

ACCRA METROPOLITAN ASSEMBLY

CLIMATE AND CLEAN AIR COALITION (CCAC)

MUNICIPAL SOLID WASTE INITIATIVE FOR SHORT-LIVED CLIMATE POLLUTANTS (SLCPs) AND GREENHOUSE GAS EMISSIONS

WORKPLAN FOR IMPLEMENTING SOLID WASTE MANAGEMENT STRATEGIES OF ACCRA CITY

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1. INTRODUCTION

As part of programs under the Climate and Clean Air Coalition (CCAC) Municipal Solid Waste (MSW) Initiative, the United States Environmental Protection Agency (USEPA) is partnering with the Accra Metropolitan Assembly (AMA) to develop and implement solid waste management strategies that potentially contribute to the reduction of Short-lived Climate Pollutants (SLCPs) and greenhouse gas emissions in the Accra City.

Preliminary scoping studies carried in early 2013 through participatory consultations with key stakeholders resulted in the preparation of a draft work-plan. The current plan is the finalized program upon further discussions and appraisal by the Accra Metropolitan Assembly (AMA).

The following agencies are the key implementing partners for this program.

- **City partner:** Accra Metropolitan Assembly (AMA)
- **City implementer:** United States Environmental Protection Agency (USEPA)

During the scoping exercise a number of international organizations with program interventions in solid waste management were identified. These include:

- The World Bank
- Global Communities (formerly Cooperative Housing Foundation (CHF) International)
- Millennium Cities Initiative (MCI)¹

The current spatial distribution of solid waste disposal facilities, mostly outside the jurisdiction of the AMA implies that other neighboring municipalities within the wider Greater Accra Metropolitan Area (GAMA) will be involved in the collaborative implementation of the program.

The areas of assistance identified by the CCAC and AMA under this program include:

- Waste Collection
- Organics Diversion
- Collection and Utilization of Landfill Gas (LFG)

An overview of status of solid waste management in Accra is presented in Annex 1.

2. OBJECTIVES AND PLANNED OUTPUTS

The objective of the project is to identify opportunities in Accra City's MSW management system for abating SLCPs, including methane and black carbon.

¹ Description of the work MCI is doing in Accra can be found at: <http://mci.ei.columbia.edu/millennium-cities/accra-ghana/background-objectives-methodology/>

The main outputs expected to be achieved include:

Output 1: AMA assisted to establish a baseline SLCPs and activities that promotes their mitigation.

Output 2: AMA provided assistance in managing LFG

Output 3: AMA technically assisted in siting and securing financing for a new and modern sanitary landfill

Output 4: AMA supported in improving organic waste collection and service system in Accra

Output 5: MSW management system financially assessed for improved collection

3. PARTNERS

The main partners responsible for the implementation of the project are:

- Accra Metropolitan Assembly (AMA) – City partner
- United States Environmental Protection Agency (USEPA) – City implementer

The U.S. Environmental Protection Agency is implementing this work with the support of a team of expert consultants including:

- Stratus Consulting – a firm that offers comprehensive, multidisciplinary expertise in environmental sciences and natural resources, environmental economics, environmental information management, and policy analysis.
- SCS Engineers – an international environmental engineering consultancy specialized in solid waste, landfill, and environmental services.
- WasteCare Associates – an environmental sanitation consultancy firm located in Accra.

4. DETAILS OF OUTPUTS AND ACTIVITIES

The table below outlines the specific task descriptions, roles and deliverables required under each output.

Output 1: AMA assisted to establish a baseline SLCPs and activities that promotes their mitigation.

Task 1. Technical Assistance		
EPA Role	AMA Role	Deliverables
Develop MSW sector baseline inventory for methane, black carbon, and relevant criteria pollutants. Model and project potential emissions reductions from primary projects.	Review and summarize the basic findings in the information provided by EPA. Delineate waste generation, collection, and disposal. Use accepted methodology for inventory and crediting purposes.	Inventory of SLCP emissions

Output 2: AMA provided assistance in managing LFG

Achieving this output would involve: assessing solid waste disposal sites for technical and economic feasibility of a LFG project; training on LFG operations and management; and assisting with engineering and procurement activities at a new site.

