Climate and Clean Air Coalition Municipal Solid Waste Initiative:
Driving transformative changes in waste management practices in cities.

Global Methane Initiative
Biogas Subcommittee Meeting
Baltimore, MD, September 27, 2017

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Outline

• Introduction to the Climate and Clean Air to Reduce Short-lived Climate Pollutants (CCAC)
• Municipal Solid Waste Initiative
• Examples of work related to biogas
ORIGINS OF THE COALITION

The CCAC was formed on 16 February, 2012, to mitigate the impacts of short-lived climate pollutants and address near-term climate change. The Coalition is a unique initiative to support fast action and make a difference on several fronts at once: public health, food and energy security and climate.

The founding seven members of the CCAC: the governments of Bangladesh, Canada, Ghana, Mexico, Sweden and the United States, and the United Nations Environment Programme (UN Environment).
**Objective:** Leverage high-level engagement, and catalyze rapid and concrete action to address SLCPs as a global and collective challenge to protect the environment and public health, promote food and energy security, and address air pollution and near term climate change.

**Strategy:**
Voluntary and non-binding, action-oriented, partner-driven, multi-stakeholders, collaborative, building on sound science, catalytic, targeting high level decision makers, building on and bringing together existing efforts, complementary to CO2.
WHAT ARE SHORT-LIVED CLIMATE POLLUTANTS?

SLCPs are substances with relatively short lifetime in the atmosphere and a warming influence on near-term climate.

<table>
<thead>
<tr>
<th>SUBSTANCE</th>
<th>ANTHROPOGENIC SOURCES</th>
<th>LIFETIME IN ATMOSPHERE</th>
<th>IMPACTS/MITIGATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLACK CARBON (BC)</td>
<td><img src="image1" alt="Anthropogenic Sources" /></td>
<td>DAYS</td>
<td><img src="image2" alt="Local" /> <img src="image3" alt="Regional" /> <img src="image4" alt="Global" /></td>
</tr>
<tr>
<td>METHANE (CH₄)</td>
<td><img src="image1" alt="Anthropogenic Sources" /></td>
<td>12 YEARS</td>
<td><img src="image2" alt="Local" /> <img src="image3" alt="Regional" /> <img src="image4" alt="Global" /></td>
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<tr>
<td>TROPOSPHERIC OZONE (O₃)</td>
<td><img src="image1" alt="Anthropogenic Sources" /></td>
<td>WEEKS</td>
<td><img src="image2" alt="Local" /> <img src="image3" alt="Regional" /> <img src="image4" alt="Global" /></td>
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<tr>
<td>HYDROFLUOROCARBONS (HFCs)</td>
<td><img src="image1" alt="Anthropogenic Sources" /></td>
<td>15 YEARS (WEIGHTED BY USAGE)</td>
<td><img src="image2" alt="Local" /> <img src="image3" alt="Regional" /> <img src="image4" alt="Global" /></td>
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www.ccaccoalition.org
WHAT ARE THE IMPACTS OF SLCPs?

- Harm public health
- Reduce food security
- Warm the atmosphere
- Increase ice and snow melting
- Disrupt weather patterns
**WHY DO WE NEED TO ACT ON SLCPs URGENTLY?**

### SLCP CLIMATE BENEFITS

Avoided Global Warming **by 2050**

<table>
<thead>
<tr>
<th></th>
<th>°C</th>
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<tbody>
<tr>
<td>BC + CH(_4)</td>
<td>0.5°C</td>
</tr>
<tr>
<td>HFCs</td>
<td>0.1°C</td>
</tr>
<tr>
<td>SLCPs</td>
<td>0.6°C</td>
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**SIMULATED TEMPERATURE CHANGE UNDER VARIOUS MITIGATION SCENARIOS**

- BAU reference (Business As Usual)
- CO\(_2\) only
- BC + CH\(_4\) only
- Full Mitigation CO\(_2\)+SLCPs(B-C+CH\(_4\)+HFCs)
**WHAT ARE THE BENEFITS OF CUTTING SLCPs EMISSIONS?**

**ANNUAL BENEFITS**

*From large-scale mitigation by 2030*

<table>
<thead>
<tr>
<th>Climate</th>
<th>Avoided Warming</th>
<th>Reduced rate of sea-level rise by ~20% by 2050</th>
<th>Reduced rate of melting</th>
<th>Reduced rate of sea-level rise by ~20% by 2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>2.4 million</td>
<td>Avoided premature deaths annually from outdoor air pollution</td>
<td>Reduced air pollution - World’s largest environmental health risk</td>
<td></td>
</tr>
<tr>
<td>Crops</td>
<td>52 million</td>
<td>Tonnnes of avoided crop losses from 4 major staples year</td>
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</table>
Control measures that involve already existing technologies and practices could significantly reduce SLCPs emissions if implemented around the world.

