile              | Hazardous industrial waste   |
| Tire & Rubber        |  <p>Special Waste 43%</p> <p>MSW 57%</p> <p><b>Waste Composition – MSW Vs. Special Waste</b></p> |
| Inorganic Fractions  |  |
| Yard Waste           |  |
| HHW                  |  |
| Other waste          |  |
|                      |  |
|                      |  |

Obsolete car batteries also contain hazardous materials, and therefore, they should be collected and stored by different means, and handled, even if they are sold out of island. Similarly, hazardous medical waste should be handled separately under oversee and control of the Ministry of Health.

As aforementioned, eight waste generation categories by source is determined in Sint Maarten, which are: 1) Household/institutional waste, 2) commercial waste, 3) yard waste and stray garbage from area cleaning, 4) industrial waste (hazardous & non-hazardous), 5) mixed C&D waste, 6) car wrecks & tires, 7) medical waste (hazardous & non-hazardous), and 8) others.

The the following Figures show the composition of major categories.





**Figure 2.19: Waste Composition of Major Categories by Source**  
 (Consultant's analysis based on the results of waste characterization survey, 2009)



### Household/Institutional Waste Composition

The main waste fractions in the household/institutional waste are organic waste (29%), paper (16.60%), plastics (15.30%), glass (16.30%), metals (5.50%), yard waste (8.20%), and construction waste (5.90%).

### Commercial Waste

Most of the commercial waste is coming from hotels/resorts, restaurants, bars, and grocery stores, and mostly contains food left-overs and packaging waste. The commercial waste mainly comprises of paper (23.70%), plastics (13.30%), glass (9.90%), metals, (8.60), organics (25.10%), yard waste (4%), and construction waste (12.10%).

### Yard Waste & Stray Garbage

Yard waste mainly contains the green waste (yard waste – 88%) and construction waste fractions (9%). The other waste fraction in yard waste make up only 3% of the total yard waste.

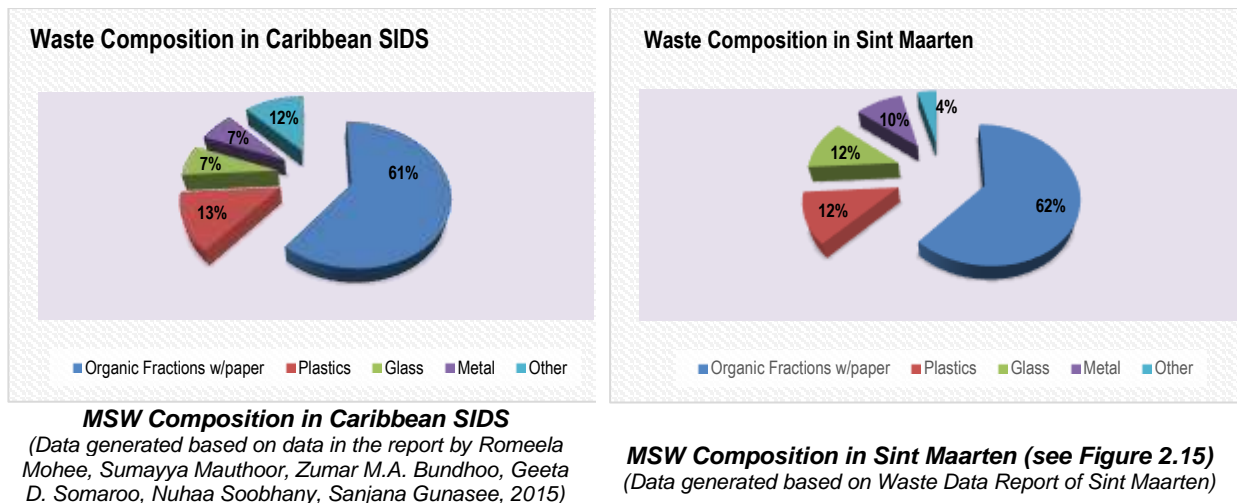
However, stray garbage contains significant amount of paper (14.10%), metals (15.70%), organics (13%), yard waste (green waste – 34.40%), construction waste (6.40%), and 14% undefined waste fractions. This situation indicates that littering is matter for Sint Maarten as stray garbage with yard waste make up 35% of total waste generated by source in the country.

### Construction Waste

Construction waste mainly contains scrap and left-over construction materials (90.10%), and small amount of metals (5.50%). The other waste fractions make up only 4% of total construction waste with very small proportions.

### Comparison of Waste Composition of Sint Maarten with the One in Caribbean SIDS

The similarity of MSW composition of Sint Maarten with Caribbean SIDS is remarkable. The following comparison shows that MSW composition (Figure 2.15) in Sint Maarten almost mimics the character of waste generated in Caribbean SIDS.

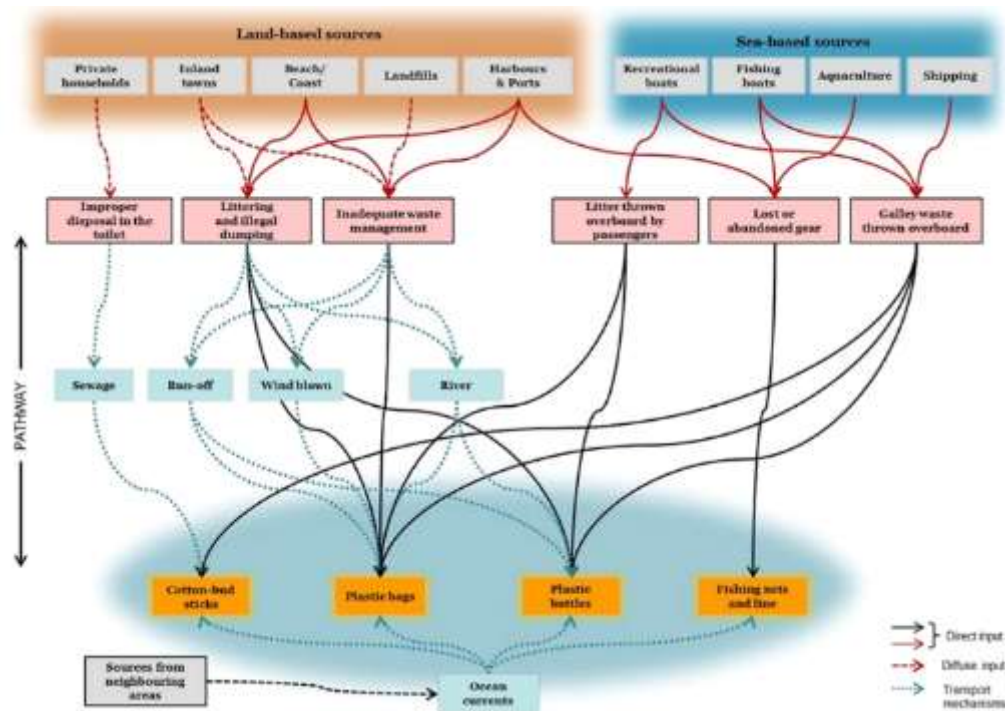


**Figure 2.20: Comparison of Waste Composition with Caribbean SIDS**  
 (Re-development of Waste Composition Data in Regional Waste Market Review Report of Aim Texas)



### Marine Litter

Studies have shown that 80% of marine litter is plastic waste because plastic replaced wood, metal, leather and glass in the last decades. Eighty percent of marine pollution is the results of direct or indirect discharge of solids and liquids from land-based sources such as rivers, outfalls, waterways, agricultural runoff, and infrastructure. However, there is no study on how many marine and coastal waste is collected in Sint Maarten/St. Martin coastal area, but almost all studies are on Wider Caribbean Region.



**Figure 2.21: Marine Litter Sources**

(Identifying Sources of Marine Litter – European Commission JRC Technical Reports – 2016)

Marine and coastal litters are collected with area cleaning activities, which is organized by VROMI with the central government budget.

### Disaster Waste

The country is a disaster risk prone area through tropical storms, storm surge, hurricanes, and earthquakes in Lesser Antilles. The last and heavily devastating Hurricane Irma has accumulated significant amount of disaster waste in the country. As mentioned in Chapter 2.7 and Figure 2.12, all Irma debris is hauled to Irma Debris Disposal Site (IDDS). Currently, 216,136 cubic meter debris are deposited in IDDS. According to EE&G Background Diagnostic Report, the Irma waste stream was comprised of typical possible disaster related debris. Below is a list of observed debris waste:

- |                        |            |
|------------------------|------------|
| Whole trees and stumps | Steel      |
| Lumber                 | Vegetation |
| Concrete               | Wire/poles |



|  |                               |
|--|-------------------------------|
| Boats  | Automobile bodies             |
| Appliances   | Storage Containers and Frames |
| Furniture  | Auto Engines                  |
| Electronics, Computers/TV                          | Paper                         |
| Zinc (steel or galvanized steel corrugated panels) | Plastics                      |
| Tires  | Mattresses                    |
| HHW  |                               |

VROMI reports that about 3500-4000 cars are wrecked during Irma Hurricane.

## 2.7.2 Waste Generation

The consultant has reviewed all data obtained from VROMI on waste generation, and compared them with the aforementioned waste characterization survey conducted in 2009. All historical data on waste generation in Sint Maarten have been evaluated by the consultant within the Waste Data Report produced by Aim Texas in October, 2019. Therefore, the results of evaluations are given here, to avoid the unnecessary repetitions.

Based on analysis of historical data on waste generation, it is assumed that waste generation (including C&D waste) by 2016 in Sint Maarten was around 127.4 thousand tonnes. Accordingly, the following waste generation projection has been conducted by the Consultant.

Estimated and projected waste generation capacity from 2016 to 2040 is given below, assuming that the incremental increase per year will be in parallel with the population growth rate of 1.5% for base case scenario, 1.00% for low case scenario, and 2.0% for high case scenario. It seems that Sint Maarten could have waste generation capacity of 182,103 tonnes per annum by 2040 including C&D and other special waste types.

**Table 2.8: Waste Generation Projections by Base – Low – High Case Scenarios, 2016 – 2040**

| Years | Base Case Scenario |                    | Low Case Scenario  |                    | High Case Scenario |                    |
|-------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|       | C&D Waste included | C&D Waste Excluded | C&D Waste included | C&D Waste Excluded | C&D Waste included | C&D Waste Excluded |
|       | t/a                | t/a                | t/a                | t/a                | t/a                | t/a                |
| 2016  | 127,389            | 80,083             | 128,663            | 80,884             | 129,937            | 81,685             |
| 2020  | 135,206            | 84,997             | 133,887            | 84,168             | 140,648            | 88,418             |
| 2025  | 145,656            | 91,566             | 140,717            | 88,462             | 155,287            | 97,621             |
| 2030  | 156,912            | 98,643             | 147,895            | 92,974             | 171,449            | 107,781            |
| 2035  | 169,039            | 106,267            | 155,439            | 97,717             | 189,294            | 118,999            |
| 2040  | 182,103            | 114,479            | 163,368            | 102,701            | 208,995            | 131,385            |

Source: Consultant's own estimations based on historical data provided by VROMI.



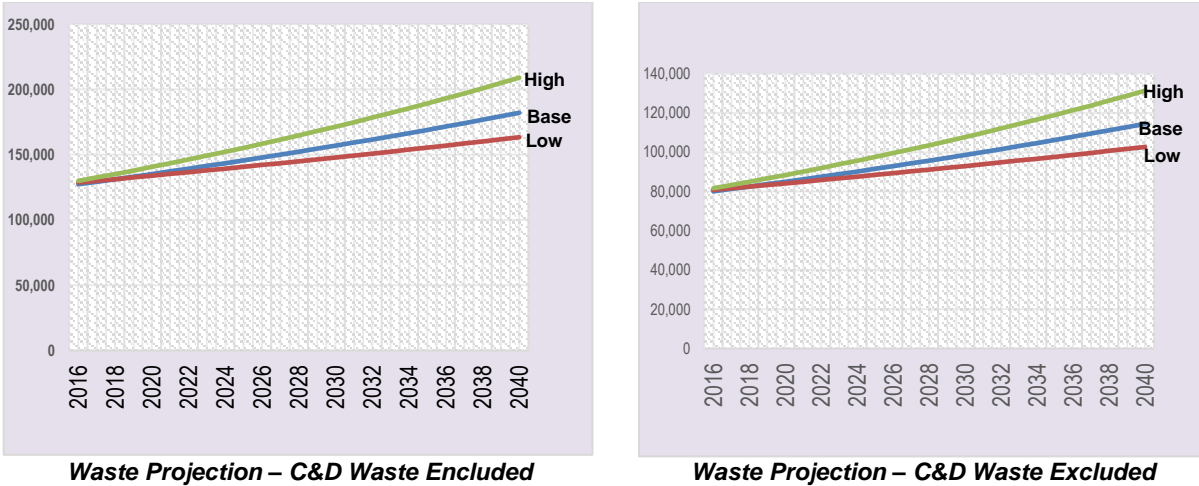


Figure 2.22: Waste Generation Projection by Base – Low – High Case Scenarios, 2016 – 2040

Waste generated by stayover tourism activity is included in this projection, but no ship waste is projected in this projection, except the boats moored in the marinas. Consultant’s team observed that the tourists coming by own boats are using the communal containers for disposing their waste. Waste from commercial establishments and households are collected as mixed waste, and transported to the Pond Island landfill. Therefore, no separate category is considered to be assessed for the waste from the boats moored in the marinas.

The following assessment on waste generation by source is also conducted based on VROMI weighbridge register from 2009 to the end of 2015. This analysis shows that averagely 18.54% of waste disposed has come from households and institutions; 24.52% from commercial sources; 34.89% is yard waste from different waste streams, and 19.42% from construction sector.

Table 2.9: Averaged waste disposed by source between 2009 and 2015

| Waste Source              | Generation    |                |
|---------------------------|---------------|----------------|
|                           | ths. tonnes   | %              |
| Household / Institutional | 23.62         | 18.54%         |
| Commercial                | 31.24         | 24.52%         |
| Yard Waste                | 44.45         | 34.89%         |
| Industrial                | 1.46          | 1.14%          |
| Mixed C&D                 | 24.74         | 19.42%         |
| Car Wrecks/Tires          | 1.50          | 1.18%          |
| Medical Waste             | 0.06          | 0.05%          |
| Other                     | 0.33          | 0.26%          |
| <b>Total</b>              | <b>127.40</b> | <b>100.00%</b> |

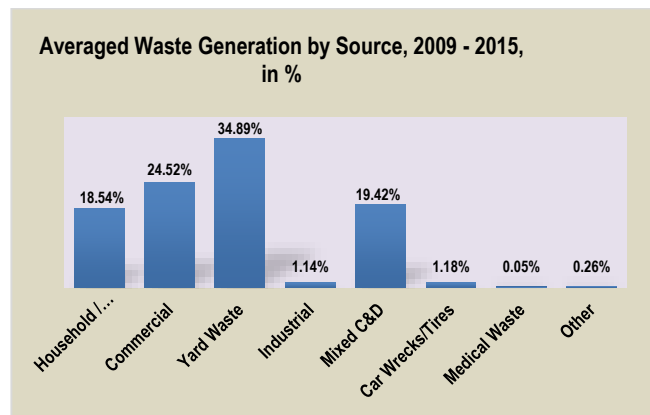


Figure 2.23: Averaged waste tonnages disposed by source between 2009-2015 (VROMI)



## COVID-19 Effect in Waste Generation in Sint Maarten

However, a sharp decrease is expected on waste generation due to COVID-19 implications from March, 2020 to present. Based on research to date, the waste value chain does not appear to spread COVID-19. However, the SWM sector has felt impacts.

Waste production has shifted from industry and commercial centers to residential areas. According to IFC report<sup>13</sup>:

- The volume of medical waste may increase by up to 40 percent;
- Industrial and commercial waste production may fall drastically due to the slowdown in manufacturing activity and absence of tourism activities in the island;
- Hazardous waste production may grow with higher production from the pharmaceutical and medical sectors. Existing hazardous waste treatment capacity in developing countries (such as in Sint Maarten) is likely to be overwhelmed, leading to stockpiling and potentially inadequate disposal; and
- Municipal waste, except from commercial and industrial waste, may increase in volume, effectively overwhelming existing waste collection and disposal systems. A reduction in recycling activities further compound challenges in the collection and disposal of municipal waste.

However, we will not truly know the answers without systems modeling of waste management data. The goal of this perspective is to bring attention to the need for better real-time waste management data and systems thinking in the context of the COVID-19 pandemic and beyond.

### 2.7.3 Waste Generation Rate (WGR)

Waste Generation Rate (WGR) has been evaluated for two cases of C&D waste is included or excluded. The WGR in Sint Maarten is one of the highest rate among the Caribbean SIDS.

**Table 2.10: Waste Generation Rates**

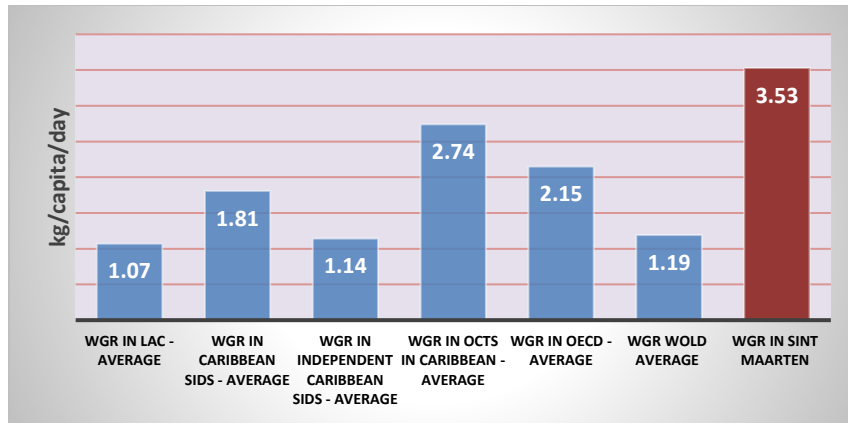
Source: Consultant's own development.

| C&D Waste Included   | C&D Waste Excluded   |
|----------------------|----------------------|
| <i>kg/capita/day</i> | <i>kg/capita/day</i> |
| <b>5.99</b>          | <b>3.53</b>          |

Many of the highest waste generators are the active tourist economies in SIDS like Sint Maarten in Caribbean region. The following Figure shows the regional comparison overview of WGRs in the Small Island States that have high tourist economies. The WGR in OCT SIDS in Caribbean region is almost 50% higher than the world average (1.19 kg/capita/day), and more than two folds in LAC (1.07 kg/capita/day).

<sup>13</sup> COVID-19's Impact on the Waste Sector, IFC, 2020.



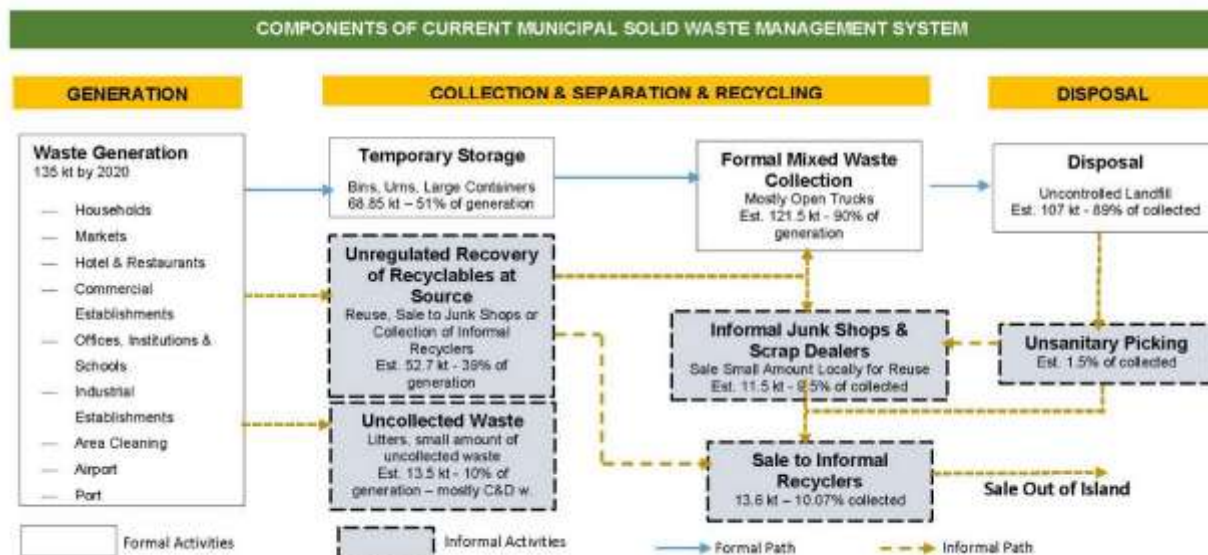


**Figure 2.24: Comparison of Average WGRs in Independent Caribbean SIDS, OECD & World Average** (Consultant's own assessment).

In addition to growing rates of solid waste generation per capita, stop-over tourists are reported to generate at least twice the amount of waste as local residents, while cruise ship passengers generate up to four times the amount generated by local residents.

### 2.7.4 Waste Flow

Current waste collection and transport practice are only comprised of collection/transport of all types of the waste generated, and hauling them to the MSW landfill. There is no formal material recovery facility or activity programmed by the government for separating and classified the waste fractions during waste flow. Informal collection and diversion of recyclables from the main stream makes up less than 10% of total waste collected.



**Figure 2.25: Current Waste Flow Components in Sint Maarten**



The current waste flow scheme cannot be used conveniently to identify visually and to record where, how and when the wastes are generated.

### 2.7.5 Waste Character

According to the results of waste characterization survey conducted in 2009, 41% of the total waste (including C&D waste) generated in the country is C&D waste. However, 47.83% of C&D waste is formed from wooden fractures. This waste composition of Sint Maarten suggests that the topological distribution of waste generated is 55.70% organic fractions, 21.60% inorganic and inert materials, 7% plastics, 6.90% glass, 5.70% metals. Other small fractions make up 2.80% of total waste generated.

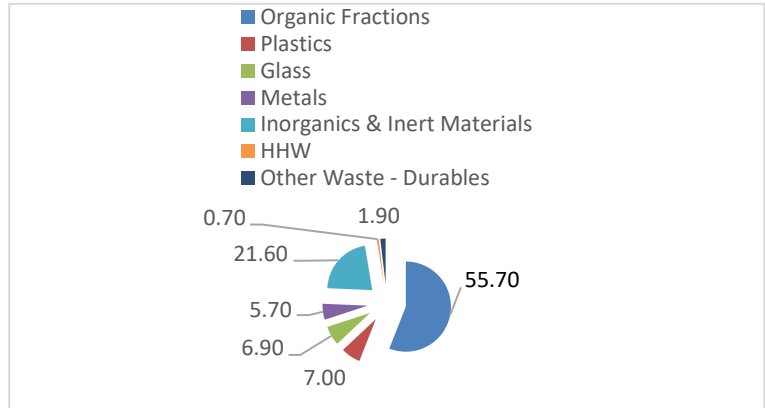


Figure 2.26: Topological Distribution of Waste

### Waste Density

As there is no reliable waste density measurements or surveys previously conducted for Sint Maarten, based on the consultant’s experience worldwide and the literature review, the average MSW densities depending on where it is placed are given below for referencing.

Consultant’s assumptions for planning level waste densities are given below.

Table 2.11: Compacted and Un-compacted Waste densities for Hauling and Landfilling Purposes

| Waste Compacted / Un-compacted                                       | Density           |
|--|-------------------|
|  | kg/m <sup>3</sup> |
| Mixed MSW in container   | 280 - 300         |
| Messy waste in open truck  | 350 - 400         |
| Compacted mixed waste in truck                                       | 650               |
| Waste in skid containers for hook lift trucks - 3 - 4 m <sup>3</sup> | 350               |
| Compacted waste in landfill  | 1,200             |
| Suitably uncompacted waste in landfill                               | 800 - 850         |

Source: Consultant’s own experience.

### Calorific (Heat) Value

The overall HHV for the projected waste stream in 2010 is 2,534 kcal/kg (R.W. Beck Report, 2009). However, no laboratory test has been conducted for determining the average calorific value of mix waste generated in Sint Maarten by R. W. Beck during the survey. Besides, few inert and non-combustible materials (other C&D waste, durables, misc. inorganics, etc.) are included in the estimation, which in turn affects the level of calorific value significantly.



The calorific value of overall waste stream will also fluctuate throughout the course of the year depending upon the amount of precipitation, variations in the composition of incoming waste, and future changes in the waste stream.

The following is the Aim Texas' re-evaluation of the High Heating Value (calorific value) of overall waste stream in Sint Maarten, removing the inert and non-combustible waste fractions from the waste stream. The same heat values of the fractions in R. W. Beck study are used during this re-evaluation.

An approximate average calorific value on potential for incineration alternative has been conducted with the sector specific caloric values of combustible fractions for overall waste stream, assuming that all wood fractions from C&D waste will go to the incinerator. [The assessment has been conducted on 21 waste fractions. The resulting wet weight low and high calorific value may be around 2,803 and 3,514 kcal/kg respectively.](#)

**Table 2.12: Low & High Heat Values of Overall Waste Stream without Non-combustible Fractions**

| Material     |                              | Low Heat Value<br>(kcal/kg), *wet weight | High Heat Values (kcal/kg),<br>*wet weight |
|--------------|------------------------------|--|--|
| 1            | Newspaper                    | 2,501                                    | 3,125                                      |
| 2            | Corrugated Paper             | 2,900                                    | 3,821                                      |
| 3            | High Grade/ Magazines /Books | 2,100                                    | 2,549                                      |
| 4            | Other Paper                  | 1,750                                    | 2,018                                      |
| 5            | HDPE                         | 8,500                                    | 9,568                                      |
| 6            | PET                          | 5,684                                    | 5,827                                      |
| 7            | Plastic Film                 | 8,500                                    | 9,500                                      |
| 8            | Other Plastics               | 5,500                                    | 6,786                                      |
| 9            | Ferrous                      | 225                                      | 328  |
| 10           | Aluminum                     | 480                                      | 725  |
| 11           | Other Non-Ferrous            | 290                                      | 455  |
| 12           | Other Metals                 | 210                                      | 392  |
| 13           | Glass                        | 40                                       | 48   |
| 14           | Food Waste                   | 1,950                                    | 2,494                                      |
| 15           | Textiles                     | 2,200                                    | 2,866                                      |
| 16           | Tires                        | 4,717                                    | 7,499                                      |
| 17           | Rubber Products              | 4,717                                    | 7,042                                      |
| 18           | Other Organics/Fines         | 1,650                                    | 2,200                                      |
| 19           | Yard Waste                   | 2,200                                    | 2,900                                      |
| 20           | Wood                         | 2,500                                    | 3,104                                      |
| 21           | Durables                     | 250                                      | 550  |
| <b>Total</b> |                              | <b>2,803</b>                             | <b>3,514</b>                               |

Source: Consultant's review on literature.

However, the consultant recommend that a detailed analysis should be conducted on low and high calorific values of the waste generated in Sint Maarten, programming a comprehensive and seasonal waste characterization survey.



