

+

Workplan to Mitigate Short-lived climate pollutant from Municipal Solid Waste Sector in East Delhi

Prepared for
East Delhi Municipal Corporation



In support from
The Climate and Clean Air Coalition
Municipal Solid Waste Initiative



© The Energy and Resources Institute 2018

Suggested format for citation

TERI. 2018
Workplan to Mitigate Short Lived Climate Pollutant from Municipal Solid Waste
Sector- East Delhi
New Delhi: The Energy and Resources Institute. 18 pp.
[Project Report No. 2016 MS 06 (Activity 1.6)]

For more information

Project Monitoring Cell
TERI
Darbari Seth Block
IHC Complex, Lodhi Road
New Delhi – 110 003
India

Tel. 2468 2100 or 2468 2111
E-mail pmc@teri.res.in
Fax 2468 2144 or 2468 2145
Web www.teriin.org
India +91 • Delhi (0)11

Table of contents

1	INTRODUCTION	4
2	BACKGROUND	4
	2.1 MSW Management and Overview	4
	2.1.1 Waste generation.....	6
	2.1.2 Waste Collection and handling.....	6
	2.1.3 Waste processing/treatment.....	7
	2.1.4 Final Disposal.....	7
	2.1.5 Communication.....	8
	2.2 Solid Waste Management Rules 2016.....	8
	2.3 Investment prospects.....	9
3	EDMC PRIORITIES	9
	3.1 Improving collection and waste segregation.....	9
	3.2 Management of Organic Waste.....	9
	3.3 Identification of gaps in existing infrastructure- Dhalaos.....	10
	3.4 Landfill Management.....	11
4	SCOPE OF ACTIVITIES	11
5	SCHEDULE	16

1 Introduction

The Climate and Clean Air Coalition (CCAC) is a voluntary partnership of governments, intergovernmental organizations, businesses, scientific institutions and civil society organizations committed to improving air quality and protecting the climate through actions to reduce short-lived climate pollutants (SLCPs). CCAC's global network includes over 100 state and non-state partners, and hundreds of local actors carrying out activities across economic sectors. One of the non-state partners committed to mitigate SLCPs is The Energy Resources Institute (TERI) in India. TERI's objective of working with the CCAC-Municipal Waste Initiative (MSWI) is to reduce SLCPs from the solid waste sector and to contribute to the CCAC (Waste Initiative) priorities by developing workplans for two cities in India, East Delhi and Coimbatore, and the creation of a regional city network for Indian cities.

This workplan for East Delhi is developed in coordination with the East Delhi Municipal Corporation (EDMC) with the objective of improving waste management practices in ways that address development priorities and reduce SLCP emissions. This document identifies some of EDMC's current priorities for improving municipal waste management which also help combat climate change. EDMC is also a part of CCAC Indian city network (<http://ccacindia.teriin.org/>) and is committed to sharing its experiences with other cities in the network.

2 Background

Delhi is the capital of India and is managed by five different local municipal corporations, namely:

1. South Delhi Municipal Corporation,
2. North Delhi Municipal Corporation,
3. East Delhi Municipal Corporation,
4. New Delhi Municipal Corporation, and
5. Delhi Cantonment Board.

East Delhi Municipal Corporation (EDMC) covers an area of 125 km² with an estimated population density of 31,608 people/km². It is the most densely populated part of Delhi (Census Organisation of India, 2011). The city had a population of 3.948 million in 2011; and is estimated as 4.500 million in 2017 and to grow to 4.868 million in 2031 and 6.708 million in 2041 (TERI estimates).

2.1 MSW Management and Overview

MSW in East Delhi is managed by EDMC, which is responsible for collection, transportation, treatment and disposal of waste. About two-thirds of the waste is biodegradable and is collected from municipal and commercial areas.

Table 1 highlights the comparison of the physical composition of MSW generated at various levels based on studies by IRG Systems South Asia Limited (IRGSSA) in 2005, COWI-Kadam

in 2004, Japan International Cooperation Agency (with IPE) in 2004, and National Environmental Engineering Research Institute (NEERI) in 2006. The table depicts average proportion of biodegradables in MSW as ranging from 62.5% to 74.9%, and average proportion of recyclables ranging from 3.84% to 68% (with higher rates found in the commercial areas).