Task 1. Identify Dumpsites		
EPA Role	AMA Role	EPA Deliverables
Identify and evaluate dumpsite(s) that present a potential opportunity for a LFG capture and collection system: <ul style="list-style-type: none"> • Mallam 1, 2, SCC • Oblogo 1 • Sarbah 	Facilitate site visits for preliminary evaluation. Provide waste data and background information on open and closed dumpsites operated by AMA.	Memo with results of preliminary LFG potential for identified sites
Task 2. Technical Assessment		
EPA Role	AMA Role	EPA Deliverables
Perform a pre-feasibility assessment of the candidate sites.	Provide documentation on existing waste. Facilitate stakeholder meetings including current municipality having jurisdiction.	Final report on assessment findings.
Task 3. Technical Training		
EPA Role	AMA Role	EPA Deliverables
Work with technical experts to conduct research and develop presentation materials on landfill	Handle logistics, including providing auditorium/meeting space and audiovisual equipment, and ensuring the	Two-day training to AMA waste staff and private operators of solid waste disposal sites on LFG

and LFG management. Cover the costs associated with the participation of LFG experts.	smooth execution of the event.	management
Task 4. Technical Assistance for Investment Opportunities		
EPA Role	AMA Role	EPA Deliverables
Assist with establishment of investment vehicle from viable LFG energy projects.	Reaching out to multi-lateral development banks and national banks.	A marketing/finance plan in conjunction with CCAC partners.

Output 3: AMA technically assisted in siting and securing financing for a new and modern sanitary landfill

Task 1. Technical Assistance		
EPA Role	AMA Role	EPA Deliverables
Develop specific areas of assistance with new landfill location. Review existing Terms of Reference (TOR), if available or identify data needed for new TOR. Perform pre-siting study of new landfill location(s).	Explore potential EPA collaboration with Conti and relevant stakeholders on siting assessments of candidate sites. Provide available site information and relevant data. Provide TOR for review. Identify at least 2 candidate sites for evaluation. Provide transportation and related logistics for all assessments.	Preliminary site evaluation report

Output 4: AMA supported in improving organic waste collection and service system in AMA

Accra has a large organic fraction in its waste stream with high moisture content. Given the difficulty of collection and its contribution to SLCP generation, it is a priority to delineate this waste stream and consider alternative treatment options. There are currently two different approaches being undertaken in Accra: a small-scale, community based model piloted by CHF (now being managed by Jekora Ventures), and a centralized, industrial-scale operation managed by ACaRP.

ACaRP indicated that it currently has a handle on its feedstock and is working to improve its operations constraints, feedstock sourcing, as well as market assessment and development of a marketing plan. Therefore short-term efforts should focus on creating a model for addressing the significant fraction of organics that is not being served by ACaRP. Evaluating the CHF model could serve as a starting point.

Task 1. Technical assessment		
EPA Role	AMA Role	EPA Deliverables
<p>Explore collaboration with Jekora Ventures/CHF.</p> <p>Prepare a preliminary assessment of the potential for organics diversion from landfills through source separation at large-scale organic waste generators such as wholesale food markets, farmers’ markets, large supermarkets, nurseries, hotels, tree-trimming operations. The assessment will include the following subtasks:</p> <ul style="list-style-type: none"> • Collect data on organics generation, organics types, organics sources, and current organics disposal practices. • Obtain data about potential end-use markets and their requirements. • Develop a model for evaluation of feedstocks, treatment, and marketing appropriate for Accra 	<p>Provide existing documentation on organic waste generation in the city and access to organizations involved in the generation and management of these waste streams.</p> <p>Facilitate stakeholder meetings.</p>	<p>Final report on assessment</p>
Task 2. Capacity Building		
EPA Role	AMA Role	EPA Deliverables
<p>Coordinate training workshop on operations and management strategies.</p> <p>Cover the costs associated with the participation of experts.</p> <p>Develop marketing strategy.</p>	<p>Handle logistics, including providing auditorium/meeting space and audiovisual equipment, and ensuring the smooth execution of the event.</p> <p>Identify consumers.</p>	<p>Two-day training to facility staff and invited management personnel</p> <p>Marketing plan outlining quality standards and cost strategy for economically viable feedstock</p>
Task 3. Coordination with World Bank		
EPA Role	AMA Role	EPA Deliverables
<p>Assist with compost/feasibility tool to identify options for cost effective composting.</p>	<p>To be discussed (TBD)</p>	<p>Financing mechanism recommendations</p>