## 2.7.6 Potential for Recycling, Resource Recovery, Biodegradation (composting) and Waste to Energy Production

The topological dynamics of waste deposited in Sint Maarten is given in the following Table. Approximately 55.70% of waste disposed in the country is putrescible organics, including paper/cardboard, organic waste (food waste, wooden fractions, tire and rubber, and yard waste. 54.20% of it is biodegradable (compostable), 46.60% recyclable, 63.90% combustible, and 57.10% can be converted into RDF for use as secondary fuel.

**Table 2.13: Topological Dynamics of Waste Disposed in Sint Maarten**

| Waste                | % in Total |
|----------------------|------------|
| Putrescible Organics | 55.70%     |
| Compostable          | 54.20%     |
| Recyclable           | 46.60%     |
| Combustible          | 63.90%     |
| RDF                  | 57.10%     |

Source: Consultant's assessment based on waste characterization survey conducted in 2009.

Potential for Recycling, Biodegradation and Waste to Energy (divided into potential for waste incineration and RDF - secondary fuel) production is assessed in the following Table based on following assumptions;

- Waste composition;
- Population Growth rate is 1,5% per base case;
- Waste generation Rate is 3.53 kg per capita per day, excluding C&D waste and cruise ship waste;

Out of the total waste stream the following Table below shows the percentage for recycling and resource recovery. The results conclude that the potential for;

- material recycling is ~ 44 %
- biological conversion is ~ 47 %
- thermal conversion is ~ 60 %
- mechanical production of RDF/SRF is ~ 48 %

The estimates assume:

- 90% of paper could be recycled, or converted into compost or incinerated or be used as RDF.
- 90% of food waste could be biologically converted to compost or biogas or incinerated for energy.
- 50% of organic waste could be dried enough for mechanical processing to RDF.
- 70% of C&D waste (excluding wood fractions) could be mechanically processed into recyclables, including: concrete aggregate, asphalt aggregate, and brick aggregate useful for road bed material, as well as some metal, and glass and wood materials are recyclable, and 70% wood fraction in C&D waste could be biologically converted to compost or biogas, 90% incinerated or 70% be used as RDF with mechanical processing.
- 100% of household hazardous wastes can be incinerated in modern high temperature incinerators that meet EU emission standards.
- 60% of durable materials could be recycled.



The Table below shows only potentials, but it does not imply that all potential may be used.

**Table 2.14: Potential for Recycling, Biodegradation and Waste to Energy Production**

| Waste Fraction         | Composition    | Potential For |                             |               |                      |
|------------------------|----------------|---------------|-----------------------------|---------------|----------------------|
|                        |                | Recyclables   | Biodegradation (composting) | Incineration  | RDF (Secondary Fuel) |
|                        |                | %             | %                           | %             | %                    |
| Paper / Cardboard      | 9.6%           | 8.64%         | 8.64%                       | 8.64%         | 8.64%                |
| Plastics               | 7.0%           | 6.65%         | -                           | 6.65%         | 6.65%                |
| Glass                  | 6.9%           | 6.56%         | -                           | -             | -                    |
| Metals                 | 5.7%           | 5.70%         | -                           | -             | -                    |
| Organics               | 15.1%          | -             | 13.59%                      | 13.59%        | 7.55%                |
| Inorganics             | 0.2%           | -             | -                           | -             | -                    |
| Yard Waste             | 11.9%          | -             | 11.31%                      | 11.31%        | 7.14%                |
| C&D Waste - Wood       | 19.6%          | -             | 13.72%                      | 19.60%        | 17.64%               |
| C&D Waste - others     | 21.4%          | 14.98%        | -                           | -             | -                    |
| HHW                    | 0.7%           | -             | -                           | -             | -                    |
| Other Waste - Durables | 1.9%           | 1.14%         | -                           | -             | -                    |
| <b>Total</b>           | <b>100.00%</b> | <b>43.67%</b> | <b>47.26%</b>               | <b>59.79%</b> | <b>47.62%</b>        |

Source: Consultant's own development, based on the results of last waste characterization survey conducted in 2009.

It should be noted that the last waste characterization survey has not contained seasonal variations, and conducted 10 years ago. A more comprehensive survey should be conducted to ensure the updated waste character and seasonal variations on amount of waste that is being generated in the country.

## 2.8 Waste Market of Sint Maarten

### 2.8.1 Market Size

Based on the historical waste records, and results of consultant's projections from 2016 to 2040, the waste market in Sint Maarten can sustain estimated 100 tonnes per annum recyclable waste, including wood fractions in C&D waste and yard waste) in a normal tourism season. However, any fluctuation on tourist capacity of the country can heavily affect the size waste market. The packages of imported materials increase the amount of recyclable waste generation in Sint Maarten. Almost 64% of the generated waste (approx. 100 tonnes per annum MSW) in total is recyclables with 85% separation & collection efficiency in the country, including wood fractions in C&D waste.

**Table 2.15: Waste Market Size of Sint Maarten by 2019**

| Waste Fractions | Recyclable Fractions - t/a - | Percent in total Recyclables | Percent in Generation | Percent with 85% collection efficiency |
|-----------------|------------------------------|------------------------------|-----------------------|--|
| Paper cardboard | 12,000                       | 11.81%                       | 8.89%                 | 7.56%                                  |
| Plastic         | 8,000                        | 7.88%                        | 5.93%                 | 5.04%                                  |
| Glass           | 9,000                        | 8.86%                        | 6.67%                 | 5.67%                                  |



|  |                |                |               |               |
|--|----------------|----------------|---------------|---------------|
| Metal  | 9,580          | 9.43%          | 7.10%         | 6.03%         |
| Wood & Yard Waste                                | 45,000         | 44.30%         | 33.33%        | 28.33%        |
| Tire & Rubber                                    | 1,100          | 1.08%          | 0.81%         | 0.69%         |
| Recyclable C&D fractions (inert)                 | 14,300         | 14.08%         | 10.59%        | 9.00%         |
| WEEE and durables                                | 2,600          | 2.56%          | 1.93%         | 1.64%         |
| <b>Total recyclables</b>                         | <b>101,580</b> | <b>100.00%</b> | <b>75.24%</b> | <b>63.96%</b> |
| <b>Waste Generation in total - yearly (2019)</b> | <b>135,000</b> |                |               |               |

Source: Consultant's own assessment based on waste characterization survey conducted in 2010.

It is seen that packaging waste (paper – 11.81%, plastics - 7.88%, glass – 8.86%, and wood pallets) plays important role on amount of recyclable waste generated in the country. Sint Maarten together with sister islands (Saba and St. Eustatius) consume over 30 million bottles of beer.

## 2.8.2 Analysis of Waste Market

Aim Texas consultants have reviewed and examined the waste market in Caribbean SIDS, and its connections to international markets, specifically on final destinations of recyclable fractions, their transportation routes to regional and worldwide recycling market, and major recyclers that play important roles in waste market in the region.

Sint Maarten shows many similarities to other SIDS in the region from the perspective of demographics, economic drivers and economic dependency on tourism, tourism related activities and tourism dependent industries, dependence or connections to regional and global market, transport capability and difficulties to haul their processed or semi-processed waste to the regional and global market, dependency on use of fossil fuel for energy, and being exposed to natural disasters such as tropical storms.

Currently, the major players in Sint Maarten waste market are the waste management authority (VROMI), relevant government agencies/authorities, the waste generators, waste recyclers/processors, general public, and non-governmental organizations (NGOs). The airport authority, port authority, and big hotels and resorts should also count as major players in waste management because they are major waste generators in the country.

However, because of the fact that these stakeholders act independently from the main waste management authority (VROMI), and in a disorganized manner, the overall waste management in Sint Maarten is unfortunately unable to be perceived as a cohesive and holistic waste management scheme. As a result, VROMI is solely relegated to performing collection of the solid waste from households/institutions and area cleaning as well as managing landfills within their own limited resources, leaving the collection and transport of commercial waste unregulated.

This situation enables local recyclers to opportunistically seek out the international markets through regional recyclers, bypassing regulations and best practices all the while selling the recyclable fractions in the main waste stream as semi-processed recyclables, since there is no robust enough industrial infrastructure to support a circular economy which revolves around these local recyclers, and also there is no industrial and agricultural base for sustaining material reuse & internal processing of recyclables.

Thus, these local recyclers are compelled to respond to the existing demand within the Caribbean waste market, and they conform their scrap recycling procedures according to hub areas around the Caribbean.



According to Aim Texas consultants' research on regional waste market, estimated 350 – 400 recyclable materials shipments per year leaving Port Philipsburg and arriving of Port Everglades in Florida exclusively, through local and regional Scrap Collectors/Dealers; They accept only scrap metal, car batteries, small amount of plastics and electronic waste, and very small amount of scrap paper. Recovered Paper supply in the region is in fact much lower than either Metal or Plastic Scrap Supply, and no scrap wood and glass demand in regional market.

### 2.8.3 Recyclers in the Market

Although exact number of local recyclers is not known as no official records, the major ones are determined by the consultant during surveys and site visits, and their names are given below. However, no official or unofficial data has been obtained from the local recyclers since they are very reluctant to interview and give their records. Therefore, the consultant went towards international port records, obtaining bill of ladings for the shipments from Philipsburg Port to final stops of shipments.

The prominent local recyclers are given in the following Table.

**Table 2.16: Local Recyclers in Sint Maarten and Saint Martin**

| Company                             | Location                                | Material Accepted   |
|-------------------------------------|---|---|
| Craft Metal                         | Philipsburg, Sint Maarten               | Scrap Metal   |
| Mavir Metal                         | Philipsburg, Sint Maarten               | Ferrous and non-ferreous metals                               |
| Caribbean Scrap                     | Philipsburg, Sint Maarten               | Scrap metal, engine parts, plastics                           |
| Eurin Metal BV                      | Philipsburg, Sint Maarten               | Scrap Metal, Scrap Batteries                                  |
| MC Recycling                        | Philipsburg, Sint Maarten               | Scrap Metal Battery, Scrap Metal, Copper, Brass, Other Scraps |
| Sint Maarten Recycling              | Philipsburg, Sint Maarten               | Paper, Plastic, Soda Cans                                     |
| Meadowlands                         | Sint Maarten                            | Scrap Plastics, Paper, Metal cans, Glass                      |
| Wastefactory                        | Philipsburg, Sint Maarten               | Scrap Glass   |
| Waste2Work                          | Cole Bay, Sint Maarten                  | Scrap Wood and Plastics                                       |
| Art Craft Café Gallery (Non-profit) | Front Street, Philipsburg, Sint Maarten | Scrap Glass   |
| Green SXM                           | Bellevue, Saint Martin                  | Scrap metal, plastics, paper cans                             |
| Verde Company                       | Cul de Sac, Saint Martin                | Scrap metal, plastics, glass, engine parts,                   |
| Windward Roads                      | Philipsburg, Sint Maarten               | Construction Waste  |

Source: Consultant's own research.

Meadowlands hires 8-10 cu.m dumpsters to large waste generators, to collect both the recyclable fractions separately from the main waste stream and bulky waste. It also had a deal with Caldwell Inc., Florida for the transportation of waste and recyclable materials out of Sint Maarten in 2019.

The Waste factory also provided recycling bins for separate collection recyclables in few points in Sint Maarten at the beginning of 2020. The waste factory also provides the regular collection of single use



plastics deposited in recycling bins, which will be processed in Sint Maarten. The waste Factory is supported by the St Peters Emergency Organization Group (SPEOG). This initiative seems to be spread to other communities in the country. Waste factory also collects and processes #1 PETE plastic in island.

Caribbean Scrap also operates a scrap yard in Soualiga road for dismantling ELVs and wrecked cars, as well as temporary storing of plastics, paper and scrap electronics.



**Dumpsters of Meadowlands**



**Meadowlands pre-processing facility in Cool Bay**



**Caribbean Scrap's Scrap Yard in Pond Island**



**Recycling Bins for separate collection of recyclables – Waste Factory**

**Figure 2.27: Dumpsters and Two Bins for separate collection of Bulky Waste and Recyclables**

Craft Metal Aluminum N.V. collects mostly used car batteries, scrap metal and aluminum, and exports to USA. It has a scrap yard in Pond Island.

Waste2Work started in January 2018 as an initiative from ‘Startup Solutions for Sint Maarten’, a coalition of Netherlands Red Cross, Ministry of Internal Affairs (BZK), Stichting Open House, Innofest, Start-up Delta, Dutch Coalition for Humanitarian Innovation and Ministry of Defense. It works on reuse of scrap woods and lumbers, producing garden furniture and some wood decorative wood stuff from the scrap woods. It also produces some souvenirs from tins and cans, and plastics. However, they have small capacity.



Some restaurants apply a discount for their customers who bring their own to-go containers or cup such as the Dinghy Dock, Mark's Place, Subway, Joga and Market Garden Cafe. Along with these restaurants more than two dozen of bar & restaurants<sup>14</sup> support the waste minimization efforts, switching to environmentally friendly products instead of single-use plastics. Their leadership in being an environmentally friendly business inspires other businesses and their customers to care more about the environment and creates a chain reaction of additional businesses and people who will refuse the use of single-use plastics in Sint Maarten.

However, no monitoring is conducted by a government department over all these waste minimization and recycling activities as there is no government policy, which regulates the recycling market in the country.

## 2.8.4 Current Recycling Rate

According to the results of Aim Texas consultants' Caribbean waste market research, estimated amount of collected and exported recyclables from Sint Maarten is 13,667 tonnes by 2019, breakdown of which is given below:

| <b>Table 2.17: Estimated Recycling Rate in Sint Maarten by 2019</b> | <b>Figures</b> | <b>Percentage of total Recycled</b> |
|---|----------------|-------------------------------------|
| Scrap metal & car batteries – exported (bill of ladings) -t/a       | 6,225          | 42.41%                              |
| Plastics & electronic scrap – exported (bill of ladings) - t/a      | 1,435          | 9.78%                               |
| Wood – in house recycled or reused (estimated) - t/a                | 6,000          | 40.88%                              |
| Glass - in house recycled (estimated) - t/a                         | 18             | 0.12%                               |
| Paper - in house reuse and exported (estimated) - t/a               | 1,000          | 6.81%                               |
| <b>Total recycled waste amount - t/a</b>                            | <b>14,678</b>  | <b>100.00%</b>                      |
| Generated waste in total by 2019 - t/a                              | 135,000        |                                     |
| <b>Estimated recycling rate by 2019 -%</b>                          | <b>10.87%</b>  |                                     |

Source: Consultant's own estimation based on data and information reviewed during Caribbean Waste Market Review.

The estimated recycling rate in Sint Maarten is around 11%, which is slightly below the regional average of 12%, see following Figure. However, regional average is probably higher than 12% as the data and information on recycling in Haiti and Dominic Republic are very scarce.

<sup>14</sup> Nature Foundation of Sint Maarten (<https://naturefoundationsxm.org/2019/08/29/nature-foundation-st-maarten-expresses-appreciation-to-businesses-that-have-reduced-use-of-single-use-plastics/>)



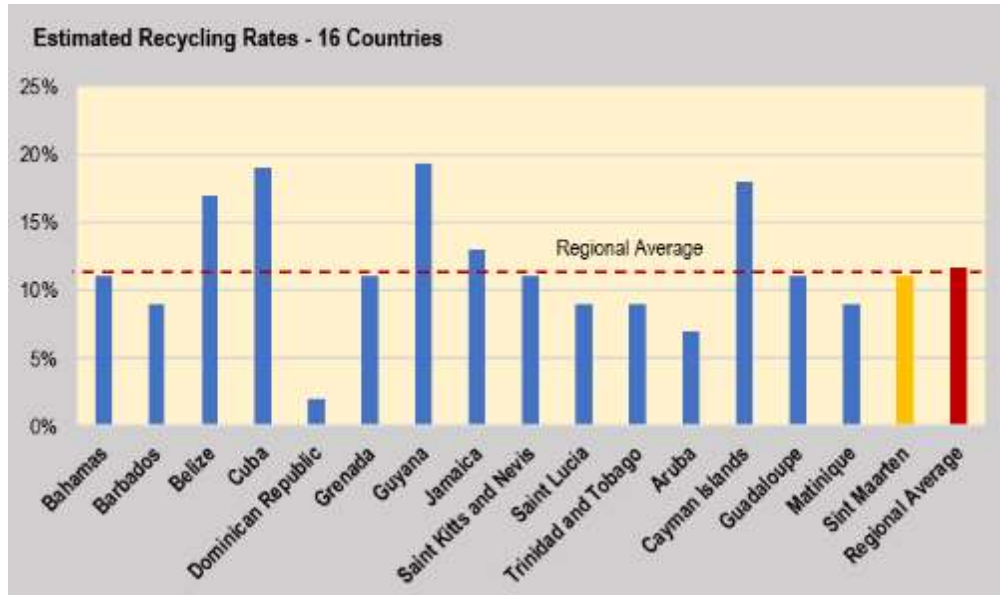


Figure 2.28: Estimated Recycling Rates – 16 Countries

The analyses above showed that the CARICOM countries like in Sint Maarten, have not sufficient industrial infrastructures which support processing the recyclables in-house or in the region, rather they rely on export of the recyclables as secondary material to the markets/countries that have more developed industrial infrastructures such as USA, China, India, Taiwan, and for small amounts to Canada and European countries. This also means that approximately 85 - 88% of waste ends up in landfills in CARICOM region as in Sint Maarten.



# CH – 3

## WASTE MANAGEMENT



### **3. Waste Management**

#### **3.1 Waste Collection & Transport Assessment**

Currently, curbside collection is applied in the country, except the large-scale touristic facilities, airport and main port in Point Blanch district. The waste collected is hauled directly to Pond Island MSW landfill in Philipsburg. There is no waste transfer station within the collection system.

All waste collection and transport activities in Sint Maarten are under responsibility of VROMI. The waste collection and transport of household waste (HH waste) and institutional waste including schools are executed by outsourcing the services to private service provider firms with a Terms of Reference (TOR) prepared by VROMI through open tenders for the period from April 01, 2016 to March 31, 2021 (five years).

District cleaning waste activities are also arranged and executed by outsourcing the services to private service providers through open tenders for the period from August 01, 2019 to July 31, 2022 (three years), with the possibility of an extension with a maximum period of two (2) years.

Sint Maarten has been divided into eight (8) waste collection parcels for collection of household waste and commercial/institutional waste, and 13 parcels for collection and transport of district cleaning waste (area cleaning waste) including street sweeping waste and waste from public spaces – roads, sidewalks, drives, alleys, squares, public schools, beaches, public cemeteries, and parks.

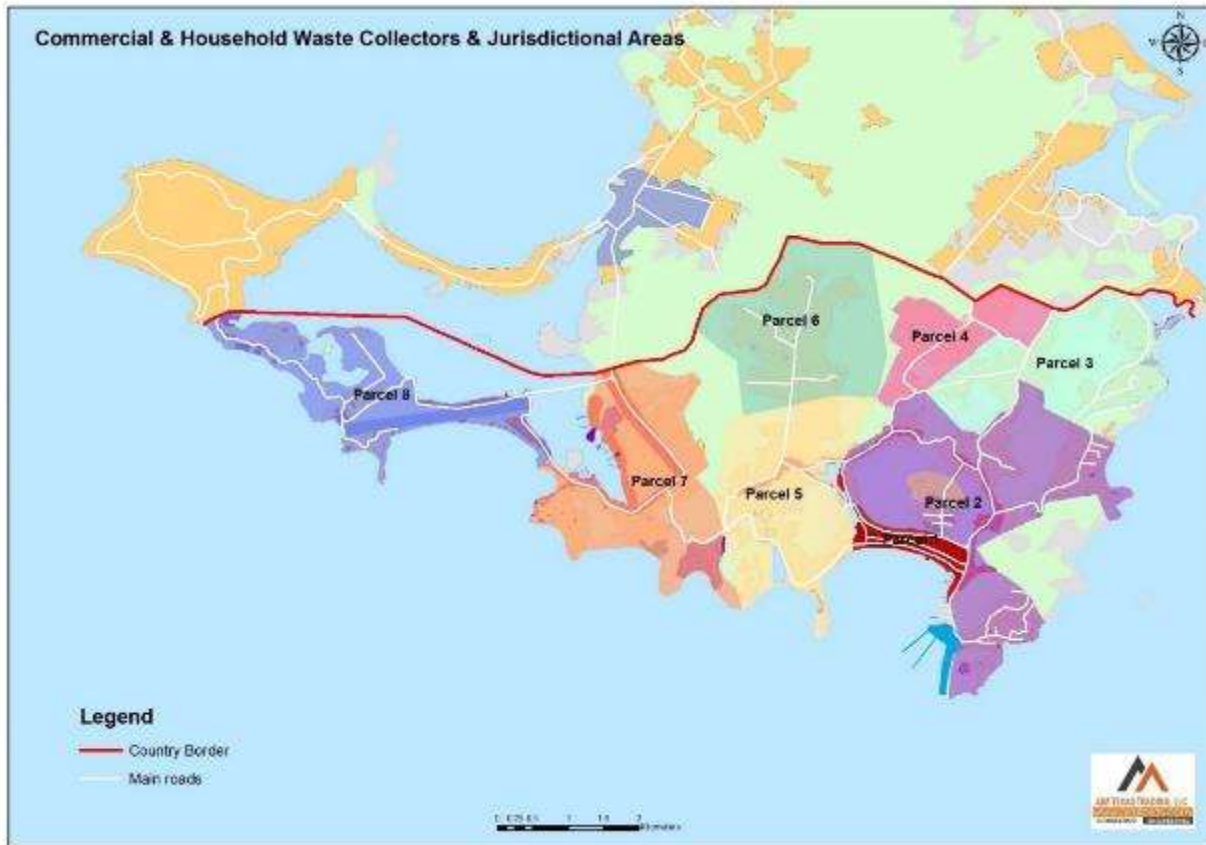
However, waste collection and transport from commercial industrial premises are executed by private un-contracted waste collectors in un-regulated form.

##### **3.1.1 Households and Institutional Waste Collection & Transport**

The Ministry of VROMI of the Government of Sint Maarten has made preparations for new multi-annual contracts for the HH waste collection and transport services, which are to be publicly tendered. For better management and control of the execution of the works it was decided to divide the territory of Sint Maarten into eight (8) work districts (parcels).

The below map shows the jurisdictional areas of eight (8) household waste collection parcels.





**Figure 3.1: Household and Institutional Waste Collectors Jurisdictional Areas**

*(Illustrated by Aim Texas GIS Team, September, 2019)*

VROMI reports that five waste collectors collect waste from households and institutions including schools. The TOR prepared and announced by VROMI for household and institutional waste collection and transport gives mainly 17 waste categories/waste types in its definition part, those are given in the following Table. However, the waste category definition is very complicated and creates confusing. The categories/waste types should be re-designed appropriately according to general concept of waste industry or waste categories in EU regulations.

**Table 3.1: Waste Categories Defined in TOR for HH, Commercial and District Cleaning Waste**

| Waste Categories |                            | Definition in TOR   |
|------------------|----------------------------|---|
| 1                | Domestic Solid waste       | Waste from private households, not being waste similar to other defined waste categories.   |
| 2                | Garden Waste               | Garden waste of small size and weight which can fit in a mini-roll container (kart) or garbage bag, not being waste similar to other defined waste categories   |
| 3                | Old Paper and Carton waste | Magazines, newspapers, print work, packaging board (boxes, also egg cartons) and print paper remains, not being cartons of milk, custard, fruit juice etc., photographs, wall paper, vinyl, key paper, plasticized paper and plastic, binders, paper towels and handkerchief, toilet paper and paper pampers. |



|    |   |  |
|----|---|--|
| 4  | Bulky Domestic waste                            | Domestic waste from private households, too large and heavy to be stored in a mini-roll container or garbage bag, such as furniture and electrical appliances, large appliances or white scrap (refrigerators, ovens, TV's, computers), and white goods (bathtubs, toilets, sinks), carpets, car tires, machines and similar waste, not being waste similar to other defined waste categories.   |
| 5  | Bulky Garden waste                              | Pruned branches that do not fit in a mini-roll container or garbage bag, sawn trunks up to a diameter of twenty centimeters (20 cm.) and length of one hundred and fifty centimeters (150 cm.), not being sand, dirt, trunks, fences, garden gates or tiles and not being similar to other defined waste categories.<br>Collection   |
| 6  | Medical Waste                                   | Waste from medical institutions and posing a possible danger for public health and environment   |
| 7  | Glass Waste                                     | Glass bottles such as empty bottles and jars, glasses, not being crystal glass, bulbs discharge lamps, fluorescent tubes, oven dishes, pottery, porcelain, glass windows and mirrors   |
| 8  | Animal Carcasses                                | Dead animals, bones or slaughter waste   |
| 9  | Vehicle Wrecks                                  | Motor vehicles with two (2) or more wheels that are technically in an inadequate condition and in an apparently neglected condition  |
| 10 | Stray Garbage (Litters, etc., in public spaces) | Waste in public areas such as bottles, tins, paper, plastic etc.   |
| 11 | Recyclable Waste                                | Old paper and carton waste, glass waste, plastic bottles, tin cans   |
| 12 | Construction Demolition Waste (C&D waste)       | Debris, concrete blocks, tiles, concrete, cement, asphalt, roof sheets, roof tiles, sand, dirt, wood, trunks, metals, insulation materials, cables, glass and similar waste that are used in the construction of roads and buildings or result from demolition works, not being waste similar to other defined waste categories  |
| 13 | Archive Waste                                   | Documents, bank statements, accounting and other valuable papers that are separately collected and destroyed in designated areas   |
| 14 | Hazardous Commercial Waste                      | Waste from businesses with a danger for public health and environment, such as adhesives and sealants, paint, solvents, acids, bases, cosmetics, medicines, pesticides, cleaners, discharge lamps, toners, fats, oils, oil contaminated waste and batteries, not being waste similar to other defined waste categories   |
| 15 | Small Chemical Domestic Waste - like HHW        | Waste from households contaminated with chemical substances harmful for public health and environment such as domestic products (batteries, liquid drain cleaner, pesticides, bulbs, lamp oil, insecticides, discharge lamps, petroleum, etc.), do-it-yourself-products (paints, varnishes, stain, etc.), paint products (turpentine, mercury switches, wood preservatives, thinner and stripper, paint thinner and brush cleaner, heating thermostats, gasoline, etc.), from the medical cabinet (mercury thermometers, medicines, needles, etc.), hobby materials (fixers, etching liquids, etc.) and transport items (batteries, oil filters, motor oil and gasoline, brake fluid, waste oil, etc.) |
| 16 | Commercial Waste                                | All other waste not being similar to other waste categories  |
| 17 | Particular Waste                                | Waste specifically defined in a Ministerial Decree   |

Source: Terms of Reference, Collection of Solid Waste on Sint Maarten 2016 - 2021

The TOR for HH waste collectors stipulates that two types of waste containers are used for single-family housing units and low-rise apartment blocks in the parcels, which are 120 liters and 240 liters plastic containers with wheels and lids. All containers are provided by the government, but their storage, distribution to collection points, maintenance and cleaning of them are under responsible of the waste collection and transport contractors.