Table 1: Comparison of Results of IRGSSA (June-July, 2005), COWI-Kadam (2004), JICA (IPE 2004) and NEERI (1996).

Parameters	IRGSSA 2005*	COWI-Kadam 2004	JICA (IPE) 2004	NEERI (1996)
No of Samples	138 (for Seven Days) (Dhalao Level)	160 (HH Level)	-	137 (HH Level)
Higher Income Group (HIG)				
Avg. Biodegradables	74.9%	71.9%	64%	44.5%
Avg. Recyclables	3.86%(does not include rag Picker segregations)	23.1%	28%	15.4%
Avg. Inerts and Others	21.24%	5%	8%	40.1%
Middle Income Group (MIG)				
Avg. Biodegradables	72.86%	75.9%	61%	39.9%
Avg. Recyclables	4.74% (does not include rag Picker segregations)	21.1%	33%	12.6%
Avg. Inerts and Others	22.4%	3%	6%	47.5
Lower Income Group (LIG)				
Avg. Biodegradables	72.96%	63.2.4%	62%	36.4%
Avg. Recyclables	5.2% (does not include rag Picker segregations)	16.6%	22%	11.9%
Avg. Inerts and Others	21.84%	20.2%	16%	51.7%
Commercial Area				
Avg. Biodegradables	68.76%	15.6%	-	38.5%
Avg. Recyclables	5.07(does not include rag Picker segregations)	68%	-	20.2%
Avg. Inerts and Others	26.17%	16.4%	-	41.3%
Landfill				
Avg. Biodegradables	62.5%	73.7%	-	30.6%
Avg. Recyclables	3.84%	9.2%	-	9.8%
Avg. Inerts and Others	33.66%	17.1%	-	59.6%

2.1.1 Waste generation

Delhi generates approximately 9,260 metric tonnes per day (MTPD) of MSW (Central Pollution Control Board, 2017). EDMC area has a population of about 4.500 million (23.5 percent of Delhi's population) generating about 2,302 MTPD¹ of MSW at a daily per capita rate of 514 gm.

2.1.2 Waste Collection and handling

EDMC maintains that it has a collection rate of 100%, and a significant amount of funds are spent on primary collection of waste. Waste generated from households is currently collected either by a door-to-door waste collector or brought to waste collection points (dhalao/dustbins) by the waste generators. Primary collection of waste involves a large fleet of vehicles, including small trucks, handcarts, and three wheeler rickshaws, including electric ones. The authorities collect segregated waste only at a few locations. During door-to-door collection, the waste collectors typically segregate recyclables like paper, plastics, metals and glass and dispose the remaining collected waste at waste collection points (dhalaos).

Dhalaos

A dhalao is a secondary waste collection center which is typically a small plot of land with a three-sided structure with a roof. At present, EDMC maintains 242 dhalaos and they are unevenly distributed across the total area covered by the municipality. The number of dhalaos per square km was found to range between 0 and 13. This wide range can be attributed to increased population density in some areas and lack of space for a dhalao in other areas. The waste collected at a dhalao is loaded on to trucks via loaders or lifted by



Figure 1: Dhalao (secondary waste collection facility)

mechanical means into the compactor truck and transported to processing or disposal sites.

Collection Vehicles

The primary collection fleet consists of 302 light motor vehicles running on compressed natural gas (CNG) along with cycle-rickshaws and wheel barrows. Secondary collection fleet consists of trucks, and loaders. EDMC owns 80 trucks and 13 loaders. There are 39 additional private trucks and 16 tipper trucks being used. All secondary collection vehicles

¹ Source: An average for November 2016-October 2017 from data obtained from EDMC by TERI on November 06, 2017

are diesel operated and emit black carbon. In addition, loaders (diesel operated) are used to transfer waste from dhalaos to trucks.

Waste Handling Equipment

The solid waste landfill located at Ghazipur occupies an area of 70 acres and has been operating since 1984. Waste handling equipment at Ghazipur landfill site includes 4 bulldozers consuming about 12-13 Lt diesel/hr/vehicle, and the 3 excavators consuming about 14-15 Lt diesel/hr/vehicle. The vehicles at the landfill also include an excavator, a water lorry tractor, and a water tanker tractor.