Output 5: MSW management system financially assessed for improved collection

Task 1. Technical Assistance		
EPA Role	AMA Role	EPA Deliverables
Review current AMA contract with collection contractors and explore ways to improve collection efficiency. Provide information on results-based financing mechanism options.	Provide copy of agreement with collection contractors to EPA. Delineate primary and secondary MSW collection rates, providers, funding.	Memo identifying a list of options
Task 2. Coordination with World Bank		
EPA Role	AMA Role	EPA Deliverables
Coordinate technical assistance and design of funding mechanism.	TBD	TBD

5. MONITORING AND EVALUATION

To ensure that the activities described in this work plan contribute to the objectives of the CCAC, progress along several indicators will be monitored and reported on a regular basis. These indicators, include: (1) quantity of greenhouse gas emissions, measured in metric tons of CO₂e, reduced or sequestered; (2) number of activities implemented at the national or regional level; (3) number of laws, policies, strategies, plans, agreements, or regulations addressing SLCPs drafted, proposed, adopted, or implemented; (4) number of sectoral policy planning tools produced; (5) person hours of training completed in SLCPs; (6) number of institutions with improved capacity to address SLCPs; and (7) amount of investment leveraged dollars, from private and public sources.

Annex 1: Overview of Solid Waste Management in Accra

Accra is the capital of Ghana and the country's largest city. Accra consists of six sub-districts referred to as Sub-Metropolitan Areas. These are Okaikoi, Ashiedu Keteke, Ayawaso, Kpeshie, Osu Klotey, and Ablekuma – that make up the Accra Metropolitan Area (District). The Accra Metropolitan Area, which is administered by the Accra Metropolitan Assembly, is one of eight districts in the Greater Accra Metropolitan Area (GAMA). The other districts include the Tema Metropolitan, Adenta Municipal, Ashaiman Municipal, Ledzokuku-Krowor Municipal, Ga East Municipal, Ga West Municipal, and Ga South Municipal districts. Accra has an estimated population of 2,290,000 (the GAMA has approximately 4,000,000 people) with an annual growth rate of 3.5%.

Accra generates about 2,500 tons per day of MSW. The current waste collection coverage is about 88% equaling 2,200 tonnes per day. A waste characterization study, conducted by the MCI in 2010 in the electoral area of Aryee, district of Kpehe, revealed that the waste was made up primarily of organics (67%) and plastics (20%). The following table presents the fractions of each waste category.

Table 1. Waste Composition²

Category	Percentage (%)
Organics	67
Plastics and rubber	20
Textiles	5
Paper	4
Metals and cans	2
Glass and miscellaneous	2
Total	100

Public-Private Partnership in Solid Waste Management

Solid waste management within Accra has been mostly privatized. Accra is divided into 10 waste collection districts each contracted to a different waste collection firm. Collection companies are responsible for all residential, commercial and industrial waste generated in their zones.

Records from the AMA WMD indicate that 88% of the waste generated is currently collected. Historically, AMA had implemented a pay-as-you-throw (PAYT) program involving drop-off collection containers (communal containers) in different neighborhoods. This mode of secondary storage has numerous challenges including illegal dumping into drains and vacant lots by households to avoid the fees charged at the container sites. AMA is working to replace all communal containers by providing all households with storage bins. Currently 98,000 waste bins have been distributed to households which represents approximate 40% coverage rate.

