

# NATIONALLY APPROPRIATE MITIGATION ACTIONS (NAMA)

## GHG Mitigation Activities in the Municipal Solid Waste (MSW) Sector in the Republic of Colombia

Developed with the support of Environment Canada

### OVERVIEW OF COLOMBIA NAMA PROJECT

Nationally Appropriate Mitigation Actions (NAMAs) are being viewed as comprehensive individual or groups of activities aimed at achieving meaningful Greenhouse Gas (GHG) reductions and important social, economic, and environmental benefits. NAMAs may become the mechanism through which GHG mitigation initiatives are implemented in the future. In partnership with the Government of Colombia and supported by Environment Canada, the Colombia Solid Waste NAMA Project has focused on developing solid waste policies at the national level and feasibility analysis of next generation waste management projects in various Colombian municipalities. The municipality of Santiago de Cali (Cali), where a pilot project is currently under development, is one of five municipalities that were assessed by the Center for Clean Air Policy (CCAP) on behalf of Environment Canada to determine the GHG mitigation potential impact of solid waste management activities. An effective Waste NAMA seeks to evaluate the potential of Integrated Solid Waste Management (ISWM) programs and policies (as illustrated in the development schematic) to generate significant GHG reductions while identifying corresponding social, economic and environmental benefits. The Colombian Waste NAMA project is aimed at developing an evaluation and development framework for NAMA implementation throughout Colombia. Similarly, Environment Canada is also supporting CCAP's efforts in the development of additional Waste NAMA initiatives in Chile, Mexico and the Dominican Republic.

### PROJECT IMPORTANCE

Conventional landfill gas management projects such as those historically supported by the GMI or through CDM mechanisms are important waste management techniques. However, integrating them into a comprehensive Waste NAMA can help reduce GHG emissions and capture the full benefits of optimized Integrated Solid Waste Management processes. For illustrative purposes, assessment impact information for the municipality of Santiago de Cali is presented.



The Colombia Waste NAMA project received the following Environment Canada support:

- NAMA development assistance
- Pre-feasibility assessment
- Technical assistance
- Pilot project feasibility study

**DISCLAIMER:** The information contained within this poster are based on the data provided by the Center for Clean Air Policy. The Global Methane Initiative (GMI) cannot take responsibility for the accuracy of these data. It should be noted that conditions in various municipalities will vary with changes in waste input, management practices, engineering practices, and environmental conditions.