The consultant observed in site visits to Sint Maarten that the containers in question, many of which are heavily damaged and some of them are not in usable condition, and located inappropriate waste collection points, see following figures. However, no inventory could be obtained from the current waste collectors within the performance period of this report.

Mainly, curbside collection scheme is applied with different frequencies that vary district by district, even in somewhere street by street.



**Mini-Roll Containers**



**Mini-Roll Containers Along the main Roads**



**Mini-Roll Containers**



**Collective Containers**

**Figure 3.2: Different size and type plastics waste containers in the neighborhoods and metal skid container with volume of 2.5 cubic meter for bulky domestic waste**

### Collection Frequency Currently Applied

The TOR for collection and transport of household and commercial/institutional waste comprises the waste collection frequencies in detail. The following Table summarize the collection and transport frequencies currently applied.



**Table 3.2: Waste Collection Frequency for Households and Commercial Premises**

| Waste Types and Generators   |   | Frequency  |
|--|---|--|
| <b>Domestic Waste, Garden Waste, Scrap Paper/Cardboard</b>   |   |  |
| 1  | Households – Mini- Roll Containers along main roads                 | Once a Day   |
| 2  | Households – Neighborhoods – mini- roll containers along main roads | Three Times a Week                                       |
| 3  | Households – Multi-Family Buildings – Collective Containers         | Three Times a Week                                       |
| 4  | Philipsburg – Mini-Roll Containers, including roads                 | Once a Day, if required, more often                      |
| <b>Bulky Domestic Waste and Bulky Garden Waste</b>   |   |  |
| 1  | Households and Garden Waste – Less than 2 cubic meter               | Once a Week (Every Week)                                 |
| 2  | Households and Garden Waste – 2 cubic meter and more                | Sole Responsibility of waste generator                   |
| 3  | Yard/Garden Waste   | No later than two (2) weeks prior every hurricane season |
| <b>Medical Waste</b>   |   |  |
| 1  | Medical Waste   | Once a Week  |
| <b>Scrap Glass and Other Recyclables – Centrally located recyclable waste collection points per parcel</b> |   |  |
| 1  | Scrap Glass and Other Recyclables                                   | Once a Week  |
| <b>Animal Carcasses</b>  |   |  |
| 1  | Animal carcasses in Public Areas                                    | Within two (2) hours after notification                  |
| <b>Commercial waste</b>  |   |  |
| 1  | Philipsburg   | Once a Day   |
| 2  | Along Main Roads  | Once a Day   |
| 3  | Other Areas   | Three Times a Week                                       |

Source: Terms of Reference, Collection of Solid Waste on Sint Maarten 2016 – 2021

### 3.1.2 District (Area) Cleaning Waste Collection & Transport

The territory of country has been divided into thirteen (13) work districts/parcels for this work. The below map shows the jurisdictional areas of 13 District Cleaning waste collection parcels. The coverage areas of these parcels are given in Figure 3.3.

#### Scope of District Cleaning Contractors

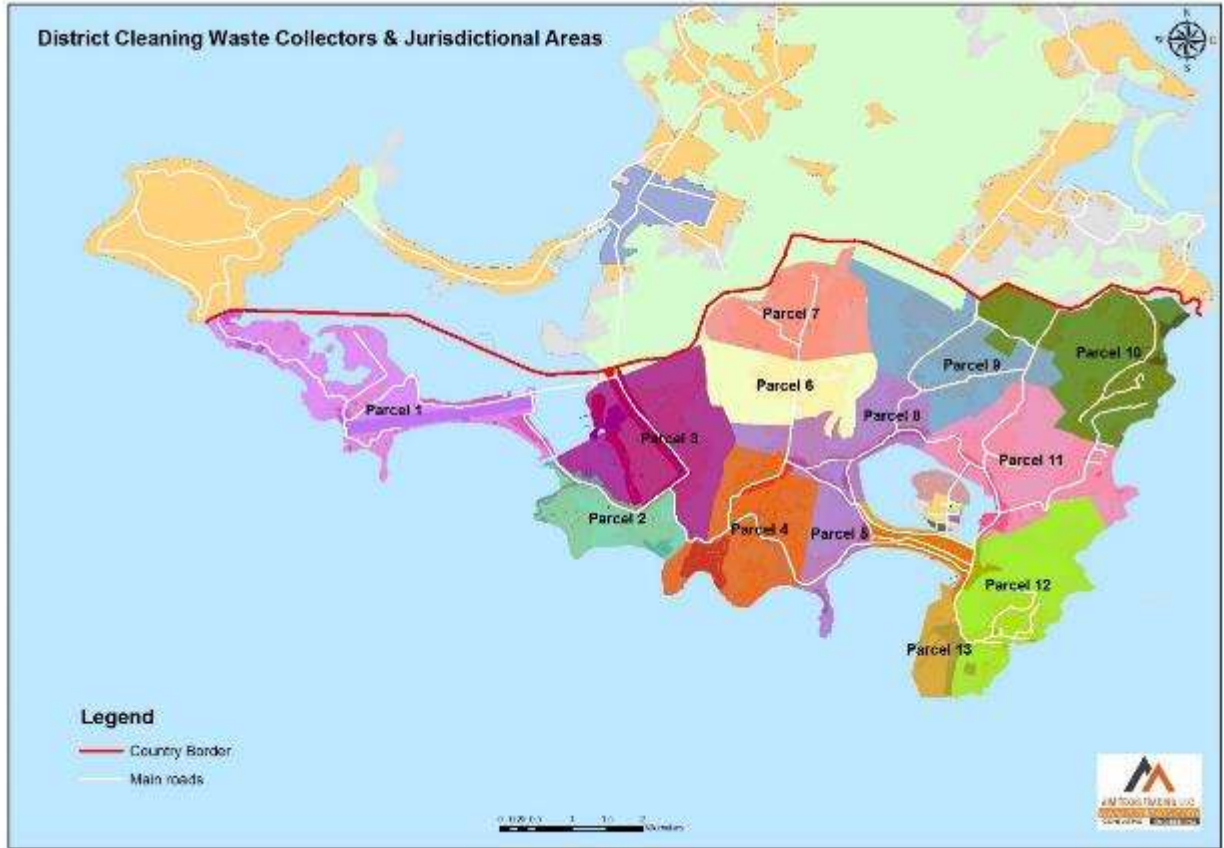
The scope of the District Cleaning Contractors in TOR prepared and announced by VROMI is conceived as follows.

- Cleaning and keeping clean the public areas in the districts (secondary roads, tertiary roads, other roads not being main roads, side-walks, swales, drives, alleys, squares, public schools, parks, beaches, public cemeteries, etc.;
- Removing erosion materials in the public area in the districts and disposing it on the Landfill;



- Cutting, pruning, maintaining and collection of overgrown trees and bushes hanging over the public area in the districts;
- Submitting Complete monthly reports and detailed work schedules to VROMI by means of a format to be provided by VROMI;
- Informing VROMI of shortcomings and damages pertaining the infrastructure in the districts which will be added as part of the submitted monthly reports to VROMI.

The below map shows the jurisdictional areas of 13 District Cleaning waste collection parcels.



**Figure 3.3: District Cleaning Waste Collectors Jurisdictional Zones**

*(Illustrated by Aim Texas GIS Team, September, 2019)*

### District Cleaning Coverage

The spaces that are covered for district cleaning are described in TOR prepared by VROMI for District Cleaning contractors. 10 space types are defined in VROMI's TOR, and those are summarized in the following Table:



**Table 3.3: Definitions for Spaces to be cleaned**

| Area to be Cleaned |               | Description  |
|--------------------|---------------|--|
| 1                  | Beach         | The strip of sand with a width of at most 50 meters, of which the surface consists of natural sea sand, situated along the sea                         |
| 2                  | Cemetery      | Cemeteries   |
| 3                  | Hard Surface  | Concrete or Asphalt  |
| 4                  | Main Roads    | Roads  |
| 5                  | Side Walks    | A paved or unpaved path for walking, often along-side a road   |
| 6                  | Swale         | A water way passage along-side of the road   |
| 7                  | Public Area   | The public space between boundaries of private properties that is frequently used by the general public  |
| 8                  | Public Roads  | All streets, roads, Side-walks, swales, alleys, drives designated for public use   |
| 9                  | Public School | Schools maintained and insured by Country Sint Maarten   |
| 10                 | Road side     | Part of the road between the driving lane(s) and boundary of private property with a maximum of three (3) meters from the edge of the driving lane(s). |

Source: Terms of Reference, Collection of District Cleaning Waste on Sint Maarten 2019 – 2022.

The TOR prepared and announced by VROMI for District Cleaning waste collection and transport gives mainly 3 waste categories/types in its definition part, those are given in the following Table.

**Table 3.4: Waste Categories/Types for District Cleaning**

| Waste Categories |                         | Definition in TOR   |
|------------------|-------------------------|---|
| 1                | Green Waste             | Grass clips, cut and pruned bush and trees and tree trims   |
| 2                | Stray Garbage (Litters) | Waste, such as bottles, tins, paper and plastic, including sand, stones and similar discarded objects which are in public areas |
| 3                | Erosion Materials       | Boulders, stones, gravel and sand that are a result of rainfall and/or another natural disaster                                 |

Source: Terms of Reference, Collection of District Cleaning Waste on Sint Maarten 2019 – 2022.

### Duration of the District Cleaning Contractors' Contracts

According to TOR of VROMI for district cleaning activities, the duration of the Contracts for District Cleaning will be for three (3) years with the possibility of an extension with a maximum period of two (2) years.

### Collection Frequency Applied

The TOR for District Cleaning waste comprises the waste collection frequencies with quiet details. The following Table summarize the collection and transport frequencies currently applied.



**Table 3.5: Collection Frequency for District Cleaning Waste**

| Waste Types and Generators  |  | Frequency             |
|---|--|-----------------------|
| <b>Secondary public roads, roadsides and beaches – stray garbage and erosion materials</b>  |  |                       |
| 1   | Any strip of land greenery on the beach and three (3) meters adjacent to the beach other than the water side | Once a Week           |
| 2   | Sweeping of hard surfaces (concrete and asphalt)   | Once a Week           |
| 3   | Swales and Side Walks  | Once a Week           |
| <b>All Public Areas and Cemeteries – stray garbage and erosion materials</b>  |  |                       |
| 1   | All public areas and cemeteries  | Once biweekly         |
| 2   | Sweeping of hard surfaces (concrete and asphalt)   | Once biweekly         |
| <b>Cutting and collection of grass, wild vegetation on roadsides of main roads, and intersections up to maximum of three (3) meters from the road (driving lane(s))</b> |  |                       |
| 1   | Cutting and collection of grass  | Once a Month          |
| 2   | Removing of grass that overgrows on the road   | Once a Month          |
| <b>Cleaning of paved/concrete sidewalks and walkways, from sand, erosion, debris, weeds and stray garbage</b>   |  |                       |
| 1   | Cleaning of paved/concrete sidewalks and walkways  | Once a Month          |
| <b>Pruning and collection of branches of overgrown trees and bushes on roadsides of main roads</b>  |  |                       |
| 1   | Roadsides including intersection roadsides   | Once every two months |
| 2   | School Yards   | Once every two months |
| 3   | Cemeteries   | Once every two months |
| 4   | Beaches  | Once every two months |
| 5   | Other Public Areas   | Once every two months |
| <b>Cutting and collection of grass and other wild vegetation in the following public area</b>   |  |                       |
| 1   | Public School Yards  | Once a Month          |
| 2   | Cemeteries-up to one (1) meter outside the boundary  | Once a Month          |
| <b>Cutting and collection of grass and other wild vegetation</b>  |  |                       |
| 1   | Roadsides (not being main roads): up to maximum three (3) meters from the road (driving lane(s))             | Once every two months |
| 2   | Intersection roadsides: up to maximum three (3) meters from the road   | Once every two months |
| 3   | Beaches: up to three (3) meters outside the boundary   | Once every two months |
| 4   | Other Public areas   | Once every two months |
| <b>Small Garbage Bins and Urns in all Public Beaches</b>  |  |                       |
| 1   | Small garbage bins and Urns in all Public Areas  | Three Times a Week    |

Source: Terms of Reference, Collection of District Cleaning Waste on Sint Maarten 2019 – 2022.



### 3.1.3 Commercial Waste Collection

As mentioned earlier, commercial waste is collected by private un-contracted waste collectors in un-regulated form. There is an open subscription system between the waste generators and private haulers for collection and transport of commercial waste. Unregulated and uncontrolled form of commercial waste collection in the country cause informal diversion of recyclable materials from main stream. These private collectors/haulers do also not pay any tipping fee at the gate of the Pond Island MSW landfill.

There are more than 10 private companies, though their numbers are changing time to time, which collect waste from commercial premises, hotels and restaurants, and dispose the waste into the MSW landfill without paying any tipping fee, despite the fact that they collect fee from their customers. The collection fees imposed by private collectors vary according customer's type of business and size.

The waste fees vary between US\$ 30 - 50.00 per month for a small shop of retail business and US\$ 80 – 150.00 per month of restaurants and bars. Hotels and resorts are paying a collection fee of approximately US\$ 10.00 per room per month depending of agreements with the waste collectors.

Small scale retail businesses use 120 – 240 l plastic containers mostly provided by private waste collector, but most hotels use compaction unit for waste deposition (see below picture), and separate some recyclable fractions such as paper, plastics, and metals from the waste before compaction, and sell them to both their own collectors or other recyclers/junk shops in the island.



*A Waste Compactor in a Resort Hotel*



*240 l Plastic Container in a commercial district*

**Figure 3.4: Waste Collection Containers and Waste Compactors**

### 3.1.4 Industrial Waste Collection

There is no heavy industry and middle and large-scale industrial activities in Sint Maarten, industry sector comprises of only small-scale workshops (carpenters, blacksmiths, plumbers, car repair shops, etc.). They are using communal roadside containers for disposal of their waste. See following Figure.





**Figure 3.5: A big size metal communal container in a light industrial area**

However, relatively big size light industrial facilities haul their waste directly to Pond Island MSW landfill with their vehicles without paying any tipping fee.

### **3.1.5 Medical Waste Collection**

There are only one hospital and one ambulatory clinics in Sint Maarten as medical facilities. Non-hazardous medical waste is collected and transported by VROMI's contracted waste collectors, and hauled to Pond Island Landfill as the medical institutions are using the communal containers for non-hazardous medical waste.

### **3.1.6 Special Waste Types Collection**

#### **Construction & Demolition Waste (C&D)**

VROMI reports that there is also no special program to collect / transport and processing the C&D waste in Sint Maarten. C&D waste owners (individuals and/or companies) bring them to the landfill for dumping with their vehicles, and all of them are simply dumped in landfill area.

There is only one C&D waste processor in the country, that is namely Windward Roads Construction Company. It reports that they are processing the C&D waste in limited amount for producing the secondary aggregate for use of them as subbase and fill material in road construction activities in their contracts. Aim Texas field team has interviewed with the Company. However, they didn't give any information on amount of C&D waste they processed. They gave only some prices of cost of secondary aggregates produced from C&D waste. They stated that cost of one-ton aggregate produced from processing of C&D waste is nearly half of it produced by the virgin material; that is around US\$22 per tonne, while one tonne aggregate produced by virgin material was US\$ 35-45 dollars because virgin material can only be found in French side. They also stated that they have prepared a business plan for the government for producing secondary material from the C&D waste in the island, and submitted it two years ago to the government. However, they could receive no answer from the government until now as the government is working on establishing an ISWMS for the country with support of World Bank, and wish to arrange all the waste management activities according to new waste management strategy.



### **Hazardous Medical Waste**

VROMI reports that medical waste collection, deposition and processing are currently handled by the medical facilities themselves according to directives of Ministry of Health of Sint Maarten.

### **WEEE & Durables**

There is no special collection program for collection and disposal of WEEE in Sint Maarten. VROMI reports that WEEE owners (individuals and/or companies) bring them to the landfill for dumping with their vehicles, and all of them are simply dumped in landfill area without no fee.

There are also no scrap processors which collect those for processing or selling out of the island.

### **Car Batteries**

There is no processor which deals with the car battery processing. Some scrap dealers are collected and export them out of island through regional recyclers.

### **Hazardous Industrial Waste**

The hazardous industrial waste eventually ends up in the Pond Island MSW landfill as disposal of this type of waste is not under control in the country despite the fact that the waste law of Sint Maarten has some articles which arrange handling of hazardous industrial waste.

### **Disaster Waste**

Irma debris is deposited in 2017 without separation of wooden fractions, and some contaminated building materials and concrete parts in IDDS in Pond Island. Auto bodies, large metal fractions are separately collected and accumulated in a metal junk yard nearby IDDS for adequately dismantling the car wrecks. However, due to insufficient equipment for handling of car wrecks accumulated in junk yard, separating, shredding and baling activities still continue. The junk yard is operated by a private contractor.

The government also planned to remove the mixed disaster debris IDDS and junk yard under Emergency Debris Management Project (EDMP) of Sint Maarten.

### **Covid-19 Effects on Waste Collection in Sint Maarten**

Governments focus have been on the collection and transport of waste away from population centers during Covid-19. According to IFC report (see footnote 13), recycling of plastic and other products has slowed substantially. While the immediate driver for the slowdown is the perceived risk of COVID-19 transmission, other key factors include supply chain disruptions and reductions of manufacturing and commercial activity. There is a risk that the economic recession combined with low commodity prices may increase reliance on cheaper virgin raw material instead of recycled feedstock.

Effects of COVID-19 on waste collection may be experienced in Sint Maarten in the following form:

- Most collected waste, including recyclables, may be transported to landfills or accumulates at temporary dumps;



- Hazardous materials in waste stream based on increasing of use of plastic-based personal protective equipment (PPE) such as gloves, masks, and disinfectant bottles, as well as packaging materials, may increase during COVID-19.

### 3.1.7 Gap Analysis

The waste collection & transport system in Sint Maarten has following apparent gaps, which are:

#### 1. Lacking in the Extent of Accountabilities:

Waste collection and transport system is vested with some lackings in the extent of accountabilities of the parties involved, i.e., lack of collateral business relationships between the major players in SWM and waste collection and transport activities such as between VROMI and the airport authority,, port authority, Ministry of Public Health and Social Development and Labor (VSA), GEBE, and unregulated private waste collectors by the central waste management authority (VROMI). This is possibly because of no ties between them, which can be provided by the regulations. This situation causes to the extent of accountabilities in solid waste collection & transport remain unattended.

#### 2. Lack of Integrated Waste Collection and Transport System Regulated as a Whole:

Only household and institutional, and area cleaning waste collection and transport is regulated by the central waste management authority.

Commercial, industrial (hazardous and non-hazardous) waste collection and transport are unregulated; An open subscription system is in place for collection and transport of waste from the commercial and industrial waste generators, i.e., hotel, resorts, restaurants, private office buildings, small and light industrial waste generators; which in turn does not support the general revenue system of SWM in the country as these waste collectors are tipping the waste without paying any tipping fee/gate fee in the landfill.

#### 3. Collection Points and Collection Type:

In general, the curbside collection is applied in Sint Maarten. However, in most business districts in which the residential and commercial urban fabric are mixed, some small businesses use the communal containers which are allotted for households, government institutions and schools.

Medical waste (hazardous and non-hazardous) collection and transport and disposal are also not regulated appropriately, so that significant amount of hazardous medical waste ends in the MSW landfill.

Hazardous and non-hazardous industrial waste are collected together with regular municipal waste in many collection points as the same communal containers are used for both hazardous industrial and non-hazardous municipal waste types, including area cleaning waste.

Almost all waste types collected contain construction waste fractions, HHW, and other recyclable materials such as scrap paper, plastics, metals, glass.



Collection points, size and number of the containers for curbside collection are not determined according to a survey for waste generation by source.

#### **4. Source Separation and Separate Collection of Different Waste Streams**

The current waste collection and disposal scheme does not contain any measure or application to provide separate collection of different waste types such as separate arrangements for collection, temporary deposition and treatment of special waste types such as C&D waste, hazardous industrial and medical waste, HHW, car batteries, and WEEE and durables.

Although those remain very weak, there are source separation efforts by waste collectors in cooperation with big hotels/resorts, few restaurants, few NGOs and CBOs, informal recyclers/waste pickers, and airport authority. However, these efforts and informal diversion of recyclables during collection cycles create a chaotic recycling market in the country, and therefore, recycling market in the country is informal and unregulated centrally by a waste management authority.

#### **5. Data & Records**

No data and liable information are available for current waste collection system as the collection system is regulated partly, and VROMI has no sufficient source to adequately control and track the waste collection activities in the country.

#### **6. Equipment & Machineries**

Absence of proper machineries and equipment for cost-effective waste collection system is apparent.

#### **7. Policy and Programmes Centrally Arranged**

No policy and program support by waste management authority/government for efforts of CBOs, NGOs, and commercial community for separate collection of waste.

#### **8. Environmental Health & Safety**

EHS measures are not taken during waste collection and transport, and totally underestimated.

#### **9. Disaster Waste**

There are still uncollected disaster wastes, including car wrecks, large scrap metals in the private premises, although almost all disaster debris on road sides and public lands is collected.

#### **10. COVID-19 Effect on Waste Collection**

It is apparent that COVID-19 effects will create fluctuation on waste collection scheme of Sint Maarten as the waste generation decreased significantly, this in turn will affect the waste collection and transport companies in the country due to a large portion of their costs deriving from hourly labor and fuel, most will be unable to continue providing this critical service in the absence of continued payment.



Similar effect will be observed on small and large recyclers as the manufacturing sectors have sharply fell down globally. Therefore, although waste generation has been decreased, almost all recyclables collected will end in the landfill.

Social effect of this situation is expected to be felt by the workers that are employed in waste collection sector as the waste collection companies will decrease the number of employees significantly, although the Sint Maarten government has put in effect “A Stimulus & Relief Plan” since April, 2020.

### 3.1.8 Recommendations

Consultant recommends the following measures that should be in place for adequately manage the waste collection and transport system of the country with a holistic approach.

#### 1. Technical

- Install a weighbridge with a suitable software would allow to adequately record the waste amount by waste type and waste generator daily, and create a database for waste collection system. This would also allow the real data transferring these records into billing and accounting of the waste management system as well as having knowledge on peak days of waste receipts during typical weeks.
- Conduct collection system mapping in order to enable the dedicated routes and service providers for key waste source categories and the potential for dedicated routes that would address wastes most ideally suited for resource recovery, for example:
  - Routes for waste that are high in paper, packaging, and other readily combustible materials, (such as offices, hotels, retail stores, schools, cruise ships);
  - Routes that are high in putrescible organics (such as restaurants, markets, and landscaping activities); and
  - Routes that are predominantly mixed wastes (e.g., households, cargo ships and yachts, airport and ship port).
- Conduct collection route optimization and system configuration analysis according to sector specific best practices, to determine the system needs for urgent improvement, including standardization of collection points in accordance with environmental measures that should be taken.
- Analyze the possible locations of the color-coded containers that will be placed at different points as a mid-term measure for separate collection of the recyclables at source for enhancing the recycling potential.

#### 2. Management

- Develop regulations for waste collection & transport system in order to keep under control all activities related to waste collection and transport, including for those related to data keeping and registering them in the central waste management authority, standard



procedures for waste collection, source separation or separate collection of recyclables, and diversion of recyclables during collection cycles.

- Develop the tariffs for collection and transport system that arrange the upper and lower limits affordable for all waste generator groups, i.e. households/institutional, commercial, and industrial, classifying the commercial and industrial waste generators in accordance with their size.
- Provide policy support by waste management authority/government for efforts of CBOs, NGOs, and commercial community for separate collection of waste.
- Provide policy support for EHS measures in waste collection and transport.
- Develop and implement comprehensive, transparent, equitable, and inclusive contracting and licensing arrangements for all waste collectors of domestic and commercial wastes, where needed to supplement systems already existing.
- Arrange and establish a waste collection database, and provide access to the public.
- Examine and draft suggested improvements to the existing household/institutional and area cleaning waste collection contracts for future contracting, studying and recommending improvements to existing waste collection contractual instruments where appropriate.
- Examine and draft contracts for commercial waste collectors according to the results of collection routing and system configuration analysis.
- Provide policy support for EHS measures in waste collection and transport.
- Conduct emergency measures to collect separately with special measures the hazardous waste (gloves, masks, etc.) sourced from COVID-19 implication.

### 3.2 Assessment of Waste Disposal & Treatment

As mentioned earlier, there are two landfills in Pond Island of Philipsburg, one of which MSW landfill is lying at the north-western part of the Pond Island, and second one is Irma Debris Disposal Site (IDDS) is lying at north-eastern part of the island. See following Figure.

The Pond Island has mixed land use practices with administrative, educational, sports, residential, and commercial along with waste disposal sites. The Government House, TELEM Group building, University of Sint Maarten, Little League Baseball Stadium, VROMI's parking lot, residential and commercial buildings nearby the landfill, Carnival Village, and a Soccer Field (occupied by Irma landfill site) are all located in Pond Island.

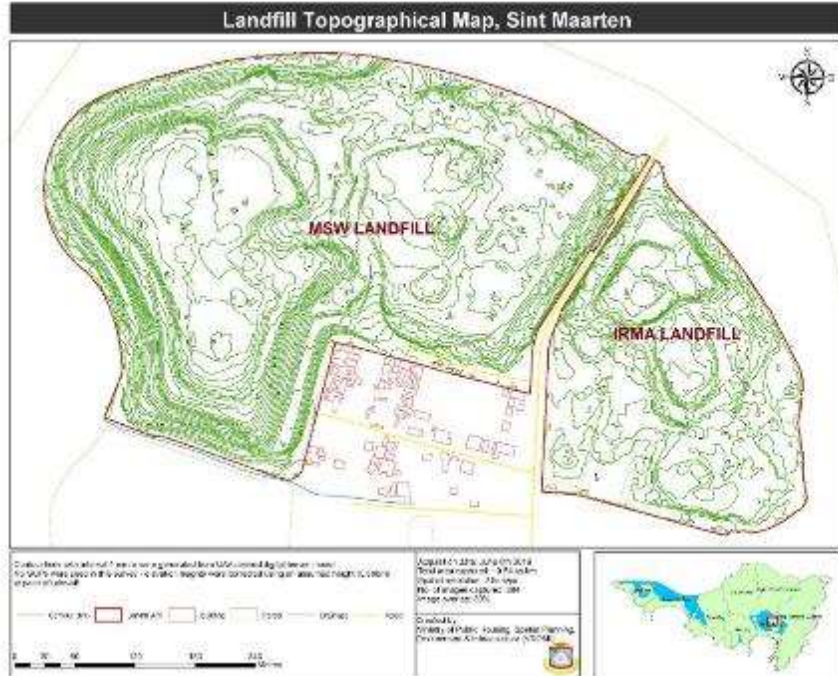
Access to landfill is via Soualiga Road, which traverses the Pond Island in South – North direction. The access road to Landfill is named officially as “Brine Drive”. Right of way of Soualiga road is 15-m in width with sidewalks.