² MCI, Report on Findings of the Waste Composition Study for the Aryee Diki electoral area of Accra New Town, Accra. 2010

AMA approves the fees that are charged to households by collection service providers. The fees are charged based on housing class which is in turn based on quality/level of infrastructure, property values and the general community amenity. The current AMA approved fees for refuse collections are shown in Table 2.

Table 2. Collection fees by class

Area	Cost per month (GHC)
1st Class	30
2nd Class	20
3rd and 4th Class	7

Service providers are responsible for collecting fees from generators. Fees are typically set so service providers can recover their costs with some reasonable profit margin as determined by the AMA. The fees are not a source of revenue for the city. Conversations with AMA indicated that a significant portion of AMA’s budget is dedicated to funding “interventions” and covering public debts to collection companies. Interventions are defined as supplementary waste collection services provided in any zone where the contracted waste collector is unable to fulfill its commitment. Interventions entail payment to other collection companies to complete service collection.

A key issue faced by many operators is the very long distances for final waste disposal, poorly maintained roads, and limited access to low-income areas of the city.

Organics Diversion

The municipality of Accra generates a large amount of organic waste that is high in moisture content. There is no formal dedicated organics collection service provided in Accra. There are two innovative models currently in place in Accra: community-based small scale composting, and a large scale, open windrow facility with a materials recovery unit.

The small scale model is a project of CHF’s program. In this project Jekora Ventures Ltd. collects organic waste from 60 companies, mainly hotels and restaurants of the tourist area of Osu. These companies receive a 5-10% collection discount depending on volume. Jekora Venture Ltd. currently diverts roughly 2 TPD of waste and sends the source separated organic waste to neighborhood composting centers. This model is quite efficient but may not be scalable.

The large scale model has substantial capacity, but has issues with the quality of its feedstock and final product. About 500 TPD of MSW is sent to the Accra Composting and Recycling Plant (ACaRP). ACaRP is located in Ga West Municipality, owned and operated by Zoomlion through a public-private partnership with AMA. ACaRP was commissioned in July 2012, and became fully operational in January 2013. Since commissioning, the facility has processed a total of 16,000 tons.

Collection and Utilization of LFG

Accra’s solid waste disposal (SWD) sites consisted mostly of abandoned stone quarry sites, gouged natural depressions in the earth, old mining areas, or man-made holes in the ground. There is open

burning at some of the open controlled dumps particularly during the dry season. The Ghanaian Environmental Protection Agency is working to remediate closed dumps and upgrade current landfills.

The main landfill currently being utilized for Accra's waste is the Tema Landfill. It is an engineered landfill in the neighboring municipality of Tema and is owned by Tema Metropolitan Assembly (in the GAMA's Tema Metropolitan District). It is roughly 37 kilometers outside Accra. The landfill was constructed to accept 700 tons per day, but currently receives a total of about 1500 tons per day (TPD) as it now accepts waste from Accra, after it closed several of its open dumps. It receives about 1100 TPD of waste from Accra and about 400 TPD from Tema. The acceptance of Accra's waste has significantly reduced the lifespan of Tema's landfill by half (originally 15 years). Until recently, the AMA was also using the Abokobi open dump site in the Ga East District. Until its recent closure in June 2013, the dump site received approximately 600 TPD.

Accra's other closed dumps include the Sarbah SWD site, Mallam SWD and Oblogo SWD sites (all located in the GAMA's Ga South District). The Mallam SWD site covers three disposal areas (Mallam 1, Mallam 2, and Mallam SCC); closure construction of the three areas is ongoing. The Oblogo SWD site covers two disposal areas (Oblogo 1 and Oblogo 2). The Sarbah, Mallam, and Oblogo 1 SWD sites present potential opportunities for LFG capture and collection system and possibly LFG utilization projects.

A more viable opportunity for an LFG project is at a new engineered landfill for Accra that is planned to be built under the Conti drains construction project³. It is unknown whether the plans for new landfill include the construction of an LFG collection system.

³ <http://www.modernghana.com/news/468321/1/accra-will-never-be-the-same-as-conti-project-comm.html>