- 40% of methane emissions
- 80% of black carbon emissions
MEASURES aiming at reducing Black Carbon

01. Replace traditional biomass cookstoves with modern fuel cookstoves
02. Replace traditional cooking and heating with clean-burning biomass stoves
03. Replace wood stoves and burners with pellet stoves
04. Replace lump coal with coal briquettes for cooking and heating
05. Replace traditional brick kilns with improved kilns
06. Replace traditional coke ovens with modern recovery ovens
07. Diesel particulate filters for road and off-road vehicles (EURO VI)
08. Eliminate high-emitting diesel vehicles
09. Ban open-field burning of agricultural waste
**MEASURES aiming at reducing Methane emissions**

10. Intermittent aeration of continuously flooded rice paddies

11. Improve manure management and animal feed

12. Pre-mine degasification, recovery, and oxidation of CH₄ from ventilation air from coal mines

13. Recovery and utilization of gas and fugitive emissions from oil and natural gas production

14. Reduce leakage from long-distance gas transmission pipelines

15. Separation and treatment of biodegradable municipal waste and landfill gas collection

16. Upgrade wastewater treatment with gas recovery and overflow control

**MEASURE aiming at reducing HFC emissions**

-HFC measures: Replacement of high climate impact HFCs with low impact alternatives
CCAC INITIATIVES

7 sectoral and 4 cross-cutting initiatives
METHANE AND BLACK CARBON EMISSIONS FROM THE WASTE SECTOR

WASTE GENERATION

INNER CITY
PRODUCE MARKET
RESIDENTIAL AREA
TEMPORARY STORAGE LOCATION
INFORMAL AREA (outside the formal waste collection, transportation, and disposal process)

Emissions from burning uncollected waste
METHANE AND BLACK CARBON EMISSIONS FROM THE WASTE SECTOR

WASTE COLLECTION AND TRANSPORTATION

- Emissions from waste handling equipment
- Emissions from trucks

TRANSFER STATION
SECONDARY COLLECTION
TEMPORARY STORAGE LOCATION
PRIMARY COLLECTION
METHANE AND BLACK CARBON EMISSIONS FROM THE WASTE SECTOR

WASTE DISPOSAL

- Emissions from trucks
- Emissions from waste handling equipment
- Emissions from landfill fires
- Emissions from organic waste decomposition

TRANSFER STATION

TRANSPORT TO LANDFILL

LANDFILL OPERATIONS
Objective:
• Reduce emissions of SLCPs across the municipal solid waste sector by providing a comprehensive package of resources, technical capacity building, and a global network of cities to facilitate the design and implementation of locally appropriate actions.

Why?
• Globally, landfills are the third largest sources of anthropogenic global methane emissions (approximately 11 %)
• Waste is growing; cities are growing
• Black Carbon from open burning of uncollected waste and transport of waste by outdated and polluting vehicles
WASTE INITIATIVE
Mitigating SLCPs from Municipal Solid Waste

Goals:

• Enable cities to develop robust waste management systems to achieve real and immediate SLCP reductions and other development benefits.

• To move cities up the waste hierarchy through transformative actions
  o implemented sustainably,
  o compatible with the local context. and
  o replicable through national policy support or through city-to-city collaboration
MSW Initiative is working with its partners on the following focus areas:

- **Reduce waste** generation
- Address **open burning**
- Improve **waste collection & handling equipment**
- Promote **organic diversion** programs: composting and anaerobic digestion
- Institute **recycling programs**
- Use landfills as final disposal options and enhance landfill operations - promote **landfill gas recovery**
- **Measure and track** SLCP emissions reduction
**WASTE INITIATIVE**