Immediately land uses adjacent to landfill are as follows:

- Nearby area of the landfill in Southern part along landfill entrance is used as residential and commercial mixed land use built-up area;



- Immediately North and West of the landfill are surrounding by Great Salt Pond;
- The neighbor plot South-West of the landfill is a vacant area owned by Government;
- In opposite side of the Soualiga road right across the landfill Irma landfill and a wrecked cars junkyard is located.



**Figure 3.6: Map of Pond Island Landfills (MSW and Irma)**  
(Source: VROMI)

Both landfills are managed by VROMI by its own staff in limited number. Infrastructure Management Department of VROMI has 20 staff for waste management activities. Of these staff, only 11 of them are employed for solid waste management, including landfill management.

Irma landfill does not accept municipal waste, but only Irma debris. However, disposal of Irma debris is nearly ended by the end of 2019 as almost all of the Irma debris are collected and conveyed to IDDS. The government and WB team has recently intended to remove the debris in the landfill, separating it into inert, wooden, metals, plastics and debris fines through a trommel screen. The recyclable fractions of inert construction and demolition debris, scraps metals and plastics will be removed to another place to be dedicated by the government, and non-contaminated fines would be hauled to the MSW landfill for re-use as daily cover materials, mixing the sands and soils.

Accordingly, removal of debris deposited in IDDS is planned within the Short Term plan activities, and cost of this activity is included in the prospective budget of the planned activities in the Short Term plan period.



### 3.2.1 Disposal & Treatment Processes

The current waste disposal practices do not meet basic hygiene, sanitation, and ecological requirements. There is practically no waste neutralization and treatment, and they are merely used to amass waste. There is no leachate or gas control and treatment, no groundwater or gas monitoring, there is inappropriate machines/equipment at best, and little or none waste accounting is performed, and there is no compaction activity with an appropriate compactor.

The collected all types of waste are currently tipped to MSW landfill in uncontrolled manner without any separation activity in the landfill, including medical, C&D waste, organic waste, recyclables (paper, metals, glass, plastics, and yard waste), except Irma debris and few recyclable fractions mainly plastics and metal fractions) diverted during collection and hauling by collectors and/or informal recyclers/waste pickers. This creates huge loose volume in the landfill, then in turn causes to volume constraints for future waste disposal.



**Figure 3.7: Current Practices in Landfill**

Although open fires are stopped, the hot spots are determined in the Aerial Infrared Thermographic Survey conducted by EE&G Consultants on 2018 and 2019, see following Figure.



**Figure 3.8: Captured basic Image from Aerial Thermal Infrared Survey**

*(EE&G Consultants, September 26, 2019)*

However, according to EE&G Consultants' thermal infrared survey report, the results did not provide exact temperature readings but a visual with a relative color-coded scale as readings were collected of the surface and may not be representative of or provide usable information about subsurface conditions, but, there was less potential for radiant heat (from the sun) to affect them but there still existed the potential for latent heat to mask the results as the readings were collected at night.

#### **Leachate Collection and Treatment System**

There is no leachate collection and treatment system in both landfills.

#### **Gasification**

No gasification system exists in both landfills.

#### **Stormwater Collection and Treatment or Discharge System**

There is also no such system which can provide the collection of the stormwater and reuse it in landfill applications, desilting or treating and depositing adequately or discharge it appropriately in both landfills.

#### **Compaction of Waste**

As there are no compactors either owned by VROMI or contracted with private contractors in both landfills, and currently excavators are used for compaction of waste, no adequate compaction is provided in both landfills.

#### **Daily Cover and Interim Capping**

Adequate daily cover is currently not applied in both landfills as reportedly suitable daily cover material cannot be supplied in the island. A type of sand for daily cover material is barged in from St. Barths Island. [Although and Alternative Daily Cover \(ADC\) application is recently examined for testing, however, it did not provide to reach the expected results as an ADC application alone would not be effective without taking other necessary measures such as adequately compaction of waste pile, storm water facilities \(down chutes, swales and perimeter channeling\), and etc.](#)

#### **Ring Road and Emergency Entrance**

There is currently no ring road around the landfill and emergency exit in both landfills.



## Material Recovery

No waste separation activities exist in both landfills. The pre-processing activities are also not conducted in both landfills.

## Fire Fighting System

There is also no adequate firefighting equipment and facility in both landfills. There are only two water pumps with no adequate capacity for extracting the water from Great Salt Pond for any fire suppression activity.

## Existing Volume and Waste Density in MSW Landfill

The landfill currently accepts almost all kinds of waste from commercial and residential haulers as well as the waste hauled by some generators with their own vehicles. According to EE&G Consultants' drone surveys conducted in 2018 and 2019, approximately 150,000 cubic meters waste is disposed to the landfill last year. However, as there is no functional weighbridge at the gate of the landfill, it is unknown how much waste by weight is disposed last year. Nevertheless, the volume aforementioned correspond to approximately 110K – 120K tonnes of waste per year, including C&D waste, yard waste from area cleaning activities, household waste, commercial waste, WEEE, industrial and institutional waste.

According to this information and assuming each vehicle can haul 3 - 3.5 tonnes of waste on average at each sortie, approximately 40 - 50 vehicles enter the Landfill each day.

### 3.2.2 Gap Analysis

The following gaps are determined by the consultant with regard to waste disposal and treatment activities in both landfills of Pond Island;

- Absence of land adjacent to the landfill suitable for lateral expansion of the MSW landfill is a serious problem for landfill operational life;
- Access control is not provided at the entrance of both landfills as no weighbridge or other mean in order to check the waste loads and their contents exist at the entrance.
- Both landfills are not equipped with a functional weighbridge that records the weight and other source information on the waste delivered to the landfills;
- Since the incoming waste is not being weighed or monitored in both landfills, the actual tonnages in the landfills are unknown.
- Observations made by our specialists during the site visits in May, June, and August, 2019 and January, 2020 supported that the incoming waste quantity may be less than the estimated as no adequate compaction is done, and density of the current waste pile is less than the one in a regularly and adequately compacted landfill.
- Both landfills are not designed according to sector specific requirements such as no lining at the bottom and no adequately graded slopes;



- No adequate compaction with suitable machineries and equipment in both landfills as there is no compactor in landfill, only the excavators were and are being used for debris distribution, and therefore, compaction is inadequate.
- The waste density of about 800 -850 kg per cubic meter in a landfill indicates spaces that contain no waste inside the waste pile. LFG can easily accumulate in these spaces, and oxygen contact with LFG (mainly methane) triggers deep seated fires or shallow sub-surface fires. Especially, oxygenations of metal fractions in waste pile, and oxygen introduced through cracks and fissures due to settlements in the waste can provide the required oxygen intrusion to start smoldering.
- Crevasses, fissures close to slopes suggest that there are unstable areas on the landfill slopes.
- Slopes near the residential area adjacent to the landfill are very steep.
- No leachate collection, treatment and disposal system also exist in both landfills. As in the MSW landfill, presumably, all leachate is seeping to water table under the landfill and then migrate to the Great Salt Pond, and is diluted in the Pond.
- All landfill machineries and equipment are hired from private contractors. However, VROMI has no guidance and/or method statements for measuring the performances of these contractor due to its non-sufficient resources.
- Perimeter fence is not in adequate, and far from keeping the litters inside the landfill.
- No measures on avoiding of environmental and social impacts of the landfills' daily operations, and monitoring such as:
  - No traffic control at the intersection of Soualiga road with landfill access roads;
  - No environmental monitoring on leachate seeping or littering to the Great Salt Pond;
  - There is a residential/commercial area adjacent to landfill in south and south-east, which is heavily impacted by daily operation of MSW landfill with dispersing of fugitive dust, and is exposed to the risks of slope failure that can create physical damage (including deaths) in a distance of estimated 100-150-m south-southeasterly from toe of the landfill.

### 3.2.3 Recommendations

#### Emergency Measures

- Take emergency measures for protecting the residential/commercial area south and southeast of the landfill from the potential slope failure during the landfill operation and improvement activities, including resettlement of the people reside in residential/commercial area;
- Take measures for mitigating the environmental and social impacts of daily operation of the landfills such as measures to prevent the fugitive dust spread, heavy traffic around the landfill entrance;



- Provide and install a mobile weighbridge for the landfill with a suitable software in order to start recording the waste delivered to the landfill;
- Conduct a comprehensive geotechnical site investigation in MSW landfill in order to have necessary data on characteristics of the landfill, in order to make correct decisions about the behavior and characteristics of the landfill waste, which will be base for engineering design of MSW landfill improvement, and distance of safety zone (SFZ) which will provide a buffer for avoiding the damage of potential slope failure during the landfill improvement activities;
- Do not involve any construction, regrading, or interim capping activity in the landfill before completing a detailed geotechnical site investigation and engineering design based on data obtained from the investigation;
- Procure the landfill equipment for compaction, spreading, earth moving, excavation and fire suppression;
- Establish a temporary MRF like waste pre-processing facility (TDSR) to pre-process the accumulated scrap tire, wood waste, scrap glass, and yard waste, in order to reduce the volume of these waste types as those occupy lots of space in the landfill;
- Such waste accumulated in MSW landfill could be converted into the following tradable goods through pre-processing as well as reducing the volume of scraps, this in turn causes to have additional space in MSW landfill, which will allow to gain additional life time for the landfill:
  - Scrap Tire : Crumb rubber or tire chips
  - Wood Waste : Wood chips and wood briquette
  - Yard waste : Chips
  - Scrap Glass : Glass cullet and sand
- Procure other TDSR equipment for pre-processing the scrap tire accumulated in MSW landfill, wood waste (wood pallets, scrap woods from Irma debris and C&D waste), yard waste, scrap glass, and removing the debris in IDDS;
- Put in effect a programme and schedule immediately to avoid the hazardous waste disposal into both landfills as a result of COVID-19 effect.

### Short Term and Mid Term Measures

- Start the landfill improvement activities, including fire suppression activities according to requirements of Landfill Improvement PFS;
- Provide budget for removal of debris in Irma landfill and conduct a tender for hiring a contractor for this activity, screening and separating the inert and other recyclable materials; Haul the separated materials to new C&D waste handling facility area, except the fines and sands that are by-product from this activity; Re-use the fines and sands in the MSW landfill operation.
- Prepare a guidance that complies with best practice applications and EU regulations for landfill management and closure activities;



Establish an Integrated Waste Management Facility (ISWMF), and develop a 20-year DBO contract prequalification documents to implement and operate ISWMF sized to address local municipal wastes only, to be built at a location close to MSW landfill, and also provide treatment for the residuals so that landfill requirements would be largely minimized (as in Japan); The facility operator would take over the landfill operation activities from the interim service contractor as part of this DBO contract; All land and works would be owned by Government, after commissioning and transfer. Investment financing would cover the cost of initial works through the period of commissioning operations and tipping fees would cover the remainder of the any works costs, including any renewal and expansion during the contract period;

- Develop Waste Fee Framework and Tariff Study for waste disposal and treatment (tipping fee for the landfill, gate fee for ISWMF for various waste types), including Developing Software Package for Tracking the Waste, Revenues/Expenditures, and Billing, in order to provide cost recovery for a sustainable waste disposal and treatment system.

### Implementation Arrangements

- Develop a DBO contract prequalification documents with initial contract performance standards adequate to obtain a shortlist of 3 to 5 qualified consortiums to implement the improvement and operation of the MSW landfill initially during Short Term Plan period (5-7 years).
- The DBO contract would handle all municipal waste during the initial 7 years, with an option to expand and extend capacity for the longer term if the results indicate that cost recovery potential expansion of the facility beyond meeting only local municipal waste needs, see Short Term Plan;
- Develop a short-term Service Contract Tender Document to implement operational arrangements for the facility for separately handling of C&D waste in another place other than MSW landfill;
- Hire the Contract to properly operate the facility and provide pre-processing of all inert recyclable materials; All works and use of Contractor equipment would be covered under the service agreement.

### 3.3 Assessment of Recycling & Recovery

Currently, waste management is strongly inspired by the waste hierarchy, an influential philosophy in waste and resource management that prioritizes practices ranging from waste prevention to landfill. Adherence to waste hierarchy is also often equated with the least environmental impact and saving of resources. However, application of the priority orders of waste hierarchy requires strong policy support, that is not in place in Sint Maarten. The European Directive 2008/98 EC introduces the "polluter pays principle" and the "extended producer responsibility" along with waste hierarchy priority orders.



Figure 3.9: Waste Hierarchy



As mentioned in Chapter 2.8.2, the overall waste management in Sint Maarten is unfortunately unable to be perceived as a cohesive and holistic waste management scheme. This situation leaves recycling market unregulated without overseeing. VROMI's Infrastructure Management Department, as single waste management authority in the country, suffers from lack of necessary equipment, human resource, capacity and budget shortage during managing the system. Due to lack of policies and regulations that arrange the recycling market from import to export, absence of robust enough industrial infrastructure to support a circular economy which revolves around the recyclers cause the local recycling market incapable to process the recyclables locally. So that the local recyclers seek out the international markets through regional recyclers, and they are compelled to respond to the existing demand within the Caribbean waste market, and they conform their scrap recycling procedures according to hub areas around the Caribbean.

The relatively small capacity of the local market, and remoteness of the country to international market are also playing important role on orientation of recycling market in the country. The recycling activities result in an estimated recycling rate of 11% in Sint Maarten despite the fact that more than a dozen recyclers are active in the market for pre-processing and exporting the recyclables. This rate is slightly below the regional average (12%), see Table 2.23. This situation shows similarity of recycling market of Sint Maarten to some other SIDS in the region.

There is also no material recovery facility (MRF) publicly or privately owned within Sint Maarten waste management scheme in order to separate the recyclable fractions from the main waste stream for preprocessing or processing. The local recycler companies have only small scrap yards for separating the fractions into specific categories or cleaning or baling them, to sale out of the island (see Figure 2.23).

### 3.3.1 Prevention, Minimization & Reuse

The consultant observed that there are no incentives and disincentives officially arranged or government programme on waste prevention, minimization and reuse by government ordinances in Sint Maarten. Although weak waste minimization efforts are in place in few hotels, restaurants and resorts, using metallic, glass, and porcelain table wares in cooperation with few local recyclers, these efforts remain weak, and do not have wide coverage. There are also no public awareness campaigns and officially approved programmes, which support the public education on waste prevention and minimization.

Apart from the reuse of wooden fractures and scrap rebars for the repair of houses damaged by Hurricane Irma and for formwork, and weak efforts of few recyclers for reuse of wooden fractures in garden furniture production, the reuse of scraps in routine is not a common public behaviour in the country. However, the efforts of Green SXM (a waste minimization initiatives in both Dutch and French part of the island) on separate collection of reusable plastic fractions is worth to be mentioned. Its web-based promotions and public educational materials announced in its web site<sup>1</sup> give significant information on separate collection of recyclable fractions through color-coded containers in French side, and choosing the reusable fractions from the main waste stream before throwing them into the waste containers.

However, today several environmental Non-Governmental Organizations, Non-Profit organizations and initiatives active in the environmental sector, presented a collaborative support letter to the members of parliament for the implementation of the ban on single-use plastic bags, plastic straws and Styrofoam initiated by Member of Parliament Sarah Wescot-Williams. The organizations active in the environmental sector on St. Maarten would like to urge the members of parliament to vote in favor for the proposed

<sup>1</sup> <http://greensxm.com/using-less-single-use-plastic/>



legislation to ban single-use plastics in the upcoming public session of Parliament. Nature Foundations St. Maarten, Green initiatives SXM Collaboration, WasteFactory, Waste2Work Foundation, Environmental Protection in the Caribbean, Freegan Food Foundation, Green SXM, Greenbox, Spaceless Gardens and the St. Maarten Pride Foundation have collaboratively showed their support and are looking forward to hearing about a fruitful continuation to implement the single-use plastic ban.

However, there have been no monitoring conducted by a government department over all these waste minimization and recycling activities as there is no government policy, which regulates the recycling market in the country.

### 3.3.2 Composting

Significant efforts for compost production from biodegradable waste fractions (including PLA) come from Green-SXM in both Dutch part and French part of the island. It is promoting aerated static pile composting and home composting possibilities. Compost production efforts of Green-SXM by use of PLA is in experimental stage as it requires more advanced facilities. It is efforts continue to encourage the people living in both parts of the island, to participate in home composting with add-as-you-go method, tumblers, and bokashi bins, etc. Green-SXM has also a pilot aerated compost facility which is an add-as-you-go pile designed and scaled to process the waste created in a restaurant that serves between 400-500 meals a week. Their intention is to make aerated compost accessible to all in the island. However, it lacks a facility in Dutch part.



**Green-SXM Pilot Aerated Compost Facility in French Part**



**Web based Promotion and Educational Material of Green-SXM**

**Figure 3.10: Green-SXM Efforts for Promoting Composting<sup>2</sup>**

In addition to Green-SXM efforts for compost production and introducing it to all SXM residents, the landfill operator in French side is producing small amount of compost from wood chips mixing them with municipal sewage sludge, and sell to the market for use in homestead lands as no agricultural activity in both Sint Maarten and French part Saint Martin.

<sup>2</sup> <http://greensxm.com/compost/>



Apart from the composting efforts aforementioned, few resort hotels are producing small amount of compost for their needs.

### 3.3.3 Recycling

There are currently no recycling incentives in the country as Sint Maarten has no policy and regulation in force, which arrange the recycling market, and recycling market is totally unregulated. Approximately 11% of the waste generated in the country is recycled in 2009. As mentioned in Chapter 2.8.3, pre-processing and exporting the recyclables in the Caribbean waste market are organized by informal recyclers. The recycled materials collected and exported are mostly composed of metals, electronic waste, car batteries, papers, and plastics. The local recycling market is not interested in collection, pre-processing and selling or exporting of scrap woods, car tires, and recyclable fractions of C/D waste. Over 42% of the recycled material is scrap metals (ferrous and non-ferrous) and car batteries, 9 - 10% of them plastics and electronic scrap, 6-7% paper, and over 40% woods which are internally recycled/reused in the country (see Table 2.16).

Only one beer producer (Caribbean Brewing Company) is working with a local recycler company (Meadowlands) to collect and export the scrap beer bottles form the island. It is also developing a campaign for offering all its clients a rebate for all its empty amber colored bottles towards a purchase on the next case. It also plans to coordinate to locate color-coded containers in some points in the country for both collection of its glass containers and create awareness. However, the company's plans are postponed due to Covid-19 outbreak and limitations.

It should be noted that not all recycled materials come from only Sint Maarten part of the island because there is no control at the cross-border areas between two parts of the island.

### 3.3.4 Energy Recovery from the Waste

There is no energy recovery from waste either by WTE or gasification in the Pond Island landfill of Sint Maarten. However, National Recovery and Resilience Plan (NRRP) of Sint Maarten specifically states that long-term waste solutions developed are expected to “support the development of Government’s roadmap for sustainable solid waste management”, and the list of anticipated cost elements in NRRP specifically includes waste and debris disposal and WTE facilities. NRRP has included a budget of about US\$ 120 million into the NRRP Sanitation and waste management budget for establishing a WTE in the country. The Government Roadmap toa sustainable waste management in the country also foresees that 40% of the waste could be used as feedstock in a WTE. Thus, Short Term plan for establishing ISWMS of Sint Maarten comprised of establishing a WTE with a capacity of 5 - 5,5 MWh (electricity) as an optional facility that may be planned and established within the short term plan period (until end of 2026).

Almost 61% of the waste generated in the country has the energy recovery potential through incineration, and 48-50% for use as RDF. Energy recovery by gasification in the landfill does not seem possible as current MSW landfill has no LFG collection system (installed horizontally and vertical). Although landfill improvement concept foresees installing of vertical gas wells in order to monitor and control LFG generation inside the waste pile, energy recovery from LFG is not an option and economically viable as the current waste pile cannot generate sufficient LFG for energy recovery. So that in the pre-feasibility study for improvement of the MSW landfill in Pond Island recommended only vertical gas wells and gas collection system on top of the landfill for flaring the LFG collected through the vertical wells.



Energy recovery by an Integrated Waste Management Facility (ISWMF) with a suitable WTE module would be viable option for Sint Maarten as 64% of the total waste generated in the country is combustible (see Table 2.12).

However, there is an initiative in French part by Verde Company which is operator of the landfill in French part of the island, to establish a WTE in the capacity to meet the demand initially in French part. Verde also proposes to establish an energy recovery facility for Sint Maarten. The planned facility proposes a four stages treatment process and recovery of energy from the municipal waste, passing RDF prepared through a converter for drying and making it free of pathogens, and feeding the smoldering unit with this RDF, to produce Syngas (Synthetic Fuel Gas) at low temperature (350 ° C) and burning it at 800 ° C, which then feeds a power generation unit (engine, turbine) to generate electricity.

Reportedly known that Verde Company also proposed a similar system to be set up in the area of Philipsburg Port with a capacity of 40 Ktonnes per annum for recovering energy from cruise ship waste. However, these discussions seem to be dropped by the wayside due to COVID-19 implications.

### 3.3.5 Gap Analysis

- There are no incentives and disincentives officially arranged or government programme on waste prevention, minimization and reuse by government ordinances in Sint Maarten, although few hotels/resorts, bars and restaurants support the waste minimization efforts,
- There is no ban on import and use of single-use plastic containers and bags to the island, although there are civil initiatives by few non-governmental organizations on banning of imports and use of single-use plastic bags and food packaging;
- All recycling market in Sint Maarten is unregulated by a specific resource conservation and recovery policy or ordinance. This situation enables local recyclers to opportunistically seek out the international markets through regional recyclers, bypassing regulations and best practices all the while selling the recyclable fractions in the main waste stream as semi-processed recyclables, since there is no robust enough industrial infrastructure to support a circular economy which revolves around these local recyclers, and also there is no industrial and agricultural base for sustaining material reuse & internal processing of recyclables.

Thus, these local recyclers are compelled to respond to the existing demand within the Caribbean waste market, and they conform their scrap recycling procedures according to hub areas around the Caribbean.

- There is no regulation on arrangements of separation at source, and separate collection of the recyclables as well as arranging color-coded recyclable bins in public areas, which are important resource conservation measures.
- VROMI, as single waste management authority of the country, has no sufficient trained staff and financial resources to enable to control, manage and/or oversee the recycling market in the country as well as to improve networking between recyclers and buyers, and support the recyclers and contractors to improve their success in cost recovery from recycling;



- No public education and awareness programmes that are applied by the government or waste management authority (VROMI) on waste management.
- No energy recovery from the waste.

### 3.3.6 Recommendations

- As the solid waste collected is a public good, recycling market should be centrally regulated, which would be set up by a government institution largely as an organization that does data collection, planning, procurement, and financial management;
- Enforce the import of food and other materials that are packed with PLA (bioplastics-Polylactic Acid) to the island, and regulate it by policy and ordinance;
- Create a special unit within current or prospective waste management authority to study marketing activities for recyclables;
- Improve networking between recyclers and buyers, and support the recyclers and contractors to improve their success in cost recovery from recycling;
- Based on the needs of the recycling community and availability of markets, develop systems of bring back, buy banks, drop off centers, bring banks, etc., as needed to facilitate and encourage recycling;
- Create incentives for waste generators to recycle and also reduce their wastes, and give supports to the current initiatives on waste minimization, reuse and recovery activities, including composting activities;
- Provide policy support, preparing required ordinances for energy recovery from the waste in order to regulate the energy recovery from the waste.
- Coordinate with the waste collectors to improve their cooperation with the recycling agenda, and
- Provide public education to children, adults, and commercial establishments on the need for and value of recycling.



# CH – 4

## LEGAL & INSTITUTIONAL ASSESSMENT



## 4. Legal & Institutional Assessment

### 4.1 Legal & Regulatory Assessment

The legal base of Saint Martin Island is complicated by its history. For Sint Maarten, there was a history of Dutch civil law with some influence of English common law. The Dutch monarch appoints the Joint Court judges that serve the earlier noted Netherlands Antilles islands, with appeals presented to the Supreme Court at Hague. It is a parliamentary democracy under the constitutional monarchy of the Kingdom. On the other hand, as a country, it appears to be free to create its own laws in keeping with its constitution. On the French part of the island, French law applies, as well as the umbrella laws and regulations of the European Union. The approaches, siting criteria, design and operating standards vary widely, depending on which legal context applies if the country works alone, and becomes more complex if it collaborates with the very different legal framework of the French part of the island. There is no comprehensive solid waste institutional arrangement or regulatory framework at the moment, but the government is aware of this need and has expressed its desire to address it within their SWM Roadmap. Some norms from pre-independence time are still being used and there are piecemeal decrees to address some needs, as well as a draft environmental policy.

However, VROMI has prepared recently a new draft waste ordinance. It is currently circulated for comments and revisions.

Although Sint Maarten is not bound to comply with solid waste regulation in the European Union, it is generally required to comply with treaties that Netherlands enters into. MARPOL and the Basel Convention on the Transboundary Movement of Wastes are particularly relevant.

Marpol Annex V covers all wastes from ship...any kind and size of ships. It has been in force since 1988. It prohibits discharge of waste to the sea, except for certain allowable releases of food wastes in some waters, cleaning fluids and animal carcasses. For the success of the protocol, ports are expected to provide facilities to safely off-load and dispose of ship wastes.

The Basel Convention controls movement of wastes and makes special arrangements for how hazardous wastes shall be handled along with related manifest systems. How the Basel Convention relates to movement of wastes within the French side of the island and its home country of France warrants some review, and how movement is allowed within the European Union for wastes, as well as related recyclables and recovered resources from wastes. The unique differences between the independent country of Sint Maarten and the French side of the island, especially with the very open borders between the two, require some careful examination.

The Hong Kong International Convention adopted in 2009 requires that ships being salvaged or recycled following their operational life have all potentially hazardous materials properly handled to not pose any risk to workers or adverse impacts to the environment. Also, all ships are to have emergency preparedness procedures, training, and plans to avoid incidents, including fires and spills.

Aside from the abovementioned international treaties that are obligatory as a member of the Kingdom of the Netherlands, the international airport is obligated to follow the international civil aviation organization's standards. One aspect of these standards requires the management of waste so that it does not encourage bird strike within the aerodrome or wildlife on the runway.



## 4.2 Institutional Assessment

Solid waste collection and disposal operations are under the management of Ministry of Public Housing, Spatial Planning, Environment and Infrastructure, VROMI, which handles infrastructure planning and development.

Ministry of Health is responsible for regulating and overseeing the medical waste. Social issues are under the management of Ministry of Public Health and Social Development and Labour, VSA, which handles social development, labor, social inclusion and health.

VROMI outsources all of the SWM activities with open tenders to the contractors. The procedures and jurisdictional areas of collection contractors are given in Chapter 3. However, VROMI reports that only five contractors are currently giving services for household and partly commercial waste collection and transport.

Wastes from commercial enterprises and ships are not handled by government, and open subscription between these waste generators and private haulers is unregulated.

VROMI also operates the landfills with its own staff, however, all machineries and equipment used in the landfills are hired from contractors with rates set by government.