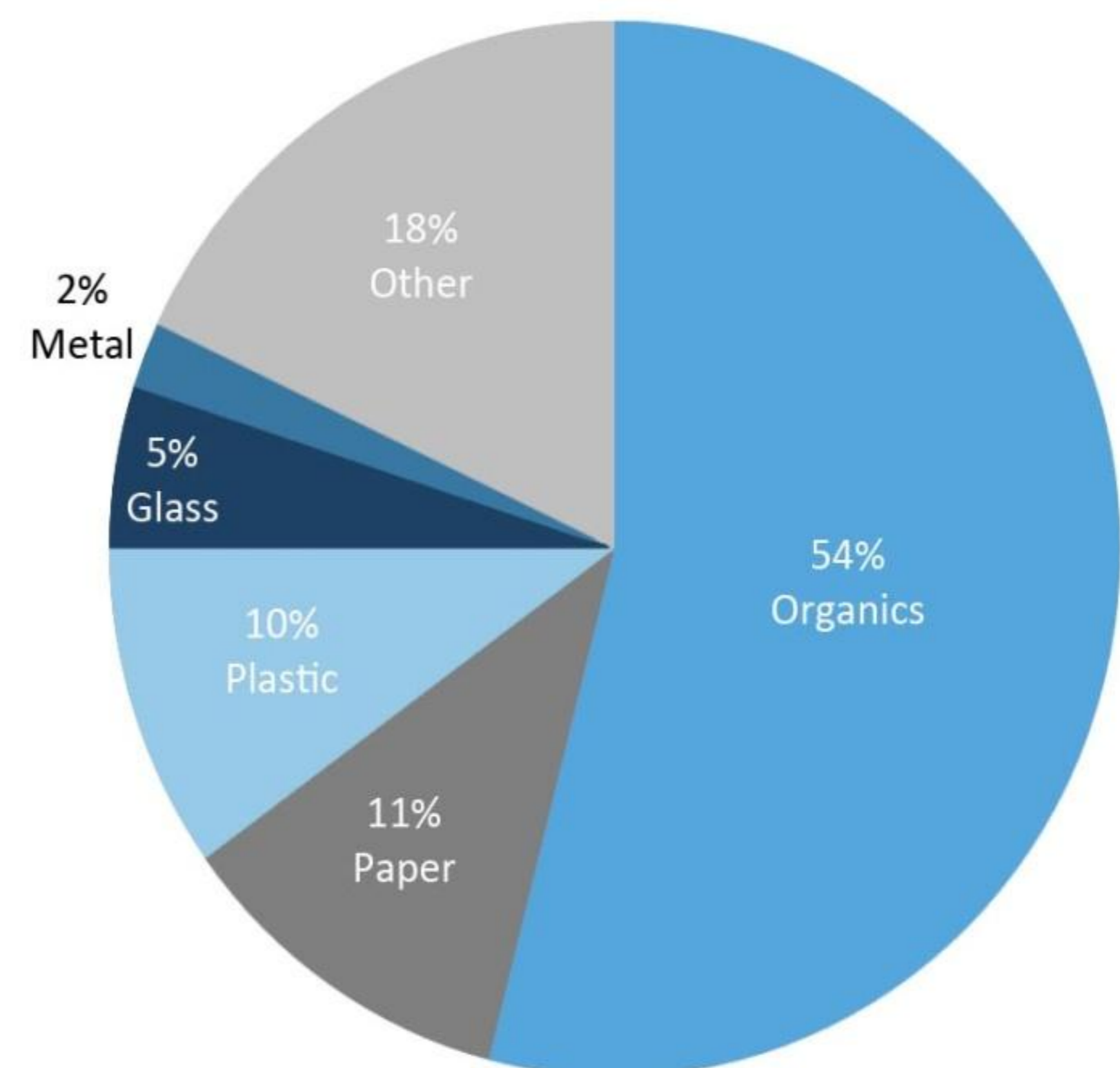
# SANTIAGO DE CALI WASTE NAMA ASSESSMENT DATA

Following completion of the preliminary country-wide Waste NAMA assessment in Colombia by the Center for Clean Air Policy, a feasibility study for a pilot project for a solid waste processing facility in Cali is being conducted which will focus on the generation of refuse derived fuel for existing cement kilns located in the region. The Cali initiative is intended to serve as a basis for evaluating and demonstrating Waste NAMA development processes that may be applicable to other Colombian municipalities and similar Latin America solid waste management situations.

## Santiago de Cali Physical/Operational Data

- Population: 2,181,000
- Quantity of waste generated annually: 610,000 tonnes/year
- Public system collection rate: 98%
- Quantity of waste generated per capita: 0.77 kg/person/day
- Current Means of Disposal: Privately owned (Interaseo del Valle S.A. E.S.P. ) Colomaba-Guabal regional landfill with active gas collection and treatment (flaring) opened in 2008 (*Note: 92% of disposal sites in Colombia in compliance with national standards and international norms. No requirements to collect or flare gas exist. Source: Comisión De Regulación De Agua Potable Y Saneamiento Básico (CRA), 2011*)
- Target Cali Waste NAMA pilot project: Materials Recovery Facility (MRF) with Refuse Derived Fuel (RDF) production and sale. Project includes analysis of recyclables materials market (including compost).

## Typical Colombian Solid Waste Composition



**Estimated Cali GHG Reduction Potential: 1.46 MTCO<sub>2</sub>E per ton processed**

## WASTE NAMA PREREQUISITES

- **Nationally Appropriate:** NAMAs should be appropriate for the particular national setting, circumstances and development needs of any country where they are implemented. In the Colombian context this has meant creating the enabling conditions to focus on alternative waste management technologies and processes through regulatory changes and incentive mechanisms to encourage private sector investments.
- **Sustainable:** NAMAs should promote the country's sustainable development agenda. These include critical co-benefits such as social, economic, and environmental benefits. Since NAMAs need both private and public sector investments, NAMA design should aim for business models that need a partial public sector investment (in the form of grants, loan guarantees, capacity building, research, etc) to overcome impediments but let the profit mechanism of the private sector take hold.
- **Support:** NAMAs should have access to developed country support including, at a minimum, technology, financing, and capacity building support.
- **Measurable, Reportable and Verifiable (MRV):** The defined NAMAs (and the support from developed countries) should be subject to international and nationally defined MRV to validate their performance and results.