2.1.3 Waste processing/treatment

A waste to energy (WTE) plant was commissioned in November 2016 at the Ghazipur site with a capacity to handle 1,300 MTPD of MSW and generate 12 MW power. This plant has received less than 1000 MTPD of waste on average, and has been able to produce only 7 to 8 MW electricity. However, there are plans to expand the capacity of the plant in the near future to 1,900 MTPD, and to 2,500 MTPD in a future phase (Thakur, 2017). The rejects from WTE are transported back to the disposal site.

Of the waste processed at the processing plant, refuse derived fuel (RDF) amounts to only about 35% of the total waste received. Additionally, bottom and fly ash constituting about 18.8% (by weight) of the RDF has to be disposed at the landfill. Thus in totality, only 28.6% of waste diverted to WTE plant is actually diverted from the landfill.

Out of the total waste generated, about 62.5% are organic in nature. Waste when received in mixed form is segregated manually and mechanically to remove recyclables. The organics are dumped along with inert and other wastes at the Ghazipur disposal site. Hence the present treatment system is inadequate as it only takes care of non-biodegradable non-recyclable high calorific value and leaves out the organic part (responsible for GHG emissions) of MSW generated to be landfilled. EDMC is interested in exploring alternatives options for treating its organic waste, including decentralized biodigesters.

2.1.4 Final Disposal

EDMC has only one dumpsite for disposal of its waste, the Ghazipur disposal site which has been operating since 1984 and exhausted its design air space capacity in 2002. The total height of the disposal site is about 60 meters, and its slopes are very steep (60-70 degrees) on some sides posing a danger to humans, animals and establishments around it (Project Report on Reclamation of Ghazipur, 2010).

The amount disposed at Ghazipur has been increasing over the past decade as shown in Table 2.

Table 2: Waste disposal at Ghazipur dumpsite

S.No	Year	Total waste disposed (in MT)
1.	2009-2010	444,886
2.	2010-2011	498,677
3.	2011-2012	523,179
4.	2012-2013	364,673
5.	2013-2014	704,645
6.	2014-2015	777,704
7.	2015-2016	752,139
8.	2016-2017	773,926
9.	2017-2018	518,543

Source: TERIs Visit to East Delhi Municipal Corporation November 06, 2017

Ghazipur site also has a 5 acre area capped to capture landfill gas (LFG) and run a 30 KW micro-turbine in partnership with Gas Authority of India Limited (GAIL).

2.1.5 Communication

East Delhi is attempting to improve waste management by involving citizens and NGOs and conducting outreach through hoardings/billboards, newspaper advertisements and the launch of swachhta app². EDMC is interested in increasing its outreach efforts.

2.2 Solid Waste Management Rules 2016

The Government of India issued the solid waste management (SWM) Rules, 2016 which requires municipal authorities, including East Delhi, to implement a number of activities, including the following:

1. Prepare solid waste management plans as per state policy
2. Prohibit littering create public awareness, direct segregation of waste at source, arrange door to door collection of segregated waste from households and other establishments.
3. Promote home composting, bio-gas plant, and community level processing
4. Recognize organizations of waste pickers/informal collectors and integrate them in SWM
5. Set up material recovery facilities for sorting of recyclables, including by waste pickers
6. Transport segregated waste to waste processing facility

² The Swachhata-MoHUA is the official app of Ministry of Housing and Urban Affairs(MoHUA), GOI. The app enables a citizen to post a civic-related issue (eg: a waste dump) which is then forwarded to the city corporation concerned and thereafter assigned to the sanitary inspector of the particular ward.

7. Setup sanitary landfill for disposal of residual waste
8. Frame bye-laws within one year, prescribing spot fines and ensuring timely implementation.
9. Prescribe user fees.

Implementation of the national rule influences EDMC's priorities in managing solid waste.

2.3 Investment prospects

EDMC spent 14,144.5 million INR (approximately 221 million USD) in 2015-16 out of which about 32% was spent on sanitation services (including MSW management). Municipalities, such as EDMC can seek additional funding from a number of sources, including 1) the Urban Development Fund, (2) Swachh Bharat Mission Fund, and (3) funds from private industries through extended producer responsibility (under e waste management and handling rules, 2016) and corporate social responsibility(CSR).