The government is just as well conducting studies for future disposal and treatment. For purposes of the financial support from external entities for emergency response to the Hurricane Irma disaster, a special government body called the National Recovery Program Bureau, NRPB, reports directly to the office of the Prime Minister. The NRPB coordinates the government agencies and also arranges for the accountable, transparent management of the procurements and actions financed for the recovery activities.

## 4.3 Gap Analysis

### 4.3.1 Legal & Regulatory

This year, Sint Maarten drafted a new comprehensive national law, which is significantly more robust than the previous law. AIM TEXAS provided review and comment on this draft law (see Annex 1), through the team Attorney, in October 2019. In summary, the comments suggested Gap Analysis to address of the draft law relative to existing laws and systems, to be sure that they are compatible. Aim Texas comments and suggestions on finalizing the new solid waste management law, institutional and legal considerations are given in Section II of Annex 1.

Once the solid waste national law is finalized and enacted, there may need to be some changes in municipal ordinances, where they may exist, to make them fully compatible with the new national law. In any case, the new solid waste law would supersede municipal ordinances or codes.

### 4.3.2 Institutional

The major conflict on institutional and regulatory side is that regulatory and operational body are the same institution – VROMI. Along with this major gap, the following gaps are identified within the current institutional arrangements:

- VROMI has no sufficient staff for adequately managing the SWM system in the country;



- Department of Infrastructure Management (DOIM) of VROMI is not only responsible for solid waste management in the country, but also it is responsible to manage the wastewater system and road networks and related activities, although it has separate, but in insufficient number of staff for SWM;
- Therefore, DOIM suffers from lack of staff capacity and capability in overall for SWM.

## 4.4 Recommendations

### 4.4.1 Legal & Regulatory Arrangements

- Normally, in most countries, solid waste management is a municipal function. But Sint Maarten is so small and has such a small population, that it makes no sense for it to be conducted municipally. For that reason, the focus of the work is assumed to be national, except regarding the issue of community and municipal stakeholder consultation and involvement;
- Finalize development of a country solid waste law to include, for example:
  - govern the behavior of waste generators and waste handlers;
- Define the potential involvement of the private sector as agents of government in meeting service needs;
- Describe issues of social inclusion, labor protection, health, safety and environmental protection; arrange for sustainable financial resources;
- Establish incentives;
- Define disincentives and potential for sanctions under the law.
- Develop related regulations under the solid waste law, and create appropriate institutional arrangements with adequate empowerment and free from conflicts of interest to provide regulatory control and enforcement related to the solid waste system;
- Legally organize improved control over waste generator behavior, solid waste collection, including commercial waste collection in addition to domestic waste, recycling, and treatment/disposal;
- Create legally developed standards and regulations on separate collection of recyclables, pre-processing and processing.

### 4.4.2 Institutional Arrangements

- Separate assessment is needed for the capability and capacity of DOIM of VROMI for management of solid waste system in the Country, and discuss challenges to increase its capacity to achieve the quick-win, emergency and short-term measures;
- Train VROMI staff and Waste Management Operators both in collection and disposal sides;



- Implement the activities on developing the proposed government owned waste management authority (ISWMA), its capacity building activities, and support the government in draft arrangements for institutional set up, and organizational and staffing arrangements.

For a sustainable solid waste management separate bodies are also needed as follows:

- A service entity, such as a solid waste authority, to conduct the planning, siting, design, tendering, operations oversight, public education, customer relations and cost recovery for solid waste service delivery to be achieved. The service entity has an inspection role to issue warnings and notices to waste generators and waste contractors and licensees.
- A regulatory entity, such as a Ministry department or a utility regulatory supervising bureau, to provide inspection and oversight of the laws and regulations, to assure that the solid waste service organization conducts its business appropriately.
- A judicial entity, such as a municipal court, that would process the enforcement of the civil warnings and notices issued by the service entity. If the issues are not civil, but criminal under the law, existing judicial systems would handle through their prosecutors. Illegal disposal of hazardous waste or deliberate pollution acts are possible criminal offences.

To develop a new system of improved waste management, government is actively examining creation of a new solid waste authority that would be fully government owned and operate much like the current electricity authority. The new authority being proposed would independently handle all aspects of waste collection, recycling, treatment, and disposal, as well as cost recovery.

Create improved staffing within a dedicated government unit or authority – Integrated Solid Waste Management Authority – ISWMA - for all types and activities within the solid waste sector, including:

- data collection and planning
- operations
- inspection
- complaint management
- accounting
- social inclusion, and
- public education.

Institutional arrangements and governance framework for a SWMA are given in Annex 1.



# CH – 5

## FINANCIAL & ECONOMIC ASSESSMENT



## 5. Financial & economic assessment

### 5.1 Assessment

VROMI's activities on waste management are secured from various sources. The national budget of the Government of Sint Maarten allocates funds to the various ministries and organizational units as Operational Expenditure Budget to be used for recurring expenses, and as Capital Investment Budget to be used for larger scale 'one-time' project investments. According to current VROMI Ministry plans, capital investments are realized through the support of External Donor Funding, which can comprise local donors as well as international donors.

A governing program has been developed by the government in 2018. The goal of the government is to act swiftly to improve the quality of life for the people, rebuild a vibrant economy, restore a robust social fabric and promote a resilient sense of community. This governing program addresses the economic and infrastructural reality that the Country is facing. It reflects the objectives and plans of the government to restore and redevelop Sint Maarten<sup>1</sup>.

Among other emergency recovery projects<sup>2</sup> that have been planned and currently being implemented, Emergency Debris Management Project with an estimated budget of US\$ 25 million and Long-Term Waste Management Project (this project) with an estimated budget of US\$ 35 million are programmed to be committed.

#### **SWM Budget and Sources in Sint Maarten**

Revenues which make up the SWM budget for solid waste management activities could comprise of the following revenue items:

- User charges from households, commercial/institutional, industrial waste generators as waste collection/transport fees,
- Tipping or gate fee at the landfill,
- Selling of recyclable fractions sorted,
- Environmental tax or municipal tax, and
- Government Subsidy

However, there is no waste collection and disposal tariff set by the government, no user charge for households and institutions (government departments and schools) in the country. There is also no billing system for SWM services.

Except commercial waste collection and transport budget, all SWM budget is provided by the government as government subsidy, including collection and transport budget of household and institutional waste, area cleaning waste, and the budget for disposal and treatment.

Waste collectors of household/institutional and area cleaning waste are paid by VROMI from the central government budget. VROMI has no revenue from the waste management activities as there are no tariffs

<sup>1</sup> Governing Program 2018 – 2022.

<sup>2</sup> Emergency Recovery Project, Emergency Income Support & Training Project, and Hospital Resilience Preparedness Project, Enterprise Recovery project, and Airport Terminal Reconstruction Project..



charged to the household/institutional waste generators, and no tipping or gate fee at the entrance of the Pond Island MSW landfill for all waste delivered to the landfill by all waste collectors and haulers, including commercial waste collectors.

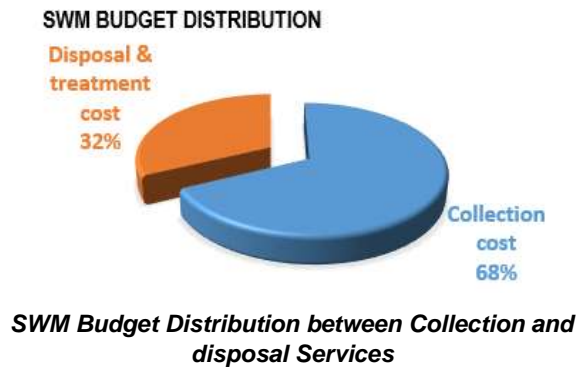
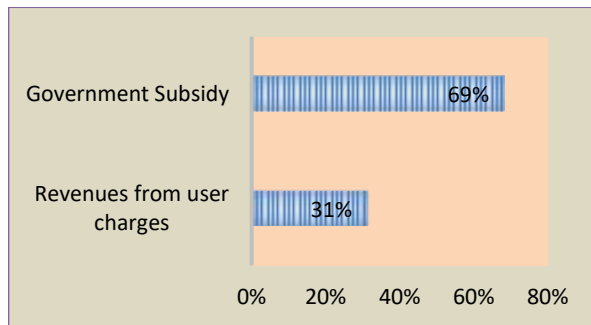
As seen in the following table and figure, almost 69% of total SWM budget is government subsidy (from government budget based on environmental fee, utility fee and occupancy tax from the hotels, resorts and time-share apartments), and estimated 31.32% is provided by commercial waste generators through unregulated waste collectors. Almost 68% of SWM budget goes to collection services, and 32% to disposal and treatment services.

**Table 5.1: Total SWM Budget of Sint Maarten by 2018**

| Cost Items   |   | Costs                |                      | Budget Source               | Percent of Total SWM budget |
|--|---|----------------------|----------------------|-----------------------------|-----------------------------|
|  |   | ANG                  | US\$ (*)             |                             |                             |
| 1  | Collection and transport budget for household/institutional and area cleaning waste – per year (2018) | 6,547,218.75         | 3,732,735.89         | Government                  | 36.54%                      |
| 2  | Disposal and Treatment budget – per year (2018)   | 5,760,000.00         | 3,283,922.46         | Government                  | 32.14%                      |
| <b>Sub-total SWM budget (provided by the government) by 2018</b> |   | <b>12,307,218.75</b> | <b>7,016,658.35</b>  | Government                  | 68.68%                      |
| 3  | Commercial waste collection & transport budget, estimated by 2018                                     | -                    | 3,200,000.00         | Commercial waste generators | 31.32%                      |
| <b>Total SWM budget</b>  |   |                      | <b>10,216,658.35</b> |                             |                             |

(\*) Parity: 1 US\$ / ANG 1.754

Source: VROMI, and Consultant's own estimation based on waste market review in Sint Maarten.



**Figure 5.1: Current SWM Budget Structure and Distribution**

Funds collected for collection and transport of waste from commercial waste generators are going directly to collectors, and they pay nothing to Government, except their income tax and other indirect taxes, as there is no fee at the gate of Landfill.

It should be noted that the government subsidy does not imply that 69% of the SWM budget is fully government subsidy as the government collects funds through different economic instruments such as environmental fee charged through hotels/resorts and room-share apartments, and also occupancy tax charged per room per week at the hotels and resorts.



## Current SWM System Operational Costs

The following analysis shows that O&M cost per ton of full SWM system by 2018 is US\$ 77,98. SWM cost per person per year and month are US\$ 162,16 and US\$ 13.51 respectively.

**Table 5.2: O&M Cost Evaluation for SWM Activities in Sint Maarten by 2018 – in Terms of US\$**

|  | <b>2018</b>   |
|--|---------------|
| <b>REVENUES - ths</b>  |               |
| <b>Total Revenues</b>  | <b>10,216</b> |
| Government subsidy   | 7,016         |
| Commercial Waste Generators  | 3,200         |
| <b>EXPENDITURES - ths</b>  |               |
| <b>Total Cash and Non-cash Operating Expenditures</b>                                | <b>10,216</b> |
| <b>Total Cash Operating Expenditures</b>   | <b>10,216</b> |
| Cash O&M Cost - Collection   | 6,932         |
| Cash O&M Cost - Landfill   | 3,284         |
| <b>Total Cash Operating Expenditures</b>   | <b>10,216</b> |
| Non-cash operating Expenditures (Depreciation Costs) - M&E                           | NA            |
| Non-cash operating Expenditures (Depreciation Costs) - Facilities                    | NA            |
| <b>Total Non-cash operating expenditures</b>   | <b>NA</b>     |
| <i>Total Surplus / Cash Deficit (Inclusive of Depreciation cost)</i>                 | <i>NA</i>     |
| <i>Total Surplus / Cash Deficit (Exclusive of Depreciation cost)</i>                 | <i>NA</i>     |
| Total Waste treated in Landfill - ktn  | 131           |
| O&M cost per ton of waste handled - US\$ (inclusive of depreciation cost)            | NA            |
| <b>O&amp;M cost per ton of waste handled - US\$ (exclusive of depreciation cost)</b> | <b>77.98</b>  |
| System O&M cost per person per year  | 162.16        |
| System O&M cost per person per month   | 13.51         |
| Landfill O&M cost per person per year  | 52.13         |
| Collection and transport O&M cost per person per year                                | 110.03        |

Source: VROMI's information, and consultant's assessment.

The results of this limited O&M cost assessment above are compared with the cost per ton rates in few European countries. Per ton O&M cost in Sint Maarten seems too high as it is almost equal to SWM system O&M cost per ton in Germany, Belgium, Ireland and Spain<sup>3</sup>. If the service level in those countries is considered as a cost level function, it is apparently seen that cost per ton O&M cost of SWM services in Sint Maarten is too high or there is no liable data on SWM budget. The latter is more possible than the first

<sup>3</sup> Costs for Municipal Waste Management in the EU, Final report to Directorate General Environment, European Commission, Enumonia on behalf of ECOTEC.



assessment because of the fact that there is no functional weighbridge at the gate of main MSW landfill; VROMI does not have sufficient staff and infrastructure to measure and keep under control the SWM system performance, and suffers from lack of capital for enhancing the performance of the system components; almost half of the collection system is unregulated, and recycling market revenues are not included into the SWM system as it is also unregulated market. See following Figure.

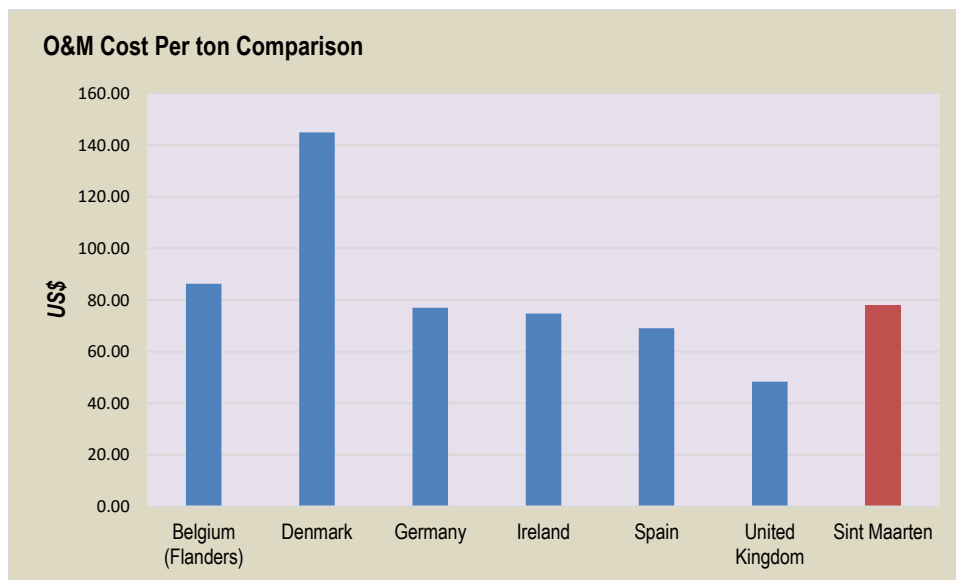


Figure 5.2: O&M cost per ton Comparison with Few European Countries

### Economic Instruments

As mentioned before there is no tariff set by the government for recovery of the waste management activities in Sint Maarten, as well as no recycling policy of the government. There is either no tipping fee for waste collectors/haulers at the gate of the MSW landfill in Pond Island of Philipsburg or service charge collected from the waste generators. There is also no regulation, which regulates the waste fee for all type of waste generators.

There is no environmental levy in Sint Maarten. There is only environmental fee of US\$ 1.50, and US\$ 3.00 utility fee per person per day, charged through hotels, resorts and room-share apartments. Apart from these, there is also a Government occupancy tax of US\$ 50.00 per unit (room) per week at the hotels and resorts. In addition, there is a departure tax of US\$ 30.00 per person for one-off entry payable at the airport.

The government also covers the costs of the waste collection from households and government institutions and schools. More than 10 private waste collection service provider companies exist, which collect waste from commercial premises, hotels and restaurants, and dispose the waste into the MSW landfill without paying any tipping fee, despite the fact that they collect fee from their customers. The collection fees imposed by private collectors vary between US\$ 30 - 50.00 per month for a small shop of retail business and US\$ 80 – 150.00 per month of restaurants and bars. Hotels and resorts are paying a collection fee of approximately US\$ 10.00 per room per month depending of agreements with the waste collectors.

There is also no deposit refund system or other revenue instruments imposed by the Government.



However, it is unknown the percentage of the budget obtained from these municipal (utility fee) and environmental fees is transferred from central government budget to SWM budget as no government budget statistics are obtained. The key characteristics of central government budget is i) annuality, ii) unity, and iii) universality. As the SWM operations in the country is government operation partly, there is no standard budget dedication methodology from the government budget specifically for SWM system, which will provide adequately splitting the budget collected as environmental and utility fees. The budget provided to VROMI is not a resource allocation type budget, but only annual authorization type budget dedication method is applied according to next fiscal year requirements of VROMI, based on its contracts related to SWM and staff work in SWM department as there is no precise financial management framework for SWM operations.

### Cost Recovery

No cost recovery is secured within the current financial model, which is not economically viable, and can no longer sustain the SWM system in Sint Maarten.

## 5.2 Gap Analysis

- No tariff set by the government and/or waste management authority (VROMI) for waste management activities in the country;
- There are only two economic instruments in Sint Maarten, which are:
  - User charge for only commercial waste generators, and
  - Government Subsidy (mainly from indirect environmental fee, utility and occupancy tax).
- No user charges within a financial framework for waste collection and transport services, and no tipping or gate fee for disposal and treatment, which should be paid by the waste collectors/haulers at the gate of the Pond Island Landfill;
- An unregulated open subscription fee collection mechanism exists for the commercial waste generators;
- Current economic instruments are far from providing a sustainable cost recovery as Sint Maarten does not have a clear financial policy and framework. The regulations for revenue providing are not directly related to specific services of solid waste management;
- Although environmental and municipal (utility) fees, occupancy and departure taxes help significantly to provide fund to government budgets, it is unclear that the fund provided by these instruments is used for SWM system's cost recovery as Sint Maarten does not have clear financial policies; The fund provided by these instruments is also used for recovering of street lighting and other communal services, the tax revenues cover all other service costs as well as SWM service. This in turn, cause to financial shortage for full cost recovery of SWM services;
- There is no revenue that could be transferred to the waste management budget from the recycling activities;



- No full cost accounting approach in the financial policies for solid waste management;
- No cost recovery is secured within the current financial model;
- The current financial model does not have a billing system;
- The other generalized problems are:
  - Insufficient financial resources to cover the SWM cost;
  - No specific SWM spending and budgeting accounts;
  - SWM revenue and costs are not clearly known;
  - Absence of a SWM cost calculation methodology;
  - Absence of SWM economic and financial performance Indicators;
  - Absence or low investment in education & communication and in planning & control;

### 5.3 Recommendations

- Develop a tariff cost recovery mechanism, tied to the framework of the new solid waste law, to enable improved financial support for collection, recycling, and safe treatment/disposal;
- Examine the potential for tariff bundling in a manner that cross subsidies are appropriately established addressing ability to pay and the principle of polluter pays, and
- Develop a fully accountable system for tracking expenses and revenues, consistent with government systems planned or being developed for financial management.
- When conducting cost analysis, all phases must be considered, e.g., collection, transportation, landfilling, illegal dumping, area cleaning, street sweeping, material recycling, composting, administration costs, and public education/social inclusion costs, etc.;
- A tool should be developed to calculate SWM costs, taking into account the financial sustainability and performance indicators;
- Distribution of the fund between the solid waste management components should be clearly stated;
- Accountability and transparency in the implementation of SWM programmes should be clearly defined in the relevant regulations;
- Relevant financial regulations should be reviewed and updated in accordance with full-cost accounting principles to support financial mechanisms;
- The fees collected for solid waste management should be kept separate from the funds of other services, and should be used only for the development of the sector;



- Tariffs set should be reviewed in every five (5) years, and updated, if necessary, and willingness-to-pay surveys should be iterated;
- Tariffs should be established by an independent authority;
- All financial reports should be complied with international financing standards (IFRS);
- Data availability should be provided by ensuring access and updating regularly;
- Budget for development of real-time data for planning, research, policy development is considered during SWM budget calculation;



# CH – 6

## ASSESSMENT OF PHYSICAL & NATURAL RESOURCES



## 6. Assessment of Physical Resources

### 6.1 Assessment and Gap Analysis

Physical resources which will support the waste management activities has examined and assessed on the following four aspects:

1. Natural Resources
2. Geographic Positioning
3. Economic Resources
4. Human Resources

#### 6.1.1 Natural Resources

Although the island introduces unique resources for tourism with a complex mosaic of natural, man-made and cultural attractions along with the supportive facilities of ports, airport, hotels/resorts, and beaches, it lacks on resources for adequate waste management such as land scarcity for additional facilities which would allow the expand of the current facilities, scarce soil resources for daily cover and top soil, scarce raw materials (gravel and rocks for crushed aggregate) for different applications in SWM system facility improvements, and absence of natural water resources.

The lack of these natural resources makes difficult such applications for improvement of SWM facilities.. Lack of natural resources particularly triggers the energy dependency of the country to fossil fuels. Lack of water resources also affects the life time of the equipment which are used for waste management due to use of saline or brackish water such as pumps, water trucks, etc.

#### 6.1.2 Geographic Positioning

Geographic location of the island makes it a prone area for natural events which cause frequent extensive destruction in the island such as tropical storms and hurricanes with torrential rains, storm surge, tsunamis, earthquakes due to volcanic activities and plate-tectonics, that are frequently experienced natural events in the region. These events, along with their heavy destructive effects, cause to accumulate huge amount of debris that degrades often the waste management scheme and programmes, bringing additional burden to overcome by the waste management department and service providers. As a result, the financial and economic strengths of the island and islanders do not have resiliency to overcome the problems caused by the natural events. So that waste management in the island is vulnerable to consequences of the natural events.

The country is also highly vulnerable to the effects of climate change due to extreme weather events, sea level rise, habitat degradation, etc.

In addition, regional position of the island bears some difficulties to connect to transport grid in Caribbean region and sub-regional marine transport routes. So that transshipment services are more costly than those in the islands of Greater Antilles and continental countries as most of the marine transport routes are circular and include a base or hub port in the region, and the trade flows are through the regional hub ports in Caribbean region.



Remoteness from global markets also leads to high production and trading costs, limiting investment, competitiveness and the scope for integrating global value chains of pre-processed or processed recyclables.

### **6.1.3 Economic Resources**

Neither part of the island has any industrial infrastructure to support the internal recycling which will support a circular economy in the island. This creates a strong dependency to the regional waste recyclers, and the demand of regional and global recycling market.

Small domestic market and a narrow natural resource base result in undiversified economy, limits for achieving economies of scale, and reduced scope for private sector development with attendant impacts on economic growth and job creation in the country.

The country's economy is highly open, and thus are quickly and strongly affected by global trade and financial volatility and economic downturns.

Infrastructure costs, particularly for sustainable energy, communications and transport, are high in the country.

In addition, small scale economy and absence of economies of scale are major impediments for attracting domestic and global capital in SWM investments for exploring waste management techniques other than traditional ones.

### **6.1.4 Human Resources**

Lack of human resources and expertise for SWM in the island is a common concern for other SIDS in Caribbean region. It creates stresses on waste governance as in other SIDS in Lesser Antilles. This situation is an impediment on effective use of the resources dedicated for waste management.

## **6.2 Recommendations**

The concept of vulnerability combines the likely physical impacts of the hazard (vulnerability), with the ability to manage or adapt to that event/change (resilience). Achieved disaster resilience to natural events would create early preparedness in the waste management in case the natural events occurred.

Evidence suggests that regional cooperation is critical in helping the country island handles, transports and manages waste effectively as the island is remarkably remote to the regional waste market. Intra-island and inter-island cooperative agreements would also provide economies of scale on SWM operations, then in turn would support the circular economy.

Conduct continuous programmes for training the SWM staff of solid waste management department and operators/collectors.

Effective waste management could help improve human health, reduce the environmental footprint, tackle climate change and boost economic growth and employment in the island.



# CH – 7

## SOCIAL INCLUSION, PUBLIC AWARENESS & PRIVATE SECTOR INVOLVEMENT



## 7. Social Inclusion, Public Awareness & Private Sector Involvement

### 7.1 Social Inclusion & Public Awareness

#### 7.1.1 Assessment

Solid waste management is particularly dependent on public cooperation. If a collection truck goes down the street gathering waste and people put it out after the pickup time, the street will not appear clean, and appearances of waste piles lead to more lack of cooperation.

Several environmental non-governmental and non-profit organizations and initiatives are active in the environmental sector in Sint Maarten, presenting a collaborative support to the government, which are:

- Nature Foundations of St. Maarten;
- Green initiatives SXM Collaboration;
- WasteFactory;
- Waste2Work Foundation;
- Environmental Protection in the Caribbean;
- Freegan Food Foundation;
- Green SXM;
- ECO St. Maarten Research and Development Foundation;
- Greenbox;
- Spaceless Gardens; and
- St. Maarten Pride Foundation.

These organizations are presenting their supports mainly on single-use plastic ban, reuse of plastic and wood scraps in decorative applications, preventative measures for avoiding the marine littering, separate collection of re-usable and recyclable fractions, and compost production from bio-degradable waste.

Although weak waste minimization efforts are in place in few hotels, restaurants and resorts, using metallic, glass, and porcelain table wares in cooperation with few local recyclers, these efforts remain weak, and do not have wide coverage.

However, significant efforts come from Nature Foundation of Sint Maarten, to educate the youth on environmental conservation, particularly on preservation of coastal habitat. It actively engages in in-school programmes and Sint Maarten organizations providing public education and awareness on marine conservation and environmental consciousness.

Their typical motivations are to:

- Improve circumstances or a combination of personal and altruistic motivation to improve the community;
- Bring outside resources to bear on the situation;
- Outside of the formal decision-making structures of the government, but also not functioning as a private-sector business.



Greenbox does also support to provide recycle bins in more than 80 schools.



**Greenbox (Local NGO) Activities**

## 7.1 2 Gap Analysis

- Lack of public and private cooperation and awareness are serious concerns in Sint Maarten as the government does currently not support them fully (except few of them such as Nature Foundation of SM, and etc.) with a government policy and programme, though few civil initiatives listed above are in keen interest to create a clean community in the country;
- Although; in order to put in effect, the public awareness and social inclusion programmes were set forth in recent government programmes, there has been no significant achievements for providing environmental consciousness;
- Collaborative efforts between VROMI and CBOs/NGOs in waste management are weak;
- However, the community organizations and NGOs, which support the recycling activities and waste management, are collaborate mostly formal private companies and other Ministries;
- Conduct awareness programme to enlighten the public on disposing the contaminated PPE materials at haphazard due to COVID-19.