Mitigating SLCPs from Municipal Solid Waste

- Provide support to collect and assess MSW data through City Waste Assessment Tool
- Assist with the development of work plans to identify the appropriate opportunities for managing waste sustainably
- Develop tools to enable informed policy decisions, and to measure SLCP emissions through an emissions quantification tool (SWEET tool)
- Provide capacity building support through workshops, webinars, and access to online resources
- Share best practices through a global city network, and peer-to-peer learning opportunities
- Assist in obtaining technical and financial analysis supporting SLCPs mitigation projects
WASTE INITIATIVE
Highlights on Progress and Achievements to Date

- **MSW city data assessments (35)**
- **Work plans (18):** In progress: **Four** (Coimbatore, Nueva Delhi, Curitiba, Medan)
- **Tools:**
  - Solid Waste Emissions Estimation Tool (SWEET)
  - OrganEcs
  - Landfill Gas (LFG) Project Screening Tool
- **Capacity building through workshops and webinars**
- **5 Regional city networks:** South America, Central America, India, South East Asia, Francophone Africa
- **City pairings through city-exchanges (6)**
- **Implementation of activities** of different work plans
- **Knowledge Platform**
Example: Viña del Mar

The support of CCAC through CCAP has led the city to advance in the 3 stages of the Waste Initiative:

- Stage 1: Assessment
- Stage 2: Technical Work plan
- Stage 3: Elaboration of an implementation and financial plan for the organic waste treatment plant (in development)

In addition the city made an exchange with the city of Stockholm also thanks to the support of the Initiative
Example: Viña del Mar

- Elaboration of an implementation and financial plan for 1.3 MW biodigester (US $6 million investment)
- PPP with the city and the investor / private operator, with the support of Canada and the Chilean government
- It would be the **first joint industrial-municipal project to process organic waste and serve as a model**
- 5-year process to involve the city, develop a waste management plan, identify priorities, evaluate feasible options, identify possible sources of financing, and involve the private sector
Example: Rio de Janeiro, Brazil

- Completing stages & deliverables:
  - MSW management assessment, action plan, technical work plan, SLCP emissions baseline
- Assessing large-scale sources of high-quality organic waste
- Conducting training on composting project operations
- Developing recommendations for improved operations at the Caju Composting Facility
- Coordinating city representative participation at Waste Fleet Conference
- Conducting a training on landfill leachate management
Example: Naucalpan, Mexico

Support through the US EPA.

• A pre-feasibility study for a biogas project to treat organic waste in an anaerobic digester. It indicated that the project could have a rapid return on investment (2.2 years), while also reducing GHG emissions.

• A road map for implementing the biogas project, developed through a stakeholder engagement process that involved three workshops in the summer of 2016.

• A waste characterization study completed at the city’s transfer station. The study indicated that approximately 69% of the waste generated handled at the transfer station could be recycled or otherwise diverted from the landfill. More than half of the waste analyzed as part of the study was organic and could be used as feedstock in composting or anaerobic digestion projects.

In 2017, Naucalpan entered an agreement with BANOBRAS to receive funding for 50% of the projected costs for the proposed biogas project. Project needs to be implemented through a PPP.
Example: Sao Paulo, Brazil

Stage 1: Assessment & Action Plan

Stage 2: Technical Work Plan

Stage 3: Financial Work Plan
Overarching project of an Eco-Park Waste facility that integrates different technologies for the treatment/recovery of two waste streams: mixed waste from households and biowaste separated at source from large generators. The foreseen capacity is 1,250 tons/day.
1. Technical feasibility study
2. Regulatory environment study
3. Financial feasibility study
Knowledge platform to support cities and governments in short-lived climate pollutant reduction.

Address methane, black carbon, and other air pollutants emissions from the waste management sector!

Thank you!

For further questions or information contact:

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Process of joining the initiative – onboarding new cities

- Introduction to the MSW Initiative
- Joining the Initiative
- On-boarding Package
Introduction to the MSW Initiative

1. Interested City reaches out to a member of the Initiative and has an initial meeting to understand the initiative.

2. From the meeting, the interviewer recommends to the Lead Partners of the Initiative, whether or not to invite the city to join the initiative.

3. If MSWI Lead Partners approve the city, the Coordinator sends the city an *Expression of Interest* letter.
Joining the MSW Initiative

I. Cities sign an *Expression of Interest* letter -
   - Identify points of contact
   - Identify their goals(desired outcomes through cooperation
   - What they can contribute, and
   - A commitment to support other cities by sharing their experiences (webinars, workshop presentation, case study) or mentoring other cities (city-to-city partnership)

II. Welcome letter with on-boarding package