3 EDMC priorities

A number of priority areas were identified by EDMC and TERI under the CCAC Waste Initiative during the course of the city network workshops, city assessment, and multiple discussions with the city. Many of these priorities are driven by the need to comply with the SWM Rules of 2016.

3.1 Improving collection and waste segregation

As per SWM Rules 2016, waste generators are not allowed to dispose waste on streets, open public spaces, drains, or water bodies nor are they allowed to burn waste. Waste generators are required to segregate the waste, and EDMC has to develop the infrastructure to collect the waste as per SWM Rule 2016 requirements. The priorities include identifying ways to increase waste segregation by residents and commercial establishments, distributing coloured bins for segregating waste, developing coloured-systems and schedules for waste collection vehicles, and integrating informal waste collectors (ragpickers) into the formal system.

3.2 Management of Organic Waste

EDMC has to undertake several activities regarding the management of organic waste. Regarding collection, it has to train generators to segregate organic waste, provide bins to households to segregate the organic waste, and train waste collectors to ensure that households are segregating organic waste. It also has to develop facilities to treat the organic waste, such as composting or anaerobic digestion, collected from households and bulk

generators. TERI is presently working with EDMC to explore the potential for installing anaerobic digesters to treat bulk organic waste with corporate social responsibility funds. Municipal officials also needed trainings on selection of appropriate technologies for managing organic waste in decentralised manner.

3.3 Identification of gaps in existing infrastructure- Dhalaos.

EDMC collects about 2,302 MT of waste every day. As per Central Public Health Environmental Engineering Organisation (CPHEEO) there is a requirement for minimum infrastructure for collection of waste. The CPHEEO guidelines suggest that a city with more than 10 lakh population should have four secondary collection places for every square kilometer area or one secondary collection point per 5000 persons (Central Public Health and Environmental Engineering Organisation, 2016). EDMC needed to evaluate the location of dhalaos in its jurisdiction and assess its compliance with CPHEEO guidelines. This priority was addressed by TERI recently by conducting a study for EDMC. The area of EDMC was divided into a grid of 1 km X 1 km and the existing dhalaos mapped by EDMC using Global Positioning System (GPS) was obtained. The numbers of dhalaos per square kilometer were counted and compared

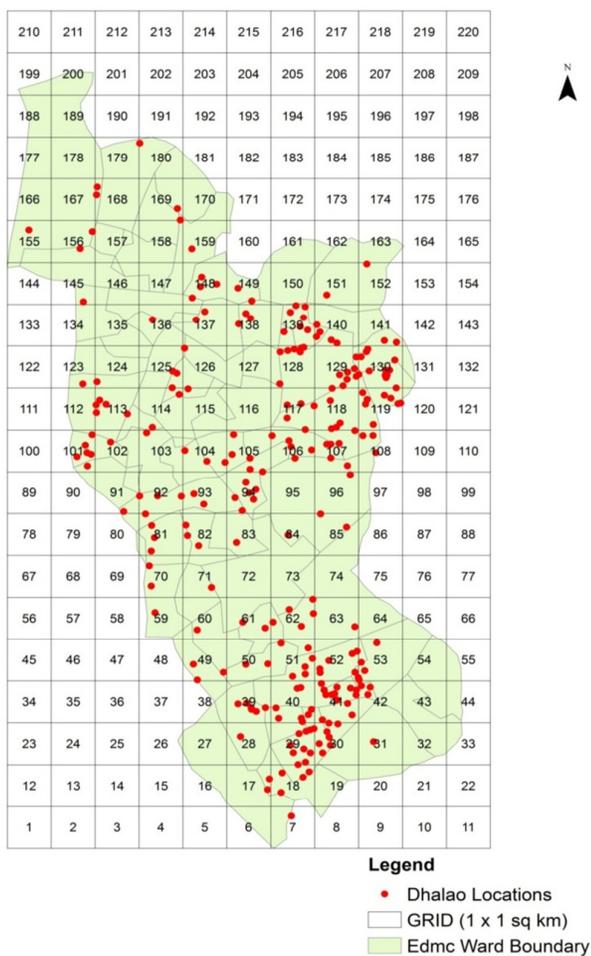


Figure 2: EDMC dhalao location in a 1x1 km grid

to the technical guidelines given by CPHEEO to estimate the additional requirements. At present, EDMC has 242 dhalaos in all wards. The maximum number of dhalao per square km was found to range between 0 and 13. The outcome of the analysis shows the need for 216 additional dhalaos for meeting the criteria set by CPHEEO. In excessively congested areas where placing a dhalao is not possible, large metallic bins should be placed that can be mechanically emptied, for proper waste collection and management.