## 7.1.3 Recommendations

- Corporate awareness also needs to be developed, which takes some training and perhaps some incentives.
- Hire staff to be community liaison specialists who conduct public information as part of both the VROMI's waste management staff and the new institutional structure for waste management;
- Provide public education of the changes in the legal and regulatory arrangements and the system for managing waste collection and treatment/disposal, in order to clarify roles and responsibilities of all parties, including all waste generators and informal sector recyclers;



- Create a system for handling and tracking complaints and suggestions, and all related responses;
- VROMI Department of Infrastructure Management (DIOM) should create a website for the public to know all requirements, contact points, system schedules and deliverables, fees, and also see the public licensing and contracting arrangements, and this web site could be handed over to new waste management authority in the future, if it is established;
- Provide public education to children, adults, and commercial establishments on the need for and value of recycling;
- Collaborative efforts of CBOs and NGOs which involve in waste management activities should be supported by the main waste management authority (WMA), and policy support is also needed to be in place in accord with the waste management programmes and strategies prepared and applied by VROMI or new ISWMA.

The benefits and advantages resulting from CBO and NGO participation are listed below. Potential benefits to the waste management system include:

- The contribution to problem-solving at the local level, e.g., by setting up and supporting primary waste collection schemes;
- Experimentation with innovations at neighborhood level and within the informal sector;
- Mobilization of citizens and enhancing their participation in solid waste management schemes;
- Promotion of environmental awareness;
- Provision of environmental health education;
- Provision of waste removal services to underserved, marginalized, or hardly accessible areas.

Social benefits include:

- Support for the poorer groups in the society, with technical assistance and advocacy;
- The provision of countervailing power;
- The stimulation of income-generating activities among the urban poor; and
- The strengthening of organizational capacities of communities and informal individuals and entrepreneurs.

## 7.2 Private Sector Involvement

### 7.2.1 Assessment

The private sector involvement in the waste management sector in Sint Maarten is formal, but not adequately organized by the government policies and programmes, which are arranged according to a specific requirements of waste sector. The formal private players in waste sector of Sint Maarten are private sector corporations, firms and individuals, operating registered and/or incorporated businesses with official business licenses, an organized labor force governed by labor laws of Sint Maarten, and some degree of capital investment. They are mostly working on waste collection and transport services, and recycling businesses. There is currently no private company which works on waste disposal and treatment business or fully processing the recyclables. The businesses that work in recycling sector are collecting, pre-processing, and selling the recyclables out of the island.



In general, their defining characteristic of the formal private sector in waste business is to generate a profit on investments. They are participating in waste management system of Sint Maarten in a number of ways, including:

- Entering into contracts paid by VROMI, to perform collection of waste from households, institutions government departments and schools, etc.), area cleaning services for compensation;
- Purchasing the right to perform services and keep (all or part of) the income generated;
- Entering into contracts with individuals or businesses for waste collection and transport services;
- Functioning as a purchaser of recovered materials from the private businesses, individuals or the collectors for selling/exporting purposes.

Involvement of informal private sector and individuals in the waste management sector of Sint Maarten is ignorable. There are almost no waste pickers and scavengers who work for their subsistence in the country. Almost all labors who work waste sector are working for government or the formal private sector companies or individuals.

There is no Community Based Organization (CBO), which involves actively in waste management sector in Sint Maarten, making arrangements themselves or hiring formal private companies or individuals.

However, few NGOs are actively involving, but in small part, in waste management sector such as Nature Foundation of Sint Maarten (in two parts of the island), Waste2Work, Green-SXM (French part), Greenbox, and etc., and they collaborate mainly with formal private sector companies.

### 7.2.2 Gap Analysis

- Private sector involvement in waste management system is partly organized by VROMI in waste collection and transport part of the SWM system in Sint Maarten;
- Although there are some policies and program support to involve the private sector in waste management by the waste management authority (VROMI) or government, weak capacity of performance measurement of the private sector is an impediment to their cost-effective involvement in some parts of SWM activities;
- They involve in waste management sector for the sake of having clean Sint Maarten by using some rule of thumbs related to waste management, but they are disconnected to a holistically prepared programme.

### 7.2.3 Recommendations

- Private sector participation and their activities in solid waste management should be overseen, controlled, and regulated by the government without reducing their involvement;



- However, government capacity for measurement of performance of private sector companies that involve in SWM activities should be enhanced with the development of the required additions to the existing regulations and new regulations specific for SWM.
- It should be emphasized, however, that these are potential gains, whose realization depends not only on the quality of the private sector actors available, but on the degree of oversight and control retained by the government responsible for the jurisdiction;

Potential benefits of private sector involvement to the waste management system would include:

- Greater efficiency and enhanced performance, due to leaner private-sector organization and more flexible employee compensation procedures, and sometimes also to the introduction of competition into waste management operations;
- Better management and accountability, due in part to the fact that the private business functions as a contractor, and could lose the contract;
- Faster response, associated with the ability of private business people to raise capital, as opposed to the relatively long lead times involved in government decision making and/or the donor grant process, or with government procurement procedures;
- Higher service ethics, associated with the business's image and their ability to attract new clients.
- Greater flexibility in terms of purchase of land and siting of facilities;
- Greater access to experience and technology, due to the potential to create partnerships with experienced private businesses in other countries and regions; and
- Risk reduction, by transferring unpredictable costs or unreliable revenues onto the private operator.

Potential benefits to the local economy include:

- Creation of a more robust commercial sector in the country;
- Generation of sustainable employment in the private sector;
- The recovery of valuable materials from recycling activities, which can be locally used without loss of hard currency or foreign exchange.

Social and environmental benefits include:

- The insulating of waste management activities from political patronage of civil service systems (although patronage in the form of contractor choice is a danger of private sector participation in contracts);
- Conservation of resources when materials are recovered; and
- Reduction in environmental damage from exploiting primary resources.



# CH – 8

## Conclusion

Based on works and studies conducted to date, the consultant team completed an comprehensive assessment of the existing SWM conditions that will serve as the starting point for any improvements required to establish an effective solid waste management system for Sint Maarten in the following summary Tables, which provides summaries of assessments / gaps determined, and recommended solutions. Potential solutions will be defined in detail in the Deliverable 4.1 Report of this TA for SWM Strategy and Action Plan in accord with the defined solutions in this report and Short-Term Plan and Pre-Feasibility Studies (Deliverable 2.3) previously performed.



| A. TECHNICAL SYSTEMS  |  |  |  |
|---|--|--|--|
| Table 8.1 Waste Collection  |  |  |  |
| Gaps  | Recommended Measures   |  |  |
|   | <i>Technical</i>   | <i>Managerial</i>  | <i>Implementation</i>  |
| <ul style="list-style-type: none"> <li>- Waste collection system is vested with some lackings in the extent of accountabilities of the parties involved.</li> <li>- Only waste collection system for households, institutions, and area cleaning is regulated.</li> <li>- Waste collection form commercial &amp; industrial premises is unregulated.</li> <li>- An open subscription system is in place for collection and transport of waste from the commercial and industrial waste generators.</li> <li>- Significant amount of C&amp;D waste is collected with the municipal waste.</li> <li>- All waste types collected mixedly, and transport to the Pond Island MSW landfill.</li> <li>- Waste collection system is not arranged in a holistic approach., and not integrated with other components of waste management system.</li> <li>- Informal diversion recyclables by waste collectors.</li> <li>- No public awareness of residential waste generator responsibilities in the waste collection system.</li> <li>- No standardization on number of communal containers, and their locations</li> <li>- Waste accumulations at waste collection and communal container locations.</li> <li>- Increased litter in non-tourist residential areas.</li> <li>- The current waste collection and disposal scheme does not contain any measure or application to provide separate collection of different waste types.</li> <li>- No weighing and recording the waste collected.</li> <li>- EHS measures are not observed within the waste collection scheme,</li> <li>- No policy level support for engagement of CBOs in waste collection.</li> <li>- No policy and program support by waste management authority/government for efforts of CBOs, NGOs, and commercial community for separate collection of waste.</li> </ul> | <ul style="list-style-type: none"> <li>- Conduct collection system mapping in order to enable the dedicated routes and service providers for key waste source categories and the potential for dedicated routes that would address wastes most ideally suited for resource recovery,</li> <li>- Conduct collection route optimization and system configuration analysis according to sector specific best practices, to determine the system needs for urgent improvement;</li> <li>- Analyze the possible locations of the color-coded containers that will be placed at different points as a mid-term measure for separate collection of the recyclables at source;</li> <li>- Conduct emergency measures to collect separately with special measures the hazardous waste (gloves, masks, etc.) sourced from COVID-19 implication.</li> </ul> | <ul style="list-style-type: none"> <li>- Examine and draft suggested improvements to the existing household/institutional and area cleaning waste collection contracts for future contracting;</li> <li>- Examine and draft contracts for commercial waste collectors according to the results of collection routing and system configuration analysis;</li> <li>- Develop and implement comprehensive, transparent, equitable, and inclusive contracting and licensing arrangements for all waste collectors of domestic and commercial wastes, where needed to supplement systems already existing.</li> <li>- Study and recommend improvements to existing waste collection contractual instruments where appropriate;</li> </ul> | <ul style="list-style-type: none"> <li>- Develop Waste Fee Framework and Tariff Study for waste collection and transport/transfer.</li> <li>- Establish a waste collection database, and provide access to the public.</li> <li>- Provide policy support by waste management authority/government for efforts of CBOs, NGOs, and commercial community for separate collection of waste.</li> <li>- Provide policy support for EHS measures in waste collection and transport.</li> </ul> |



**Table 8.2 Waste Disposal & Treatment**

| Gaps   | Recommended Measures  |  |   |
|--|---|--|---|
|  | Technical   | Managerial   | Implementation  |
| <ul style="list-style-type: none"> <li>- Absence of land adjacent to the landfill suitable for lateral expansion creates problem for MSW landfill operational life;</li> <li>- Access control is not provided at the entrance of both landfills.</li> <li>- Both landfills are not equipped with a functional weighbridge; so that unknown actual waste tonnage.</li> <li>- No lining at the bottom, no adequately graded slopes in both landfills; so that slopes are very steep.</li> <li>- No adequate compaction and grading equipment; so that no adequate compaction and grading in both landfills.</li> <li>- The waste density of about 800 -850 kg per cubic meter in the landfill indicates spaces that contain no waste inside the waste pile. LFG can easily accumulate in these spaces, and oxygen contact with LFG (mainly methane) triggers deep seated fires or shallow sub-surface fires.</li> <li>- Crevasses, fissures close to slopes suggest that there are unstable areas on the landfill slopes.</li> <li>- No leachate collection, treatment and disposal system also exist in both landfills, all leachate is seeping to water table under the landfill.</li> <li>- No guidance and/or method statements for measuring the performances of the contractors.</li> <li>- Perimeter fence is inadequate.</li> <li>- No EHS measures in place in disposal &amp; pre-treatment activities</li> <li>- No measures on avoiding of env. and social impacts of both landfills' daily operations, and monitoring:                         <ul style="list-style-type: none"> <li>o No traffic control at the intersection of Soualiga road with landfill access roads.</li> <li>o No environmental monitoring on leachate seeping or littering to the Great Salt Pond;</li> <li>o Residential/commercial area adjacent to landfill in south and south-east, which is heavily impacted by daily operation of MSW landfill with dispersing of fugitive dust.</li> <li>o People living in residential and commercial area south and south-east of MSW landfill are under slope failure risks that can cause significant damage.</li> </ul> </li> </ul> | <p>Provide and install a mobile weighbridge for the landfill with a suitable software in order to start recording the waste delivered to the landfill;</p> <p>Conduct a comprehensive geotechnical site investigation in MSW landfill in order to have necessary data on characteristics of the landfill, in order to make correct decisions about the behavior of the landfill waste.</p> <p>Procure the landfill equipment for compaction, spreading, earth moving, excavation and fire suppression;</p> <p>Establish a temporary MRF like waste pre-processing facility (TDSR) to pre-process the accumulated scrap tire, wood waste, scrap glass, and yard waste, in order to reduce the volume of these waste types as those occupy lots of space in the landfill;</p> <p>Procure other TDSR equipment for pre-processing the scrap tire accumulated in MSW landfill, wood waste (wood pallets, scarp woods from Irma debris and C&amp;D waste), yard waste, scrap glass, and removing the debris in IDDS.</p> <p>Start the landfill improvement activities, including fire suppression activities according to requirements of Landfill Improvement PFS;</p> <p>Establish a separate C&amp;D waste handling facility.</p> <p>Establish an Integrated Waste Management Facility (ISWMF) in accordance with PFS, which includes an MRF and optional WTS facility;</p> | <p>Take emergency measures for protecting the residential/commercial community south and southeast of the landfill from the potential slope failure during the landfill operation and improvement activities, including resettlement of the people reside in residential/ commercial area;</p> <p>Take measures for mitigating the environmental and social impacts of daily operation of the landfills, including EHS measures.</p> <p>Do not involve any construction, regrading, or interim capping activity in the landfill before completing a detailed geotechnical site investigation and engineering design based on data obtained from the investigation.</p> <p>Provide budget for removal of debris in Irma landfill and</p> <p>Prepare a guidance that complies with best practice applications and EU regulations for landfill management and closure activities;</p> <p>Develop Waste Fee Framework and Tariff Study for waste disposal and treatment.</p> <p>Developing Software Package for Tracking the Waste.</p> <p>Revenues/Expenditures, and Billing, in order to provide cost recovery.</p> <p>Put in effect a programme and schedule immediately to avoid the hazardous waste disposal into both landfills as a result of COVID-19.</p> | <p>Develop a DBO contract prequalification documents with initial contract performance standards adequate to obtain a shortlist of 3 to 5 qualified consortiums to implement the improvement and operation of the MSW landfill initially during Short-Term Plan period (5-7 years).</p> <p>Hire the Contract to properly improve and operate the MSW landfill initially during Short Term Plan period (5-7 years).</p> <p>Develop a short-term Service Contract Tender Document to implement operational arrangements for the facility for separately handling of C&amp;D waste in another place other than MSW landfill;</p> <p>Hire the Contract to properly operate the C&amp;D waste facility and provide pre-processing of all inert recyclable materials; All works and use of Contractor equipment would be covered under the service agreement.</p> <p>Conduct a tender for hiring a contractor for removal of Irma debris; Haul the separated materials to new C&amp;D waste handling facility area, except the fines and sands that are by-product from this activity; Re-use the fines and sands in the MSW landfill operation.</p> <p>Develop a 20-year DBO contract prequalification documents to implement and operate ISWMF sized to address local municipal wastes only, to be built at a location close to MSW landfill.</p> |



**Table 8.3 Recycling & Recovery**

| Gaps   | Recommended Measures  |  |  |
|--|---|--|--|
|  | Technical   | Managerial   | Implementation   |
| <ul style="list-style-type: none"> <li>- All recycling market in Sint Maarten is unregulated by a specific resource conservation and recovery policy or ordinance.</li> <li>- There is no robust enough industrial infrastructure to support a circular economy which revolves around these local recyclers, and also there is no industrial and agricultural base for sustaining material reuse &amp; internal processing of recyclables.</li> <li>- There are no incentives and disincentives officially arranged or government programme on waste prevention, minimization and reuse by government ordinance, although few hotels/resorts, bars and restaurants support the waste minimization efforts,</li> <li>- There is no ban on import and use of single-use plastic containers and bags to the island, although there are civil initiatives by few non-governmental organizations on banning of imports and use of single-use plastic bags and food packaging;</li> <li>- There is no regulation on arrangements of separation at source, and separate collection of the recyclables as well as arranging color-coded recyclable bins in public areas, which are important resource conservation measures.</li> <li>- VROMI, as single waste management authority of the country, has no sufficient trained staff and financial resources to enable to control, manage and/or oversee the recycling market in the country as well as to improve networking between recyclers;</li> <li>- No public education and awareness programmes that are applied by the government or waste management authority (VROMI) on waste management.</li> <li>- No energy recovery from the Waste.</li> </ul> | <p>Based on the needs of the recycling community and availability of markets, develop systems of bring back, buy banks, drop off centers, bring banks, or civic amenity centers, etc., as needed to facilitate and encourage recycling;</p> | <p>Enforce the import of food and other materials that are packed with PLA (bioplastics-Polylactic Acid) to the island, and regulate it by policy and ordinance;</p> <p>Improve networking between recyclers and buyers, and support the recyclers and contractors to improve their success in cost recovery from recycling;</p> <p>Create incentives for waste generators to recycle and also reduce their wastes, and give supports to the current initiatives on waste minimization, reuse and recovery activities, including composting activities;</p> <p>Provide policy support, preparing ordinances for energy recovery from the waste in order to regulate the energy recovery from the waste in the country.</p> <p>Coordinate with the waste collectors to improve their cooperation with the recycling agenda, and</p> <p>Provide public education to children, adults, and commercial establishments on the need for and value of recycling</p> | <p>Recycling market should be centrally regulated, which would be set up by a government institution largely as an organization that does data collection, planning, procurement, and financial management;</p> <p>Create a special unit within current or prospective waste management authority to study marketing activities for recyclables;</p> |



| <b>B. ENABLING SYSTEMS</b>  |  |
|---|--|
| <b>Table 8. 4 Legal / Regulatory</b>  |  |
| <b>Gaps</b>   | <b>Recommended Measures</b>  |
| <ul style="list-style-type: none"> <li>- This year, Sint Maarten drafted a new comprehensive national law, which is significantly more robust than the previous law. AIM TEXAS provided review and comment on this draft law (see Annex 1), through the team Attorney, in October 2019. In summary, the comments suggested Gap Analysis to address of the draft law relative to existing laws and systems, to be sure that they are compatible.</li> <li>- Once the solid waste national law is finalized and enacted, there may need to be some changes in municipal ordinances, where they may exist, to make them fully compatible with the new national law. In any case, the new solid waste law would supersede municipal ordinances or codes.</li> </ul>   | <ol style="list-style-type: none"> <li>1. Define the potential involvement of the private sector as agents of government in meeting service needs;</li> <li>2. Describe issues of social inclusion, labor protection, health, safety and environmental protection; arrange for sustainable financial resources;</li> <li>3. Establish incentives;</li> <li>4. Define disincentives and potential for sanctions under the law.</li> <li>5. Legally organize improved control over waste generator behavior, solid waste collection, including commercial waste collection in addition to domestic waste, recycling, and treatment/disposal;</li> <li>6. Finalize development of a country solid waste law to include, for example:                         <ul style="list-style-type: none"> <li>o govern the behavior of waste generators and waste handlers;</li> </ul> </li> <li>7. Develop related regulations under the solid waste law, and create appropriate institutional arrangements with adequate empowerment and free from conflicts of interest to provide regulatory control and enforcement related to the solid waste system;</li> <li>8. Create legally developed standards and regulations on separate collection of recyclables, pre-processing and processing.</li> </ol> |
| <b>Table 8.5 Institutional</b>  |  |
| <b>Gaps</b>   | <b>Recommended Measures</b>  |
| <p>The major conflict on institutional and regulatory side is that regulatory and operational body are the same institution – VROMI. Along with this major gap, the following gaps are identified within the current institutional arrangements:</p> <ul style="list-style-type: none"> <li>- VROMI has no sufficient staff for adequately managing the SWM system in the country;</li> <li>- Department of Infrastructure Management (DOIM) of VROMI is not only responsible for solid waste management in the country, but also it is responsible to manage the wastewater system and road networks and related activities, although it has separate, but in insufficient number of staff for SWM;</li> <li>- Therefore, DOIM suffers from lack of staff capacity and capability in overall for SWM.</li> </ul> | <ol style="list-style-type: none"> <li>1. Separate assessment is needed for the capability and capacity of Department of Infrastructure Management (DOIM) of VROMI for management of solid waste system in the Country, and discuss challenges to increase its capacity to achieve the quick-win, emergency and short-term measures;</li> <li>2. Train VROMI staff and Waste Management Operators both in collection and disposal sides;</li> <li>3. Implement the activities on developing the proposed government owned waste management authority (ISWMA), its capacity building activities, and support the government in draft arrangements for institutional set up, and organizational and staffing arrangements.</li> <li>4. Actively examine the creation of a new solid waste authority (ISWMA) that would be fully government owned and operate much like the current electricity authority.</li> <li>5. Create improved staffing within a dedicated government unit or authority – Integrated Solid Waste Management Authority – ISWMA - for all types and activities within the solid waste sector</li> </ol>   |



**Table 8.6 Financial & Economic**

| Gaps  | Recommended Measures   |
|---|--|
| <ul style="list-style-type: none"> <li>- No tariff set by the government and/or waste management authority (VROMI) for waste management activities in the country, including waste collection disposal (tipping fee);</li> <li>- There are only two direct economic instruments in Sint Maarten, which are:                             <ul style="list-style-type: none"> <li>o User charge for only commercial waste generators, and</li> <li>o Government Subsidy.</li> </ul> </li> <li>- There are also 4 types indirect economic instruments, those are: 1) Environmental fee, 2) Municipal (utility) fee, 3) occupancy tax, and 4) Departure tax.</li> <li>- However, it is unclear that the fund provided by the indirect economic instruments is used for SWM system's cost recovery as Sint Maarten does not have clear financial policies; The fund provided by these instruments is also used for recovering of street lighting and other communal services. This in turn, cause to financial shortage for full cost recovery of SWM services, and no cost recovery could be made secure;</li> <li>- An unregulated open subscription fee collection mechanism exists for the commercial waste generators;</li> <li>- Current economic instruments are far from providing a sustainable cost recovery.</li> <li>- The regulations for revenue providing are not directly related to specific services of solid waste management, and billing system exists;</li> <li>- No revenue is transferred to the waste management budget from the recycling activities;</li> <li>- No full cost accounting approach in the financial policies for solid waste management;</li> <li>- No cost recovery is secured within the current financial model;</li> <li>- The other generalized problems are:                             <ul style="list-style-type: none"> <li>o Insufficient financial resources to cover the SWM cost;</li> <li>o No specific SWM spending and budgeting accounts;</li> <li>o SWM Revenue and Costs are not clearly known;</li> <li>o Absence of a SWM Cost Calculation methodology;</li> <li>o Absence of SWM economic and financial performance Indicators;</li> <li>o Absence or low investment in education &amp; communication and in planning &amp; control;</li> </ul> </li> </ul> | <ol style="list-style-type: none"> <li>1. Examine the potential for tariff bundling in a manner that cross subsidies are appropriately established addressing ability to pay and the principle of polluter pays.</li> <li>2. When conducting cost analysis, all phases must be considered, e.g., collection, transportation, landfilling, illegal dumping, area cleaning, street sweeping, material recycling, composting, administration costs, and public education/social inclusion costs, etc.;</li> <li>3. Distribution of the fund should be clearly stated between the solid waste management components;</li> <li>4. Accountability and transparency in the implementation of SWM programmes should be clearly defined in the relevant regulations;</li> <li>5. Tariffs set should be reviewed in every five (5) years, and updated, if necessary, and willingness-to-pay surveys should be iterated once a 5 year;</li> <li>6. Tariffs should be established by an independent authority;</li> <li>7. All financial reports should be complied with international financing standards;</li> <li>8. Data availability should be provided by ensuring access and updating regularly;</li> <li>9. Budget for development of real-time data for planning, research, policy development should be considered during SWM budget calculation;</li> <li>10. Develop a tariff cost recovery mechanism, tied to the framework of the new solid waste law, to enable improved financial support for collection, recycling, and safe treatment/disposal;</li> <li>11. Develop a fully accountable system for tracking expenses and revenues, consistent with government systems planned or being developed for financial management.</li> <li>12. A tool should be developed to calculate SWM costs, taking into account the financial sustainability and performance indicators;</li> <li>13. Relevant financial regulations should be reviewed and updated in accordance with full-cost accounting principles to support financial mechanisms;</li> <li>14. The fees collected for solid waste management should be kept separate from the funds of other services, and should be used only for the development of the sector;</li> </ol> |



**Table 8.7 Social Inclusion & Public Awareness**

| Gaps  | Recommended Measures   |
|---|--|
| <ul style="list-style-type: none"> <li>- Lack of public and private cooperation and awareness are serious concerns in Sint Maarten as the government does currently not support them fully (except few of them such as Nature Foundation of SM, and etc.) with a government policy and programme, though few civil initiatives listed above are in keen interest to create a clean community in the country;</li> <li>- Although in order to put in effect the public awareness and social inclusion programmes was set forth in recent government programmes, there is no significant achievements for providing environmental consciousness;</li> <li>- Collaborative efforts between VROMI and CBOs/NGOs in waste management are weak;</li> <li>- However, the community organizations and NGOs, which support the recycling activities and waste management, are collaborate mostly formal private companies and other Ministries;</li> </ul> | <ol style="list-style-type: none"> <li>1. Corporate awareness also needs to be developed, which takes some training and perhaps some incentives.</li> <li>2. Hire staff to be community liaison specialists who conduct public information as part of both the VROMI's waste management staff and the new institutional structure for waste management;</li> <li>3. Provide public education of the changes in the legal and regulatory arrangements and the system for managing waste collection and treatment/disposal, in order to clarify roles and responsibilities of all parties, including all waste generators and informal sector recyclers;</li> <li>4. Create a system for handling and tracking complaints and suggestions, and all related responses;</li> <li>5. VROMI Department of Infrastructure Management (DIOM) should create a website for the public to know all requirements, contact points, system schedules and deliverables, fees, and also see the public licensing and contracting arrangements, and this web site could be handed over to new waste management authority in the future, if it is established;</li> <li>6. Provide public education to children, adults, and commercial establishments on the need for and value of recycling;</li> <li>7. Collaborative efforts of CBOs and NGOs which involve in waste management activities should be supported by the main waste management authority (WMA), and policy support is also needed to be in place in accord with the waste management programmes and strategies prepared and applied by VROMI or new ISWMA.</li> <li>8. Conduct awareness programme to enlighten the public on disposing the contaminated PPE materials at haphazard due to COVID-19.</li> </ol> |

**Table 8.8 Private Sector Involvement**

| Gaps  | Recommended Measures   |
|---|--|
| <ul style="list-style-type: none"> <li>- Private sector involvement in waste management system is partly organized by VROMI in waste collection and transport part of the SWM system in Sint Maarten;</li> <li>- There is no policy and program support to involved private sector in waste management by the waste management authority (VROMI) or government;</li> <li>- They involve in waste management sector for the sake of having clean Sint Maarten by using some rule of thumbs related to waste management, but they are disconnected to a holistically prepared programme.</li> </ul> | <ul style="list-style-type: none"> <li>- Private sector participation and their activities in solid waste management should be overseen, controlled, and regulated by the government without reducing their involvement;</li> <li>- It should be emphasized, however, that these are potential gains, whose realization depends not only on the quality of the private sector actors available, but on the degree of oversight and control retained by the municipal or regional government responsible for the jurisdiction;</li> </ul> |



| <b>C. PHYSICAL RESOURCES – Table 8.9</b>   |  |
|--|--|
| <b>Gaps</b>  | <b>Recommended Measures</b>  |
| <p><b>1. Natural Resources</b></p> <ul style="list-style-type: none"> <li>- Land scarcity for expansion of existing facilities.</li> <li>- Scarce soil resources for daily cover and top soil.</li> <li>- scarce raw materials (gravel and rocks for crushed aggregate) for different applications in SWM system facility improvements.</li> <li>- Absence of natural water resources.</li> <li>- Energy dependency of the country to fossil fuels.</li> </ul> <p><b>2. Geographic Positioning</b></p> <ul style="list-style-type: none"> <li>- Natural events which cause frequent extensive destruction in the island such as tropical storms and hurricanes with torrential rains, storm surge, tsunamis, earthquakes due to volcanic activities and plate-tectonics.</li> <li>- These events bring additional burden to overcome by the waste management department and service providers.</li> <li>- No resiliency to overcome the problems caused by the natural events. So that waste management in the island is vulnerable to consequences of the natural events.</li> <li>- Vulnerable to the effects of climate change due to extreme weather events, sea level rise, habitat degradation, etc.</li> <li>- Difficulties to connect to transport grid in Caribbean region and sub-regional marine transport routes.</li> <li>- So that transshipment services are more costly.</li> <li>- Remoteness from global markets also leads to high production and trading costs, limiting investment, competitiveness and the scope for integrating global value chains of pre-processed or processed recyclables.</li> </ul> <p><b>3. Economic Resources</b></p> | <ol style="list-style-type: none"> <li>1. The concept of vulnerability combines the likely physical impacts of the hazard (vulnerability), with the ability to manage or adapt to that event/change (resilience). Achieved disaster resilience to natural events would create early preparedness in the waste management in case the natural events occurred.</li> <li>2. Evidence suggests that regional cooperation is critical in helping the country island handles, transports and manages waste effectively as the island is remarkably remote to the regional waste market. Intra-island and inter-island cooperative agreements would also provide economies of scale on SWM operations, then in turn would support the circular economy.</li> <li>3. Conduct continuous programmes for training the SWM staff of solid waste management department and operators/collectors.</li> <li>4. Effective waste management could help improve human health, reduce the environmental footprint, tackle climate change and boost economic growth and employment in the island.</li> </ol> |



|  |  |
|--|--|
| <ul style="list-style-type: none"><li>- No industrial infrastructure to support the internal recycling, which will support a circular economy in the island.</li><li>- This creates a strong dependency to the regional waste recyclers, and the demand of regional and global recycling market.</li><li>- Small domestic market and a narrow natural resource base result in undiversified economy, limits for achieving economies of scale, and reduced scope for private sector development with attendant impacts on economic growth and job creation in the country.</li><li>- The country's economy is highly open, and thus are quickly and strongly affected by global trade and financial volatility and economic downturns.</li><li>- Infrastructure costs, particularly for sustainable energy, communications and transport, are high in the country.</li><li>- Small scale economy and absence of economies of scale are major impediments for attracting domestic and global capital in SWM investments for exploring waste management techniques other than traditional ones.</li></ul> <p><b>4. Human Resources</b></p> <ul style="list-style-type: none"><li>- Lack of human resources and expertise for SWM in the island is a common concern for other SIDS in Caribbean region.</li><li>- It creates stresses on waste governance as in other SIDS in Lesser Antilles.</li><li>- This situation is an impediment on effective use of the resources dedicated for waste management.</li></ul> |  |
|--|--|



# CH – 9

## INTEGRATED SOLID WASTE MANAGEMENT SYSTEM (ISWMS) APPROACH



## 9. Integrated Solid Waste Management System (ISWMS) Approach

### 9.1 Principal Factors of ISWMS

Waste management is now identified as one of the top priorities for the country. The government is keenly interested in establishing an integrated solid waste management system (ISWMS) that optimizes the holistic life-cycle sustainability of the overall system through the support of improved technical systems, optimized outsourcing, appropriate institutional arrangements, supportive legal/regulatory/policy frameworks, and financially sustainable cost recovery arrangements.