3.4 Landfill Management

On September 1, 2017 the Ghazipur landfill experienced a slope failure. Waste from the landfill slid 110 meters across an adjacent area, including a road, the Hindon Canal, and the Escape Canal. As a result of this incident, two people died and five were injured. This incident spurred a renewed immediacy to improve operations and management at the Ghazipur landfill, explore alternative waste management options, and identify future landfill sites.

As part of this workplan's activities, Abt Associates and SCS Engineers (with funding from the U.S. Environmental Protection Agency) and TERI conducted a site visit of Ghazipur landfill site and met with staff of EDMC on November 1 and 2, 2017. Based on information gleaned from the site visit and additional information provided by EDMC, a report was prepared addressing three topics of concern to EDMC – lowering the risk of future slope failure, mitigating landfill fires and identifying capacity at the current landfill until an alternative landfill is developed. For each of these topics, EDMC was provided recommendations for actions along with additional detailed analyses to inform specific actions to be undertaken by the city. EDMC requires training on ways to mitigate landfill fires and slope failures.

4 Scope of Activities

Based on the city assessment and several discussions with EDMC, various potential focus areas were identified for providing support under the Waste Initiative to improve waste management by EDMC and reduce SLCP emissions.

Key tasks are identified as below:

1. SLCP baseline establishment
2. MSW segregation and collection
3. Organic waste treatment and processing
4. Identification of gaps in locating dhalaos
5. Landfill management

Activity 1.0: SLCP baseline establishment

As a part of approach for supporting the city in formulating a workplan the baseline emissions needs to be established from various waste management activities like waste collection and transportation, waste burning, waste handling equipment, landfills and dumpsites, organic waste management facilities and waste combustion and recycling. Targeted pollutants are black carbon, methane, oxides of sulphur, oxides of nitrogen, particulate matter, organic carbon and carbon dioxide.

Task 1 Gather baseline data using data collection tool and establish baseline for short-lived climate pollutants		
TERI and EPA Role	City of East Delhi Role	Deliverable
Use the SWEET version 1.0 to develop a MSW sector baseline for emission of methane, black carbon and other criteria pollutants with assistance from EPA contractor Abt Associates.	Provide information on quantity, composition, transportation, treatment and disposal elements of waste management. Provide necessary access to various departments and offices of the municipality to gather and compile accurate data.	Baseline assessment for East Delhi
Task 2 Estimating potential emission reductions		
TERI Role	City of East Delhi Role	Deliverable
Estimating potential emission reduction from waste management activities under four alternate scenarios	Data input and feedback on project implementation and operational assumptions. Meetings and discussions for revising documents and alternate options	Model results.

The emissions from all the sources (including waste collection and transportation, waste treatment, waste handling, landfill and waste burning) of carbon dioxide, nitrous oxide, black carbon, organic carbon and methane have been estimated using solid waste emission estimation tool (SWEET version 1.0). The results of the baseline scenario for EDMC is shown in Table 3.

Table 3: Baseline scenario GHG emissions

Year	Emission (metric tonne CO ₂ eq)
2021	651,393
2025	658,989
2031	919,529
2041	18,04,425
2050	21,04,996

TERI also helped EDMC in formulating four alternate scenarios considering various combinations of organics waste treatments, alternate transportation fuel, landfill practices and WTE as shown in Table 4. Emissions were estimated for each of these scenarios to help East Delhi understand the implications of alternate waste management scenarios.

Table 4: Alternate Scenario Analysis

Alternate	Compos	Anaerobic	Waste	Additional activities
-----------	--------	-----------	-------	-----------------------

Scenario	ting(TPD)	digestion(TPD)	combusti on(TPD)	
Alt 1: Low expectation	200	0	1300	A new landfill site to be operationalized from 2019 till 2050, having flaring and LFG utilisation facility, but with no high BTU energy source
Alt 2: Medium expectation	300	100	1900	Partial secondary collection fleet to be diverted to CNG fuel. A new landfill site shall be operationalized after closure of Ghazipur in 2018 till 2055, having flaring and LFG utilisation facility, but with project utilising high-BTU LFG as an energy source.
Alt 3: SLCP's reduction	400	250	1300	A new landfill site shall be operationalized after closure of Ghazipur in 2018, which shall be operational till 2055, have flaring and LFG utilisation facility, but with project utilising high-BTU LFG as an energy source. Complete fleet shall be converted to CNG fuel.
Alt 4: SLCP's reduction- High expectation	400	800	1300	Complete fleet shall be converted to CNG fuel. A new landfill site shall be operationalized from 2018 – 2055 have flaring and LFG utilisation facility, but with project utilising high-BTU LFG as an energy source.

The four alternate scenarios were analysed using SWEET tool for calculating and comparing baseline emissions from waste management in EDMC area and Figure 3 indicates the results.

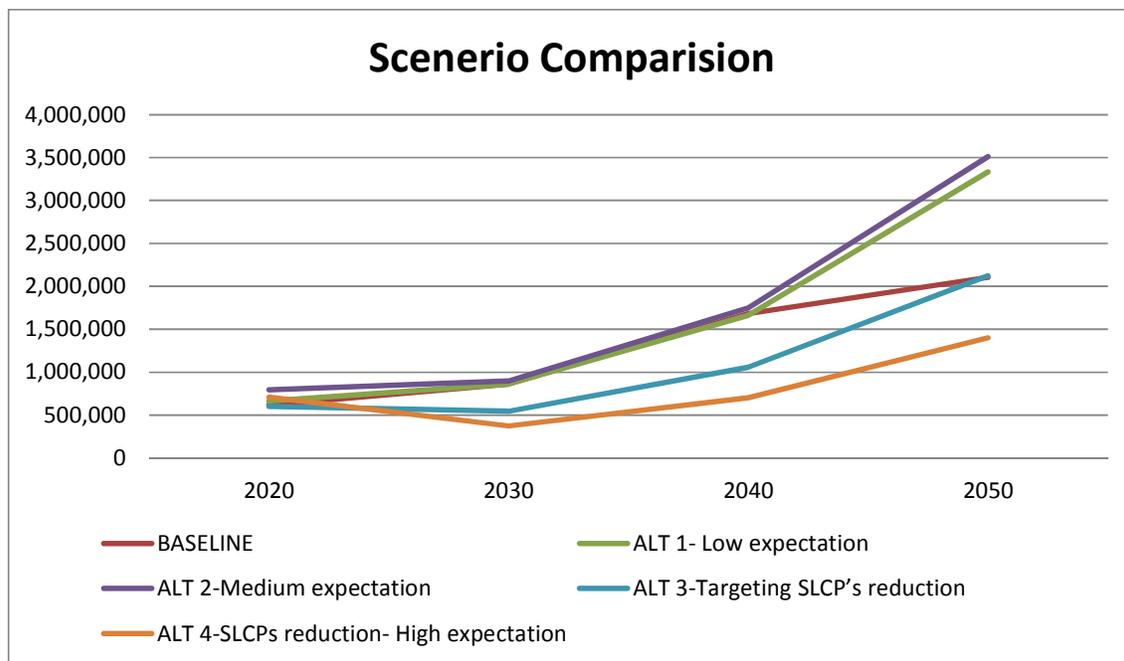


Figure 3: Scenario Comparison for EDMC (MT CO₂ Eq)

In the case of alternate scenario 1, the total emissions are expected to continuously increase when compared to baseline scenario due to waste combustion methods.

In the alternate scenario 2 of medium expectation, the total emissions are expected to increase as compared to baseline scenario due to waste diversion to anaerobic digestion and the expected increase in capacity of waste to energy plants as per scenario.

In the alternate scenario 3 of targeting SLCP reduction, the total emissions are expected to decline when compared to baseline scenario. This is due to diversion of more waste to composting and anaerobic digestion.