The primary purpose of the solid waste management (SWM) strategy is to address the health, environmental, aesthetic, land-use, resource, and economic concerns associated with the improper disposal of waste. Historically, public health concerns, security, scarcity of resources, and aesthetics acted as central drivers for waste management systems. Small communities manage to bury solid waste just outside their settlements or dispose of it in nearby rivers or water bodies, but as population densities increase, these practices no longer prevented the spread of foul odors or disease.

SWM is driven by five principal factors (drivers):

- Driver 1: public health,
- Driver 2: the environment,
- Driver 3: resource scarcity and the value of waste,
- Driver 4: climate change, and
- Driver 5: public awareness and participation (NIMBY and behavioral change).

#### **Driver 1: Public Health**

Public concern about sanitation has risen as epidemic diseases continued to rock cities regularly. Thus, governmental interest in public health drove solid waste management improvements in American cities as well through legislation and investment in infrastructure. Public health legislation continued to drive waste management. The first municipal priority was to collect and remove waste from the immediate vicinity of residential areas. Once the waste had been removed from underfoot, priorities shifted to other aspects of the waste management chain, such as the proliferation of landfills. However, from 1900 to 1970, disposal was for the most part unregulated and uncontrolled, consisting of dumping and burning. The focus remained on waste collection and transportation out of the city (UN-HABITAT, 2010).

#### **Driver 2: The Environment**

The environmental movement acted as a primary driver of the policy stages from the 1970s onwards (Wilson, 2007). SWM policy from the 1970s to mid-1980s focused on waste control, and was therefore characterized by measures such as the daily covering and compacting of landfills and retrofitting incinerators for dust control. The following policy stage, which emerged in the 1980s and continues today, focused on gradually increasing technical standards, beginning with landfill gas and leachate control, incinerator gas and dioxin reduction, and now spanning to odor control for composting facilities and anaerobic digesters (Wilson, 2007). In the 1990s, integrative policy gained much attention because it had become evident that advocating for ever-increasing environmental protection was not enough; an integrative regulatory approach was needed that encompassed not only the technical and environmental



but also the political, social, financial, economic, and institutional elements (enabling framework options) of waste management if environmental protection were to be realized.

### **Driver 3: Resource Scarcity and Value of Waste**

In pre-industrial times, resources were relatively scarce. Anything vendible in the waste stream was scavenged and consumer goods were reused and repaired rather than tossed into the waste stream. As cities grew in size during the industrial revolution, the resource value of waste rose again, and ‘rag pickers’ or ‘street buyers’ collected, used, and sold materials from the waste stream; an activity that continues today in many developing countries. However, recycling rates plummeted from the high levels of preindustrial times to single digits by the 1970s, as this was a period of immense increase in consumption, strong marketing of commodities, and little regard for resource consumption. The recycling and reuse that went on in the 19th century was sparked again in the 1970s by the European concept of the ‘waste hierarchy’, on which current waste policy in the EU is based.

The original idea for the waste hierarchy was first borne out of the Dutch government’s shortage of landfill sites, but the idea was propelled forward primarily by the environmental movement. First introduced in the European Union’s Second Environment Action Programme in 1977 (CEC, 1977), the waste hierarchy is a model of waste management priorities based on the “Ladder of Lansink”, a hierarchy of waste handling techniques going in order from prevention to reuse, reduction, recycling, energy recovery, treatment (such as incineration), and finally landfill disposal.



**Figure 9.1: Ladder of Lansink**

Thus, the availability of land and its value as a resource somewhat acted as a driver for the move away from landfilling, though land scarcity primarily led to new treatment options, such as incineration. The waste hierarchy sparked a massive transition from end-of-pipe to preventative thinking, which emerged with a multitude of new terms and phrases – pollution prevention, source reduction, waste minimization, waste reduction, toxics use reduction, clean or cleaner technology, etc. – to replace the old terms that focused on reaction and control instead of prevention.

This policy shift away from landfilling has significantly increased the use of medium priority waste handling methods, which were historically more prominent due to resource scarcity but dropped to single digit percentages in Europe during the first half of the 20th century. Recycling, for example, has rebounded to 25% or higher in Europe until 2006, reaching rates as high as 60% in Austria and the Netherlands. However, it is pointed out that this is “often driven by statutory targets rather than by the resource value per se ... recycling is practiced because it is the right thing to do, not because the value of the recovered materials covers the costs”. Many governments, industry members, educators, environment groups, and programs have adopted and endorsed the waste management hierarchy as “an almost mantra-like acceptance among waste professionals”, has sparked a flurry of criticisms. According to Gertsakis and Lewis (2003), the hierarchy is difficult to implement because solid waste managers in industry and government have little control over production decisions that could influence higher-level priorities, such as waste prevention and minimization. Additionally, McDougall et al. (2001) point out that the waste hierarchy does not make room



for combinations of techniques, account for costs or specific constraints, lacks scientific or technical basis, and cannot provide what is fundamentally needed – an assessment of the context-specific system as a whole.

#### **Driver 4: Climate Change**

Climate change acts as an environmental driver since the early 1990s, leading to a shift away from landfilling biodegradable waste, which is a major source of methane emissions, and a strengthened focus on energy recovery from waste. This driver is brought on by the global concern about climate change issues, which leads to pressure and advocacy around the world. This driver leads to a policy stage focused on waste prevention and target achievements, and characterized by a series of preventative policy measures, including laws and targets for compost and recycling goals, diversion from landfill, extended producer responsibility, and landfill bans for recyclable materials.

Policies such as the EU Landfill Directive require reductions in levels of biodegradable material sent to landfill as a method to recover valuable materials and reduce methane emissions. This furthers increased recycling and composting rates, which are on the rise in cities modernizing their waste systems. However, since climate change measures can only have significant impact if many adhere to this objective, there is no immediate national gain from reducing greenhouse gas emissions. This is the primary weakness of this driver, and one of the primary reasons it is so difficult to gain consensus for a post-2012 convention for reducing carbon dioxide levels.

#### **Driver 5: Public Concern & Awareness (NIMBY and behavioral change)**

Public concern and awareness acts as SWM drivers in high-income countries. Poor practices in the past, such as burning dumps and polluting incinerators, have left the public with negative perceptions of new SWM strategies. While the public may recognize the need for SWM facilities, the common “Not In My Backyard”, or NIMBY, attitude means they would rather have them located elsewhere describes how negative perceptions of past facilities “have led to the almost inevitable NIMBY reaction to proposals for any new waste management facility, no matter how clean or sustainable that may be”. Unsustainable behavior also inhibits movement towards better SWM.

Therefore, strategies that include more recycling, repair, reuse, home composting, sustainable consumption, etc. require behavioral change, which is becoming the ‘holy grail’ of any sustainable development strategy. The systems that shape patterns of the public’s activities create complex barriers to sustainable behavior. Many people are unable to exercise deliberate choice because they find themselves locked into unsustainable patterns caused by habits, routines, a lack of knowledge, institutional structures, inequalities in access, social expectations, and cultural values.

Additionally, each form of sustainable behavior has a unique and complex set of barriers that vary amongst social groups. Even seemingly closely associated sustainable behavior, such as composting and recycling, can be barricaded by different sets of obstacles. Therefore, transferring initiatives that appear successful in a specific context is unlikely to be effective. Overcoming public attitudes and unsustainable behavior requires effective communication, a broad public understanding of the requirements of SWM, and active participation of all relevant stakeholders throughout all project stages.

For example, some of the top strategies identified for overcoming NIMBY opposition include building project supporters before implementation, developing a comprehensive understanding of causes of opposition,



and acting to remove them through stakeholder consultation, correction of misinformation, and compromise. These 'best practices' is effective at combating NIMBY opposition to many major development projects. Thus, building public awareness through such measures and focusing public concern on the need to develop sustainable behavior acts as SWM drivers.

## **9.2 Approach to Effectuate ISWMS of Sint Maarten**

The following are recommended for effectuating the ISMWS for Sint Maarten.

- Accept waste hierarchy with 4-R's of waste reduction, reuse, recycling and resource recovery as priority steps to minimize land disposal;
- Use phased approach in a holistic perspective;
- Adapt tailor-made solutions;
- Optimize the cost-effectiveness of the solid waste activities;
- Adopt polluter-pay principles;
- Optimize economies-of-scale;
- Outline enabling frameworks of supportive laws, institutions, financing, economic instruments, social inclusion, and private sector participation;
- Assess a full array of possible environmental, social, and health impacts for optimization of choices and inclusion of mitigation measures

ISWMS of Sint Maarten would be designed in the following plan periods:

1. Short Term Plan Period would be the first 5 – 7 years of implementation, and would comprise of the priority activities designed in Short Term Plan prepared for this project.
2. Mid Term Plan period would be between 7 -10 years of implementation, and would comprise of the activities designed in Short Term Plan prepared for this project.
3. Long Term plan period would be between 10 – 25 years of implementation, and would comprise operating the system, required modifications, and closure and post-closure activities.

Investments for effectuating ISWMS would be completed in Short and Mid-Term Plan periods.



# ANNEX 1

1. Section I: Suggested Legal & Regulatory Arrangements
2. Section II: Comments & Suggestions on VROMI's Draft Law of Solid Waste Management

# SECTION I

## SUGGESTED LEGAL & REGULATORY ARRANGEMENTS

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## 1. Legal and Regulatory Arrangements

This Annex discusses Legal and Regulatory Arrangements. These include national law, municipal law, and related regulatory and enforcement systems. This section of the Annex also briefly outlines key international law binding to Sint Maarten through being part of the Kingdom of the Netherlands, which has signed a number of international treaties involving solid waste.

### 1.2 National law

This year, Sint Maarten drafted a new comprehensive national law, which is significantly more robust than the previous law. AIM TEXAS provided review and comment on this draft law several months ago, through the team Attorney, in October 2019. In summary, the comments suggested Gap Analysis to address of the draft law relative to existing laws and systems, to be sure that they are compatible. Aim Texas comments and suggestions on finalizing the new solid waste management law, institutional and legal considerations are given in Section II of this Annex.

The Gap Analysis would examine all relevant existing laws to identify consistencies and inconsistencies and alert the drafters of the new law on issues that may need resolution. Each law would be described and any specific part described and analyzed for redundancies, omissions, and conflicts. Changes would then be made in the new solid waste law, the current other law, or both, for each issue identified. The Gap Analysis would include examining:

- essential elements of solid waste systems for data collection and planning requirements, waste flow control, extended producer responsibility, market and consumer requirements, marine protection, drop-off requirements for recyclables; sustainable packaging requirements, separation of hazardous and other non-compatible wastes from the general municipal wastes, and creation of an enforceable system of sustainable cost recovery;
- current local laws regarding systems of permits and licenses, hindrance and nuisance issues, government procurement, environmental norms, siting of facilities, marine system protection, social inclusion, protection of occupational health and safety, environmental assessment, and public involvement;
- current international laws regarding Basel Agreement limiting transboundary movement of wastes, MARPOL Agreement requiring ports to provide internationally acceptable waste management systems for ship wastes; EU laws defining solid waste disposal and treatment standards; and International Civil Aviation standards regarding protection of the aerodrome from wildlife and bird strike;
- Netherlands law defining human rights and fundamental rights, especially with regard to definition of waste as a property of government once it is put out for collection by the waste generator, and how any licensees or contractors are allowed to handle that property during the time they might be collecting, transporting, or processing it.

Following the development of the national law, a comprehensive set of national regulations are needed. The law lays the foundation of policy and provides overarching guidance. The regulations would set out the precise standards, specifications, systems, tariffs, and other requirements to be met.



### 1.3 Municipal Law

Once the solid waste national law is finalized and enacted, there may need to be some changes in municipal ordinances, where they may exist, to make them fully compatible with the new national law. In any case, the new solid waste law would supersede municipal ordinances or codes.

Normally, in most countries, solid waste management is a municipal function. But Sint Maarten is so small and has such a small population, that it makes no sense for it to be conducted municipally. For that reason, the focus of the work is assumed to be national, except regarding the issue of community and municipal stakeholder consultation and involvement.

### 1.4 Institutional Arrangements

Institutional Arrangements and Governance Framework are described separately in the following Chapter (Chapter 1.5 of this Annex), and focus on the creation of new organization (ISWMA of Sint Maarten) and frameworks for managing solid waste in Sint Maarten. In summary, separate bodies are needed as follows:

- A service entity, such as a solid waste authority, to conduct the planning, siting, design, tendering, operations oversight, public education, customer relations and cost recovery for solid waste service delivery to be achieved. The service entity has an inspection role to issue warnings and notices to waste generators and waste contractors and licensees.
- A regulatory entity, such as a Ministry department or a utility regulatory supervising bureau, to provide inspection and oversight of the laws and regulations, to assure that the solid waste service organization conducts its business appropriately.
- A judicial entity, such as a municipal court, that would process the enforcement of the civil warnings and notices issued by the service entity. If the issues are not civil, but criminal under the law, existing judicial systems would handle through their prosecutors. Illegal disposal of hazardous waste or deliberate pollution acts are possible criminal offences.

### 1.5 Recommended Integrated Solid Waste Management Authority (ISWMA)

#### 1.5.1 Governance Framework

It is envisioned, in keeping with the Government's Road Map for Solid Waste, that there will be creation of a Solid Waste Authority which would be wholly owned by Government. The new Authority would be fully transparent and accountable, which would facilitate raising funds for capital works and operating optimally as a cost center.

Costs would be partially covered through tipping fees at the treatment and disposal facilities, license fees from authorized private haulers, and tariffs from establishments receiving contracted waste collection services. Since a major quantity of waste is derived from passengers, crews and other visitors that are passing through to shop and tour the country, and some of those wastes are collected from communal bins in public areas, a general tariff to the ships and airlines for solid waste management needs consideration. The Government's Solid Waste Authority is expected to be subsidized through general revenues from Government, as solid waste management is normally not profitable. Also, solid waste systems are not private goods. Only collection of wastes from a home or business directly, i.e., at the door or curbside for



only that establishment, is considered a private good. All other activities are considered public goods, including communal container collection, communal recycling drop off centers, sweeping of public areas and streets, minimizing disposal by special recycling and treatment, and safe disposal.

The Board of Directors needs to represent key Government agencies, as well as the Port Authority. It additionally would include key NGOs that protect natural resources and focus on social inclusion.

There would likely be shareholders, but no shares would be available to any foreign entity or be held by any private company which could create a conflict of interest. Initially, all shares would be owned by the Government, and Board of Directors could adjust the shareholders with the agreement of Government and in accord with the founding framework legally established as part of the Authority's establishing framework, i.e., Articles of Association.

The Board of Directors will hire the Chief Executive Officer, who will then, in consultation with the Board, hire all other staff.

### 1.5.2 Organizational Structure

The Solid Waste Authority would be set up largely as an organization that does data collection, planning, procurement, and financial management. All actual service operations will be handled through contracting or licensing with private sector service providers. Consultancies will be arranged to help set up the initial systems of the Authority.

Under the Chief Executive Officer (CEO) there would be the following primary activities, each under a manager reporting to the CEO (see Figure below):

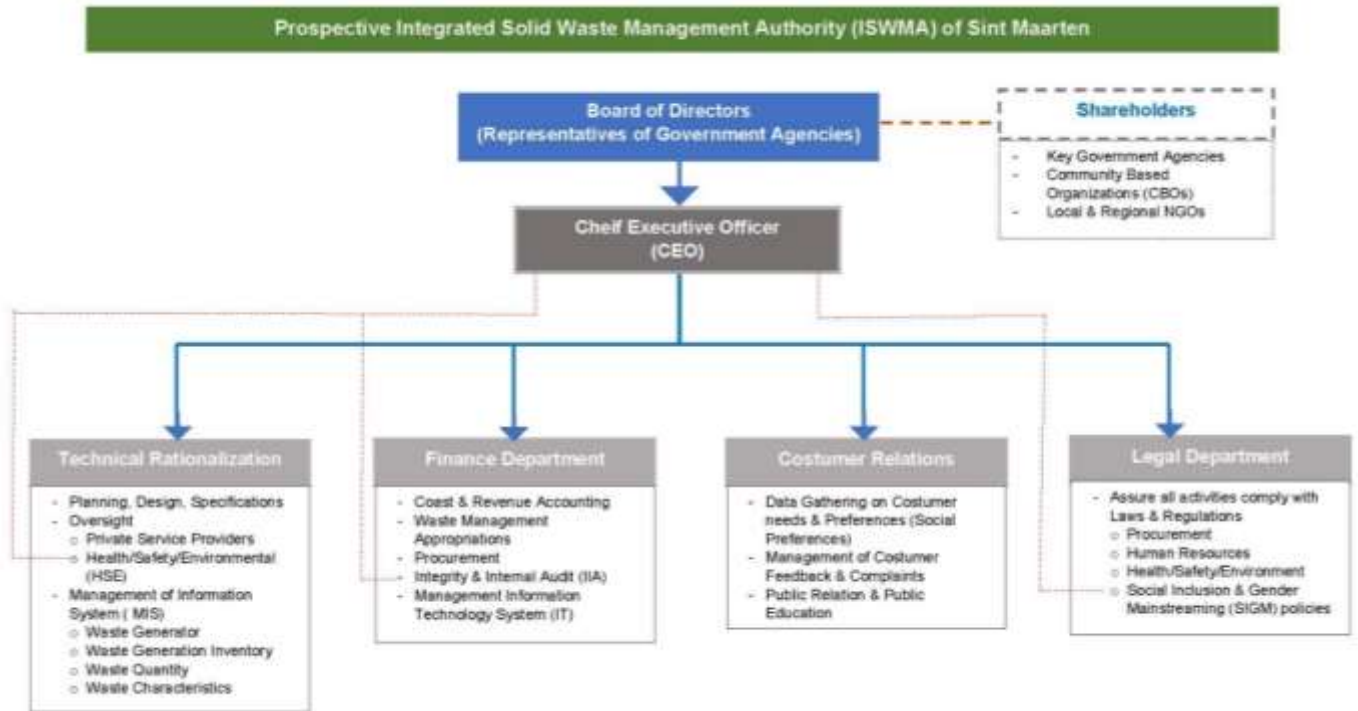
- Technical Rationalization – including planning, design, specification, oversight of private service providers, health/safety/environment (HSE) and management information systems on waste generators, waste quantities, and waste characteristics;
- Financial Management – including cost and revenue accounting, procurement, integrity and internal audit (IIA), and management information technology systems (IT) on cost recovery and tariffs relative to ability to pay;
- Customer Relations – including data gathering on customer needs and preferences as well as ability and willingness to pay, management of customer feedback and complaints about services, and education of the public on service requirements and customer responsibilities;
- Legal – including assuring all activities comply with laws and regulations, such as procurement and human resource requirements, health/safety/environmental requirements, and social inclusion and gender mainstreaming (SIGM) policies.
- Additionally, specific officers handling SIGM, HSE, IIA, and IT will have direct access to the CEO for specific issues considered to be confidential.

Initially staffing will be just one manager and one key staff in each of the four main activities noted above, plus the special officers noted for SIGM, HSE, IIA and IT. It is envisioned that new activities data



development, plans, procurement documents, accounting systems, complaint handling, etc. would be handled largely by consultancies reporting to the four main managers and their limited staff noted above. Over time, as need and capacity develops, additional staff could be engaged for routine activities (such as inspections and customer relations), while specialized activities are anticipated to continue to be done by consultancies (such as media development of education materials, technical site investigations, designs, website creation, software for management information systems).

The following Figure shows proposed SWMA organization.



## SECTION II

# Comments & Suggestions on VROMI’s Draft Law of Solid Waste Management

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## Finalizing the New Solid Waste Management Law Institutional and Legal Considerations

### Comments and Recommendations

Sint Maarten this year drafted a new, comprehensive national solid waste ordinance. The new law will replace the prior SWM ordinance which was general and spare. We acknowledges the invested political / policy positions and regulatory and administrative issues that individuals have already considered, and the careful drafting that individuals have already written. These individuals may have already implanted many suggestions and recommendations described in this paper. Hopefully they will find some new ones. Let this paper also serve as a check list: a confirmation of what already has been accomplished.

### Subjects are grouped in five main recommendations (with discussion)

#### Part 1. INSTITUTION

- Divide the new solid waste entity into two, separate entities:
  - a) Administrative (developing and operating the solid waste system), and
  - b) Regulatory (issuing and forcing permits).
- Prevent conflict of interests or even the public perception of conflict.

#### Part 2. FUNDING

- Establish an enforceable funding structure (generator, collector fees, tipping fees etc.) acceptable to the public.

#### Part 3. WASTE FLOW CONTROL

- Secure “waste flow control”: governmental authority to direct destination of the waste (such as to disposal, composting and recycling facilities).

#### Part 4. GAP ANALYSIS

- Identify provisions of national and international law, and treaties that empower - not constrain - governmental authority, and facilitate – not handicap - solid waste management, directly or indirectly.

#### Part 5. REFERENCES

- **Conducting the Gap Analysis:** Create a checklist of potential, additional SWM policy and requirements to include in the new law. Many sources are listed.



## Part 1 INSTITUTION

- Divide the new solid waste entity into two, separate entities:
  - a) Administrative (developing and operating the solid waste system), and
  - b) Regulatory (issuing and forcing permits).
- Prevent conflict of interests or even the public perception of conflict.

### No Conflict of Interests

An entity such as a utility, state owned enterprise / VROMI) that provides SWM services and issues permits to itself or for its operations. If cannot enforce its own permits, the entity would lack credibility with the public. It would not be transparent. Separate, independent administrative entity and regulatory entity does not have those disqualifying self-interests.

### A. The Administrative Entity

#### 1. Authorize the new administrative entity to provide every aspect of SWM management:

- Enter into SWM service contracts/franchises and operating contracts/ concessions (such as, DBO/DBOT processing or disposal facility development, etc.);
- Make put-or-pay commitments for waste delivery to a facility (but do so only when absolutely required);
- To pledge operation revenues;
- To procure SWM services not through lowest bids but through Requests for Proposal with flexibility to weigh multiple evaluative criteria (such as financial stability, experience with full-scale facilities, environmental record, acceptance / rejection of terms in the contrast, references, performance guaranties etc.;
- Also develop a structure of **good governance** including transparency to the public such as polished budgets, independent audits, and agendas of Board meetings; and noticed, public meetings. The current utility Boards adopts budgets, appoints Directors, and chooses management but does not administer operations. (See also the subject Good Governance below).

#### 2. Contract Administration

- **Collection Contract: performance standards and guaranties**

Be certain to authorize the SWM administrative entity to enter into, administer and meet its obligations under a collection service agreement contain such as:

- collecting, hauling, recycling, organics handling and special services such as neighborhood cleanups,



- Christmas tree, batteries and sharps (needles) collection. Before finalizing our report, it would be helpful for us to review documents for a recent public tender for collection services to households (and some commercial enterprises) for collection, transport and disposal of household waste issued by the VROMI Administration Department and Terms of Reference that are incorporated by reference.

### 3. Public tender / TOR

- Enforcement of service contracts between the administrative entity and private contractors;
- Access to civil courts (jurisdiction, venue, governing law, etc.);
- SW facility operations and SWM service contracts will presumably include multiple options to enforce contractors' obligations, including liquidated damages. However, the Utility may have to seek enforcement in civil courts. When establishing the Utility court jurisdiction, venue for contract litigation, contractual parties for service of process, and governing law must be provided.