In alternate scenario 4, due to high organics treatment in composting and anaerobic digestion, the SLCPs are expected to reduce substantially. Figure above highlights the difference in the various scenarios.

Activity 2: MSW segregation and collection

TERI is supporting EDMC in identifying ways to increase waste segregation at source and implement segregated waste collection. EDMC is also interested in converting the dhalao locations into material recycling facilities and integrating the informal sector in primary collection and waste recycling activities. EDMC officials will further expand the waste segregation and collection drive in the city with the help of on-the-ground force and through outreach to its residents. The drive will start with commercial establishments, gated colonies and resident welfare associations.

Task 1 Technical Assistance		
TERI Role	City of East Delhi Role	Deliverable
<p>Assess the current mechanism of primary and secondary waste collection and identify strategies for up scaling segregation and segregated waste collection.</p> <p>Develop indicators for measurement, reporting and verification at various levels of waste management to sustain the efforts to combat climate change.</p>	<p>Providing access to documents and past studies to assess the composition and management of waste from various sectors.</p> <p>Facilitate in data collection and discussion with stakeholders involved in generation and collection of MSW.</p>	<p>A report to EDMC identifying population projection for the city, estimates of organic waste to be generated from city and methodologies for up scaling segregation and segregated waste collection.</p>
Task 2 Networking/capacity building		
TERI Role	City of East Delhi Role	Deliverable
<p>Facilitate linkage with other cities of the network that have implemented successful and relevant projects, and encourage participation of EDMC officials in webinars, trainings and workshops.</p>	<p>Identify officials to act as focal point and participate in CCAC activities</p> <p>Incorporate learned knowledge into decision making of the city waste management.</p>	<p>List of events (webinars, workshops and trainings). Webinars made available on CCAC-India network website.</p>

Activity 3: Organic waste treatment and processing

EDMC required support to assess the feasibility of the treatment of organic waste in decentralised and centralised manner to reduce emissions from waste sector. TERI helped East Delhi in formulating plans for organic waste treatment and processing. This also helps the city in creation of green jobs and reduction of waste transportation thereby reducing fuel consumption and landfill burden.

Task 1 Technical Assistance		
TERI Role	City of East Delhi Role	Deliverable
Conduct a technical study on incorporating decentralised and centralised organic waste processing units. Train city officials to measure the emissions and track progress in future. A centralised organic waste management plant for bulk organic waste generators under CSR funding	Provide access to data on organic waste managed by the city. Discuss feasible scenarios for organic waste management. Identify challenges faced by EDMC associated with organic waste management	A report to EDMC identifying methods to implement decentralised and centralised processing units. Training city officials with material for the use of SWEET A proposal for CSR funding.
Task 2 Networking/capacity building		
TERI Role	City of East Delhi Role	Deliverable
Facilitate linkage with other cities of the network that have implemented successful and relevant projects, and encourage participation of EDMC officials in webinars, trainings and workshops.	Identify officials to act as focal point and participate in CCAC activities Incorporate learned knowledge into decision making of the city waste management.	List of events (webinars, workshops and trainings). Webinars made available on CCAC-India network website.

Activity 4: Identification of Gaps with existing infrastructure in locating dhalaos

East Delhi required technical assistance to evaluate the existing waste collection locations and evaluate the additional dhalaos in the city. TERI supported East Delhi by evaluating maximum number of dhalao per square km using GIS tool. The outcome of the analysis shows the need for 216 additional dhalaos for meeting the criteria set by CPHEEO. East Delhi is interested in putting up additional dhalaos in the identified location and also converting some of these dhalao locations to material recovery facilities.

Task 1 Technical Assistance		
TERI Role	City of East Delhi Role	Deliverable
Conduct a study of the current location of dhalaos; evaluate it against CPHEEO guidelines; and develop recommendations.	Facilitate in data collection pertaining to location of dhalao.	A report to EDMC with study results and recommendations.
Task 2 Networking/capacity building		
TERI Role	City of East Delhi Role	Deliverable
Facilitate linkage with other cities of the network that	Identify officials to act as focal point and participate in	List of events (webinars, workshops and trainings).

have implemented successful and relevant projects, and encourage participation of EDMC officials in webinars, trainings and workshops.	CCAC activities Incorporate learned knowledge into decision making of the city waste management.	Webinars made available on CCAC-India network website.
--	---	--

Activity 5: Landfill Management

Following the incidence at Ghazipur landfill in September, 2017 EDMC needed urgent guidance on addressing landfill fires and slope failure, and identifying capacity at the current landfill until an alternative landfill is developed. East Delhi is putting in its efforts to combat landfill fires and stabilize the slope of the Ghazipur landfill site in accordance with the report prepared by CCAC team.