## B. The Regulatory Entity

### Forming the Regulatory Entity

- **Regulatory / Permit Department.** The regulatory entity could be a newly created governmental department or agency, or it could be an existing department, such as VROMI's Permit Department. The Department might have to both expand and detail its authorities and responsibilities (Review VROMI Permit Department authority, obligations, operation).
- **SW Authority** The regulatory entity could be an independent authority created by statute (see Chapter 1.5 of this Annex).
- **State Owned Enterprise.** It could be a State-Owned Enterprise (SOE). Sint Maarten has a successful history of providing public services (water, electricity) through SOEs.
- **Drafting regulations.** Formation of legislation and legislative frameworks for the promotion of a sustainable quality of living environment and nature.
- **Granting permits. (Issue building & business permits).** Permits will include siting, design, construction and operation of SWM *facilities* (composting or other organics processing, recyclables recovery and processing, disposal (landfill, incineration, anaerobic digestion etc.)); and SWM *services* (via contracts with public or private entities for residential / commercial collection, materials processing / marketing, disposal)
- **Inspecting operations.** Administer and track permits: facility operations & services (including collection)
- **Enforcing permits.** Impose penalties, compliance orders. If any enforcement actions are not only civil but criminal, government entities such as Prosecutors may be involved.

**TEATT: Compare authority & obligations of TEATT.** Compare TEATT authorization and obligations for possible, additional SWM entity's authorizations and obligations.



## Part 2. FUNDING:

**Establish an enforceable funding structure (generator, collector fees, tipping fees etc.) acceptable to the public.**

### A. Contractual / Bilateral Agreements

- **Concession Agreements:** Before finalizing the new law, review:
  - 1) The current Concession Agreements between the Sint Maarten government (Department of Public Health) and the water & power utilities, and
  - 2) Subcontracts between the water and power utilities and private service providers. Simultaneously, determine what government department will enter into and administer the SWM Concession, such as VROMI or Public Health.
- **Commercial Collection Franchise:** Building disposal costs into commercial hauler franchises as a pass-through. To ensure "flow control" of commercial waste to governmental facilities, the government will likely enter into a franchise/contract with commercial haulers.
- The franchise would not regulate hauler's rates, except possibly setting a floor to prevent price gouging of haul-competitor and ceiling to prevent price-fixing among haulers at monopolistic rates. Such a commercial haul franchise / contract could also include minimum service standards and probably include mandated programs (such as source-separated recyclables for materials processing, and food-waste collection for composting). It could also include a franchise or other fee payable by the hauler to the government to cover SWM administration and disposal costs.
- **Household Collection Charges Collection Contract / Pass-Through Costs.**

Currently households (and a few commercial enterprises) pay service fees directly to the government, not a franchised / contract hauler. To reduce governmental administration billing costs, consider providing that the franchise/contract hauler issue and collect SWM bills, without recourse to the government as is currently done with commercial haulers. This shifts delinquency risk to the hauler.

However, the government could develop a protocol to recover delinquent fees: the hauler could to request that the government place delinquencies on parcels. (Payments of property tax has very low delinquencies, although the hauler would have delayed cash flow (annually?).

### B. Utility Bills

#### Household Collection Fees: Place on Water or Power Bill

- Consider joint billing of SWM service fees with water or power bills and turning off water or electricity if any portion of the joint bill remains unpaid after established period and delinquency notices.

Issue: the service providers which provide service (such as electricity) under contract with utility will object to turning off their services because of a delinquency on solid waste services. If a



household does not pay any or all SWM fees, the utilities could have first priority over fees that are paid.

- Consider requiring every household to subscribe to SWM services. Failure would be a misdemeanor.

Non-payment: This becomes political issue, although ultimately the utility is owed by the Sint Maarten government which presumably has authority to establish such a fee collection program.

- Review terms of contracts between water / power SOE's to determine flexibility for amendment, termination.

### **C. Tipping Fees**

Currently, there are Zero Tipping Fees.

- If Sint Maarten does not charge tipping fee at its disposal facility, then commercial haulers have no economic disincentive to deliver waste anywhere else or any other waste disposal facility.

Examples: might be example exporting waste (or RDF) off-island or trans-boundary.

- Haulers might have an incentive to deliver *recyclables* somewhere else or to someone other than Sint Maarten, if the recycler *pays* the haulers instead of charging them.
- Alternatively, if the government does charge tipping fees at its disposal facility, then the commercial hauler might take specific types of waste to privately owned SWM facilities that charges lower tipping fees.

### **D. SWM Enterprise Fund**

When obtaining capital financing, establishing a governmental SWM Enterprise Revenue Fund to pay costs (fees for franchised collection, concession disposal etc.) provides lenders the assurance that the Fund cannot be invaded to pay non-SW costs, as can be done in a General Fund. On an ongoing basis it also shows the public the true costs of services, including any subsidies. Review the most recent budgets for SWM (under VROMI), water (under Public Health) and power to determine the current transparency of SWM credits and debits.



## **Part 3. WASTE FLOW CONTROL**

### **Secure “waste flow control”: governmental authority to direct destination of the waste (such as to disposal, composting and recycling facilities)**

#### **1. Regulatory / Financial**

To secure financing for solid waste facilities the developer must demonstrate to its lender that it will have a secure volume of waste/feedstock. In some countries, constitutional provisions may protect the rights of waste "owners" including potentially generators, haulers, and governments.

Ownership may raise issues of government's ability to regulate owners to send waste to government identified sites without compensation (such as for recyclables). Sint Maarten counsel will have to opine on the government's ability to effect flow control by regulation and/or contract. An example is private haulers that collect commercial waste (including recyclables) may want to enter into their own destinations off-island, in Saint Martin or private facilities within Sin Maarten.

#### **2. Economic**

An alternative to regulatory or contractual flow control is economic flow control where the government charges rates that are much lower than any other alternatives.



## Part 4. GAP ANALYSIS

**Identify provisions of national and international law, and treaties that affect SWM management directly or indirectly.**

### GAP ANALYSIS of New MSW Ordinance

Sint Maarten has probably already completed much of the review described under this Part, but it may find some new, additional suggestions. Let it also serve as a confirmation of what you have already done.

- **Objectives.** The objective of a gap analysis includes:

- Assess gaps;
- Recommend legal framework;
- Describe "issues and needs" to improve legal / regulatory framework.

- **Process**

The process of conducting a gap analysis includes generally these tasks:

1. **Identify Relevant, Existing Law:** Re-visit current law (ordinances, regulations), policies, guidance documents etc., and alert for requirements that are related to SWM directly (SW standards, generators' obligations, hauler requirement, facility design and operation), and indirectly (general permitting protocols, budget format, personnel organization);
2. **Translate:** Procure competent translations of highly technical and non-colloquial language; (we could not find English translations of all SWM-related laws);
3. **Compare:** Compare the identified laws to note redundant, over-lapping or conflicting provisions;
4. **Organize:** Compile remaining provisions in manageable form, such as in clear, simple and easy-to-navigate tables, and ultimately divisions / chapters / sections;
5. **Analyze:** Scrutinize the redundancies and omissions, deciding which ones to delete, amend or move to the new or revised SWM law;
6. **Incorporate:** Insert the moved provisions in the most suitable place of the proposed SWM law; indicating their position by red-lined text or comments;
7. **Annotate:** Explain to non-SW officials, staff and the public why the provisions were inserted, where they came from, and what amendment is required in their source law;
8. **Make International Comparisons.** Drawing on SWM expertise and experience, using other nations' (or states') laws as comparative check list, see what is not there; notice what provisions are missing; IDENTIFY THE GAPS!!



9. **Explain:** Condense changes in a short presentation written for readers that are not necessarily-lawyers or SWM professionals. Annex annotated text of revised SWM law, and the tables itemizing the redundancies and inconsistencies of existing laws that must be amended or deleted.



## Part 5. REFERENCES

### Conducting the Gap Analysis

This Part will help you identify law and regulation that you may wish to include in the new laws. Scanning through the list of Sint Maarten non-waste laws; and US, EU and other SWM laws and regulations will identify topics that may not yet be included in the new SWM law.

#### A. Solid Waste Management Issues

Are the following provisions in the new law? Have they been considered?

- **Planning** requirements (waste characterization, education, waste/recyclables/organics handling capacity, funding, etc.;
- **Extended Producer Responsibility (EPR)** - to reduce waste disposal (mattresses and carpets), and toxicity (pharmacy drop-off of drugs and needles / sharps, mercury-content thermostats, architectural painting);
- **Market Development:** RDF, recyclables, compost such requirements for businesses and government to use products with (post-consumer) recycled content, street departments to use recycled concrete;
- **Marine protection:** specifications for plastic products (labeling on recycling opportunities) plastic rings on 6-packs, straws - products that could pollute the ocean or harm its wildlife;
- **Drop-off requirements:** Retail stores (cans, plastic bags, tires, lead-acid, lithium, household and rechargeable batteries, cell phones, used oil and filters);
- **Sustainable packaging:** and Management of facilities and services with regard to SW, including **permitting/** licensing/registration;
- **Regulatory inspections** and enforcement auctions such as corrective-action or cease-and-desist orders, civil penalties, and criminal actions;
- **Standards:** facilities;
- **Closure plans / funds** and their creditworthiness;
- **Disposal bans:** asbestos, construction and industrial chemicals;
- **Sustainable Materials Management:** Because Sint Martin is an island little or no SWM disposal capacity, emphasize WASTE SOURCE REDUCTION and SUSTAINABILITY.
- **Hazardous SW:** This project does not cover hazardous wastes. But hazardous waste - especially originating in household hazardous waste (batteries, paint, oil) - is discarded by generators in their refuse, the new SWM law must interface with hazardous waste laws. See a



general description of these laws above (US Regulatory information by topic"); texts of law and regulations here. RCRA Law & Regulation: o RCRA, 42 U.S.C. §6901 et seq. (1976)

## B. National Non-SW Laws: Checklist

Local Laws affecting SWM management:

- **Permitting:**
  - **Hindrance National Decree:** Check that new law covers permitting both **services** (collection, recycling, transport etc.) and **facilities** (WTE, RDF facilities). Some governmental agencies *franchise* waste haulers to obtain revenues (franchise fees). Of course, haulers internalize that cost in their customer service fees / rates. SWM Business is lucrative for many private businesses (although haulers tend to have lower ROI than facilities with greater capital risk.) To ensure that the government can issue, monitor, enforce and revoke permits, the permitting protocol must be clear to avoid costly argument with those businesses that need permits to operate: issue, renew, suspend, revoke ordinances; provide administrative appeal provisions for denying or revoking; ample notice rights;
  - **Permit Procedure:** Re-examine. Existing rules for VROMI Permit Department to coordinate with new SWM law;
  - **Permit Policy:** VROMI's responsibilities will increase to include *permitting haulers and facilities' operations* in accordance with standards specified in regulation implementing the new SWM law;
  - **TEATT Enforcement Policy 2015:** TEATT's current permitting protocol for marine / ship permitting may be helpful in establishing the new SWM entity's protocol. See also citations and considerations in Short-term INSTITUTIONAL Lists, above, comparing institutional and revenue structures of the water and power utilities to a new SWM utility.
- **(SW effluents) Environmental Norms:** Waste facilities will have liquid discharges that will be regulated. How the Water Permitting Agency interacts with the SE Permitting Agency determines how cumbersome / how easy it is for applicants to secure permits. These agencies should not each to through the permitting protocol for the same issue. So, for example, a SWM permit may incorporate the water discharge permit.
- **Infrastructure:** Infrastructure will include a variety of SWM facilities such as recycling processing centers; compost facilities / anaerobic digestion; RDF, WTE facilities; and transfer / transport stations (including naming for off-island export.) It might also include inspection of haulers' collection vehicles and maintenance yards.
- **Siting:** Hillside & Beach Policy. See also restrictions on construction of SWM garbage facilities within range of the international airport.
- **Local Laws on Environmental Protection: Conservation**
  - **National Ordinance with Foundations for Nature Management and Protection.** Looking forward, some solid waste facility sites (such as C&D landfill) might be remediated



to form public parks for biking, hiking and other recreation. Consider how these will inter-relate with conservation laws.

- **National Decree containing general measures for Nature Management and Protection**

### **C. International Laws – Comparison**

- **EU Solid Waste Law:** See discussion under Institutions, above
- **Summary of EU Solid Waste Law:** The list statutory topics in institutions detailed above under "US Regulatory" documentation can also be used to note topics under EU that Sint Maarten might like to include in its new SWM law. [http://www.municipalwesteurope.eu/summary-current – eu - waste-legislation](http://www.municipalwesteurope.eu/summary-current-eu-waste-legislation).
- **US Solid Waste Law:** See discussion under Institutions, above

### **D. International Treaties**

#### **Applicability of environmental treaties to Sint Maarten**

Local council should confirm what or what part of treaties /conventions, such as the following, apply to Sint Maarten:

- **EU treaties of Maastricht 1993 and Amsterdam 1999** (and consequently EU environmental laws);
- **MARPOL – International Convention for the Prevention of Pollution from Ships.** conventions, especially Annex V Prevention of Pollution by Ships (and their applicability to ships other than leviathan cruise vessels);  
(Under MARPOL ships are responsible for disposing of waste in accordance with the convention. The capacity of Sint Martin's new SWM facilities should consider the potential tonnage from ships. MARPOL Annex V , International Maritime Organization  
<http://www.imo.org/en/OurWork/Environment/PollutionPrevention/Garbage/Pages/Default.aspx>
- **The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal**, and Other environmental treaties?  
How do they trump Sint Maarten law? (Which is further complicated by the incorporation of some English common law judicial opinions that may interpret law).

### **E. Law of Netherlands**

#### **Role of the Netherlands: Waste Flow Control v. Property rights**

Netherlands Constitution & Human Rights. The Charter obligates the Netherlands and Sint Maarten to collaborate on "human rights". Local counsel should clarify: Do "human rights" include the "fundamental rights" articulated in – and as interpreted under - the Netherlands' constitution (such as Article 14 Property) and Sint Maarten's constitution (such as Article 15). Do the constitutions (and their interpretation) govern



waste flow control – designating where haulers must deliver waste – in Sint Maarten. Is waste “property”? Can Sint Maarten exercise regulatory flow control? Or is it relegated to economic flow control?

## **F. Other Legal Resources**

Use these sources to create a check list of what laws should include to facilitate general solid waste service contracts with the public sector, and specifically, attract capital for DBP and DBPT SWM facility development.

- World Bank, Public-Private Partnership Legal Resource Center (PPP LRC)  
<https://ppp.worldbank.org/public-private-partnership/sector/solid-waste/waste-laws-regulations>
- EU Waste Legislation; Treaty on the Functioning of the European Union (Articles 11, 191-193)- Environmental Policy - EU Waste Legislation;  
<http://ec.europa.eu/environment/waste/legislation/index.htm>  
Read through this source to better understand what rules and regulations Saint Martin must comply and what SWM transactions between it and Sint Martin would require. (See Basel Convention and MARPOL)
- U.S. Regulatory Information by Topic: Waste, US Environmental Protection Agency (EPA - <https://www.epa.gov/regulatory-information-topic/regulatory-information-topic-waste>)



# ANNEX 2

## EXTENDED PRODUCER RESPONSIBILITY

## 1. Extended Producer Responsibility (EPR)

### 1.1 EPR Context

EPR is a regulatory instrument that seeks to increase the reuse and recycling rates of various products, stimulate the development of a recycling industry in the locales where it is implemented, and increase the amount of waste diverted from landfill disposal. EPR seeks to achieve a reduction in the environmental impact of products, throughout their lifespan, from production through end-of-life.

Implementation of the extended producer responsibility principle requires a careful consideration of the term “*producer*”. It is proposed to define “*producer*” as “legal entity, which places products on the market of Sint Maarten for the first time”. It thus includes manufacturers, importers, distributors and retailers of goods on the territory of the Sint Maarten.

The advent of consumerism, particularly in relation to increased tourism on SIDS as is in Sint Maarten, brings along wastes that are not easily managed on the islands. Promoting and enforcing EPR measures will assist in increasing the accountability of importers and retailers, creating a financially feasible circular approach.

Some of the policy instruments used to implement EPR programs include the following:

1. *Product take-back requirements* that require producers to assume the responsibility of taking back their products (in whole or part) at the post-consumer stage of their product;
2. *Performance standards* that determine the extent to which producers are required to recycle their post-consumer products. This is intended to provide an incentive to producers to choose production processes and/or products that enhance recovery and recycle potential;
3. *Deposit/refund schemes* that requires consumers to pay a deposit when purchasing a product and then receiving a refund when returning the post-consumer product, the container, or the packaging. The aim is to facilitate product take-back thereby diverting it from the municipal waste stream and landfill disposal.
4. *Advance disposal fees* that involve charging consumers at the point of purchase for the cost of treating and recycling post-consumer products including the cost for take-back.
5. *Material taxes* that are usually imposed on raw materials that have high environmental risks to encourage a shift towards use of more environmentally friendly materials in products.

The extended producer responsibility tools would also include<sup>1</sup>:

- prohibiting sale;
- controlling or prohibiting disposal of products or waste;
- controlling or prohibiting the manufacture or sale of products that contain specified materials;
- requiring a takeback service for products;
- setting fees payable for the management of a product;

<sup>1</sup> United Nations Environment Programme (2016d)



- establishing container deposit schemes;
- prescribing requirements for the labelling of a product; and
- defining standards to be met when reusing, recycling, or recovering the product or material.

So far, the most prominent use of extended producer responsibility tools in SIDS relates to the prohibition of manufacturing and selling plastic bags, although no comprehensive information is available on the impact achieved in individual SIDS. For example, by using one of the tools listed above, prohibiting sale, Mauritius banned the use of nonbiodegradable plastic bags and instituted a levy on disposable bags. This resulted in significant reductions in single use plastic bags<sup>2</sup>. A similar ban on non-biodegradable bags was instituted in Samoa<sup>3</sup>. A successful extended producer responsibility tool is the establishment of container deposit schemes.

The results can be seen, for instance, in Palau Box 1, and in Yap State of the Federated States of Micronesia as shown in Box 2 below.

### BOX 1: Palau

Discarded beverage containers were a large and growing component of the waste problem in Palau. In 2006 the government of Palau, through a national act 226, created a recycling fund and established a fee-based incentive system to encourage the redemption and recycling of containers, called the Beverage Container Deposit Programme. This programme, widely implemented in the urban state of Koror, which is home to about 70% of the country's population, contributes to the recycling fund, which is now self-sufficient to cover government expenditures associated with solid waste management, including the personnel and operating costs of the recycling center and its facilities. The recycling center no longer receives an extra budget allocation from the national government. So far, of the 93 million imported beverage containers, about 81 million have been redeemed and compressed. This reflects an 87% success rate of redemption. An estimated 4,000 tonnes of used beverage containers have so far been processed for recycling and diverted from landfill in Palau. Of the containers redeemed, about 56 million aluminum and steel cans and 20 million plastic bottles have been shipped off island for recycling. About 2 million glass bottles have been recycled on the island. Because of the successful Beverage Container Deposit Programme, beverage containers are now hardly ever found in the environment or in normal household waste. The successful implementation of the programme is a manifestation of the commitment of the government to address waste issues in the country and is a good example of sustainable financing with positive environmental impacts.

*(Koror State Government and Bureau of Public Works, Palau)*

### BOX 2: Yap State, Federated States of Micronesia

The Yap State Environmental Protection Agency introduced, in 2009, a Container Deposit Programme. The state government charges a 6 cent deposit fee upon the purchase of each of the following containers: aluminum cans, polyethylene terephthalate (PET) beverage containers, polyethylene terephthalate (PET) cooking oil containers and glass beverage containers. Customers who bring back empty containers will be refunded 5 cents per container. The one cent difference goes to a private recycling center to cover operating and shipping costs. More than 14 million containers have been shipped out of Yap State for recycling, which helped to decrease the volume of plastic and aluminum waste that went to the landfill. From November 2014 to March 2015 alone, the recycling center collected almost 1 million aluminum cans, 200,000 polyethylene terephthalate (PET) bottles, 5,000 polyethylene terephthalate (PET) cooking oil containers and 17,000 glass bottles. Over a five-year period from 2009 to 2014, the number of redeemed containers exceeded the number imported during the initial stages of the

<sup>2</sup> UN Department of Economic and Social Affairs (2010)

<sup>3</sup> Government of Samoa (2010)



recycling programme, reflecting good public reception of the project. In 2014, more than 95% redemption was recorded. For a small island state like Yap with very limited capacity, initiatives such as this, which reduce generation of wastes and increase diversion from the landfill, can have very big impacts.

(Yap State Environmental Protection Agency, Federated States of Micronesia)

Provision of responsibility within the EPR is intended to link the upstream (design phase) of the product's life cycle with downstream (end-of-life management). EPR is being implemented in many places throughout the world. Each program is slightly different, but with the common theme of requiring the producer of a product to assume greater responsibility for managing its product at the end of its useful life. Among EPR programs, there is a range in the degree that manufacturers assume responsibility for end-of-life product management as compared to others in the product chain such as retailers, consumers, local governments and recyclers.

The minimum requirement for an EPR system has been that the producers should be responsible for covering a substantial part of the costs for collection, transports and recycling/recovery through fees, or in some cases taxes, that are put on products entering the market. These systems then allow for a free-of-charge take-back for the last owners.

The systems within the EPR are in almost all cases in Europe today run by so called Producer Responsibility Organizations (PROs) that are owned, at least mainly, by the producers of the products in question.

Europe has also witnessed a variety of different approaches when it comes to the number of Producer Responsibility Organizations on the market. The presence of several such PROs has in many countries led to the establishment of a clearing house to even out difference between collection amounts and the amount of products licensed by the PRO.

Today the situation in the EU is rather complex. Good collection results are reported from basically all countries, but the reliability of the data is very varying. A few countries have reliable data, while many countries present results that are difficult to verify and seem exaggerated when comparing to experiences from these countries.

The countries in the EU, as well as some of the neighboring countries, are in general using an EPR approach in their national legislation to address the packaging waste challenges. There are, however, three countries – Denmark, Hungary and Croatia – that have state taxes instead. However, also the countries with EPR approaches show considerable differences. Three models are often distinguished:

1. *The "Dual model"* – Producers are fully responsible for the management and financing of the packaging waste and organize a separate collection parallel to the mixed waste collection. Austria, Germany and Sweden are examples of countries implementing this model.
2. *The "Industry-municipality model"* – Detailed agreements and cooperation is established between the producers, who are responsible for financing, and local authorities, who frequently decide about the collection activities, or at least have a considerable influence on how this is organized. In this group, Belgium, the Czech Republic, France and Spain can be count.
3. *The "Tradable Credits model"* – The producers buy Packaging Recovery Notes from recyclers, who can generate such notes by recycling specified amounts of various packaging waste. In this model there is no clear link between producers and the collection at local level. United Kingdom is today



the leading example, but also Lithuania has earlier built its system on this model, which turned to be very risky and not transparent and caused a lot of free riding and “free” certificates.

The EU Directive does not require the member states to introduce EPR systems, but all countries but for Denmark, Hungary and Croatia have today some form of EPR system – state tax. However, the details of implementation vary considerably between the countries.

In a number of European countries introduced deposit-refund system for one-way beverage containers. The Netherlands has decided to cancel the mandatory deposit-refund from 2015. The experiences from deposit-refund systems are generally that very good collection and recycling results are achieved. The quality of the collected material is high and it can be used for the same purposes as virgin material: glass is used to make new glass, aluminum to make new aluminum cans, and PET for new PET bottles.

EPR has delivered positive outcomes, notably through a better understanding of the product and waste management chain, taking into account the whole life-cycle of a product, while introducing investment to develop separate collection and effectively increase recycling and recovery rates of under-performing waste streams. However, EPR has also has adverse impacts, e.g., the development of low-quality recycling, scheme failures due to the involvement of too many and/or mismanaged EPR organizations, and the development of free-riding behaviors due to poor enforcement and improper monitoring and control.

The fact that many of the materials that could be subject to an EPR program in SIDS are produced outside of the island weakens the linkage that could exist between SIDS’ EPR program and the producers of the products that are subject to it. In addition, the scale of consumer markets in SIDS for commodities that could be subject to an EPR process limits the influence that SIDS can have on producer practices without regional cooperation. Also, the SWM benefits associated with EPR must be considered within the context of its economic impact on consumers.

## 1.2 Sint Maarten Case

There is no EPR as a policy instrument in Sint Maarten, that provides recycling fund which will allow the Government to have sufficient budget to arrange and keep under control the end-of-life management of, especially, motor vehicles, tires, car batteries, packaging waste, and EEE as they are not manufactured in Sint Maarten, and imported as well as much of the foods with packages. So, the following EPR instruments would be recommended to be applied with the required policy support and legislatively arranged incentives / disincentives in Sint Maarten.

1. “Dual Model” or “industry-municipality model” could be applied for local beer, rum and sparkling water producers that some of them is already in keen interest to apply “deposit refund system” for their glass beverage containers (bottles);
2. Import or production of biodegradable plastic bags would be encouraged and supported by imposing a levy on non-biodegradable plastic bag import or produce;
3. A state tax would be imposed for each tire to be imported in order to provide fund for collection and adequately handling the scrap tires to be generated in the country as the collection and treatment process/recycling of scrap tire requires additional fund (mostly subsidy by the governments). Although this instrument creates a small economic impact on post-consumers, it would help to provide funds instead government subsidy;



DELIVERABLE 3.1, Country Solid Waste Management Sector Assessment (CSWMSA): ANNEX 2 – Assessment on Extended Producer Responsibility (EPR)

4. A small state tax would be imposed on import of smaller batteries, starter batteries and larger batteries built on lead-acid system (LABs) and large industrial batteries (NiCd) for the purpose of end-of-life management batteries. These batteries are hazardous, but also contain valuable materials that are easy to recycle and frequently also profitable. Also, for LABs for cars and other vehicles depending on the standard of the facility and market prices of lead, this recycling is profitable or needs subsidies. Handling of those requires a well-working system, and a pre-processing recycling facility with high environmental standards, typically, may need subsidies. An EPR instrument (a small tax when importing) would help to provide such financing, supporting the recyclers that deal with collection, pre-processing and exporting them. Although this instrument also creates a small economic impact on post-consumers, it would help to provide funds instead government subsidy for environmentally sound end-of-life management batteries.
5. Electrical, electronic equipment (EEE) along with valuable materials (metal parts) contain toxic substances, especially, the electronic components of the products. The producers should establish collection points for WEEE in cooperation with local recyclers under registry and control/oversee of ISWMA of Sint Maarten in order to create a take-back system, and disassembling of them in compliance with the environmentally sound best practices. This, in turn, would cause not to dispose of them in the landfill, and local and regional metal recyclers would interest to buy and export the metal fractions. The costs of these activities would be covered by the producers, reflecting the costs onto commodity price. Although this instrument also creates a small economic impact on post-consumers, it would provide an environmentally sound end-of-life management WEEE.
6. Establishing a PRO unit within the new ISWMA, to provide the register the EPR instruments in cooperation with the Sint Maarten custom department and the producers based on the application of the producer with the brands of the producer, control and oversee the fund to be provided through the EPR instruments, and organize and administer the information, material and financial flows.
7. In any case it must be ensured that the collected fund through the EPR instruments must be “earmarked” and cannot flow in the pool of the general government budget.



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