Task 1 Technical Assistance		
TERI and EPA Role	City of East Delhi Role	Deliverable
Site assessment by TERI EPA contractors (Abt Associates and SCS Engineers). Technical analysis by SCS Engineers Training officials on ways to deal with landfill fires and slope failures.	Providing information on landfill (including, contour map of the site pre slope failure and post slope failure, earlier studies pertaining to Ghazipur landfill site, and other relevant information.)	A report with results of the analysis and recommendations to address landfill fires and slope failures..
Task 2 Networking/capacity building		
TERI Role	City of East Delhi Role	Deliverable
Facilitate linkage with other cities of the network that have implemented successful and relevant projects, and encourage participation of EDMC officials in webinars, trainings and workshops.	Identify officials to act as focal point and participate in CCAC activities Incorporate learned knowledge into decision making of the city waste management.	List of events (webinars, workshops and trainings). Webinars made available on CCAC-India network website.

5 Schedule

Timelines for completion of each of the activities by city of East Delhi is as follows:

Activity / Deliverable	Target Date	Completion
1. SLCP baseline establishment		
Use the SWEET version 1.0 to develop a MSW sector baseline for emission of methane, black carbon and other criteria pollutants with assistance from EPA contractor Abt Associates		Completed
Estimating potential emission reduction from waste management activities under four alternate scenarios		Completed
2. MSW segregation and collection		
Assess the current mechanism of primary and secondary waste collection and identify strategies for up scaling segregation and		Completed

<p>segregated waste collection Develop indicators for measurement, reporting and verification at various levels of waste management to sustain the efforts to combat climate change.</p>	Completed
<p>Facilitate linkage with other cities of the network that have implemented successful and relevant projects, and encourage participation of EDMC officials in webinars, trainings and workshops.</p>	On-going
<p>3. Organic waste treatment and processing</p>	
<p>Conduct a technical study on incorporating decentralised and centralised organic waste processing units.</p>	Completed
<p>Train city officials to measure the emissions and track progress in future.</p>	Completed
<p>A centralised organic waste management plant for bulk organic waste generators under CSR funding</p>	On-going
<p>Facilitate linkage with other cities of the network that have implemented successful and relevant projects, and encourage participation of EDMC officials in webinars, trainings and workshops</p>	On-going
<p>4. Identification of Gaps with existing infrastructure in locating dhalaos</p>	
<p>Conduct a study of the current location of dhalaos; evaluate it against CPHEEO guidelines; and develop recommendations.</p>	Completed
<p>Facilitate linkage with other cities of the network that have implemented successful and relevant projects, and encourage participation of EDMC officials in webinars, trainings and workshops.</p>	On-going
<p>5. Landfill Management</p>	
<p>Site assessment by TERI and EPA contractors (Abt Associates and SCS Engineers).</p>	Completed
<p>Technical analysis by SCS Engineers</p>	Completed
<p>Training officials on ways to deal with landfill fires and slope failures.</p>	On-going
<p>Facilitate linkage with other cities of the network that have implemented successful and relevant projects, and encourage participation of EDMC officials in webinars, trainings and workshops</p>	On-going

About TERI

A dynamic and flexible organization with a global vision and a local focus, TERI was established in 1974, with initial focus on documentation and information dissemination. Research activities, initiated towards the end of 1982, were rooted in TERI's firm conviction that efficient utilization of energy and sustainable use of natural resources would propel the process of development.

All activities in TERI, the largest developing-country institution working towards sustainability, move from formulating local and national-level strategies to shaping global solutions to critical issues.

Buoyed by more than 43 years of excellence in research and innovation, TERI is now poised for future growth, driven by a global vision and outreach, with a philosophy that assigns primacy to enterprise in government, industry, and individual actions.



The Energy and Resources Institute

www.teriin.org