## PRELIMINARY CALI PROJECT ECONOMICS

**Estimated Capital Cost:** US\$ 32 to 65 million

**Estimated Operation & Maintenance:** US\$ 40 to 60 per ton processed

**Estimated Recyclables and RDF Revenues:** US\$ 16 to 34 per ton processed

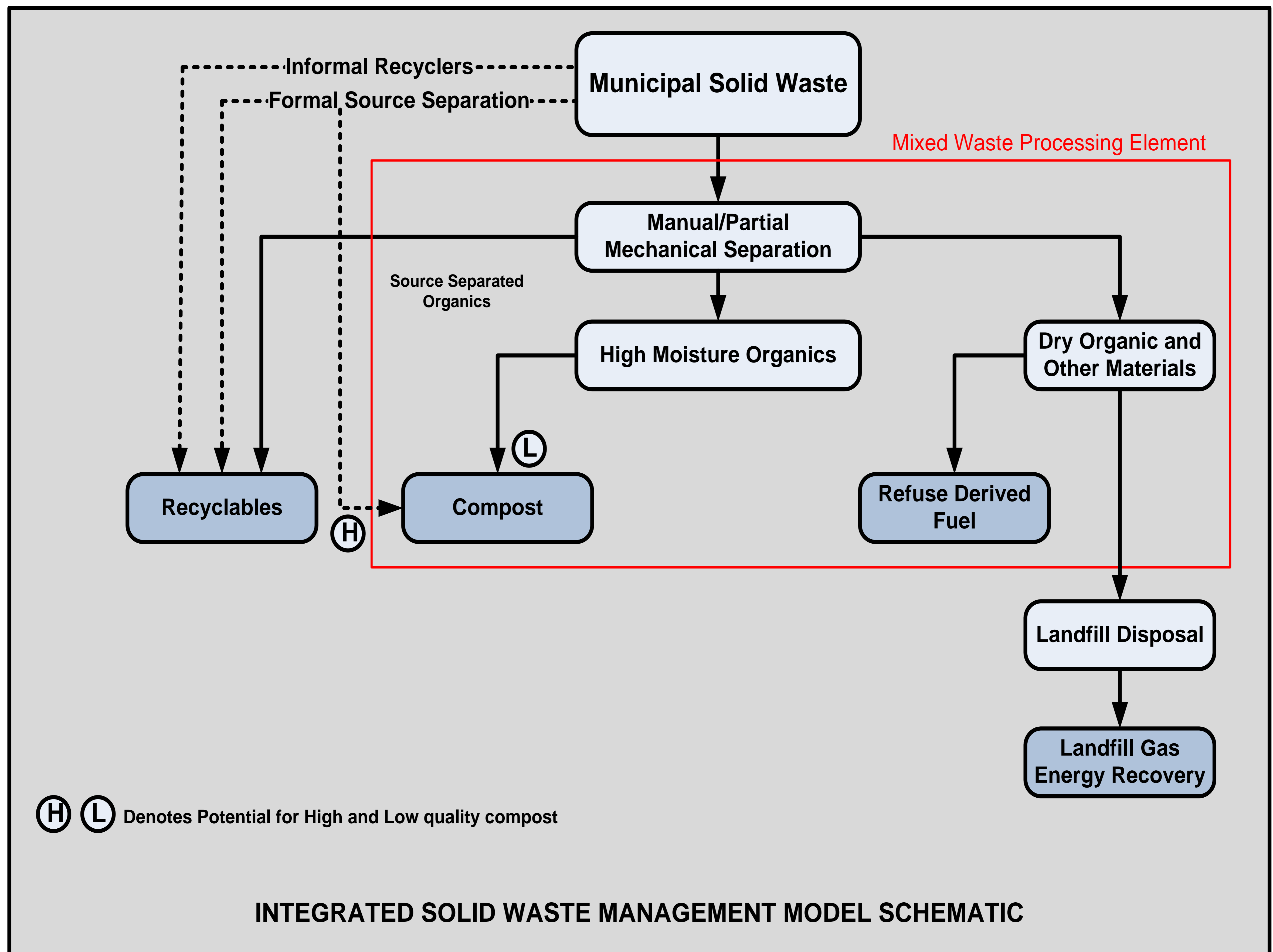
**Estimated Unit GHG Mitigation Costs:** US\$ 10 to 43 per ton CO<sub>2</sub>e mitigated

## WASTE NAMA ENVIRONMENTAL BENEFITS

A comprehensive Waste NAMA may accrue GHG mitigation benefits from a number of different policies and technologies that are most feasible in the context of the host country. In addition to developing landfill gas collection and treatment systems at existing landfills, primary GHG mitigation benefits may be derived from diverting solid waste from landfills thereby reducing GHG emissions in landfills. This can be achieved through the development of waste processing facilities such as waste to energy and mechanical/biological treatment technologies as illustrated in the development schematic. Waste diversion can also be achieved through formal and informal recycling programs that capture materials that can be sold for manufacture of new products. Materials recovery processes that increase recycling rates can also achieve GHG reductions through the offset of raw materials mining and in their use in manufacturing new products. In addition, secondary benefits can also be achieved through the optimization of collection and transfer processes which can be a source of direct GHG emissions.

Importantly, achieving any of the above also helps to optimize solid waste management processes for municipalities which have typically viewed solid waste management as one of their most pressing issues. Similar to the manner that CDM initiatives have helped to implement many landfill gas recovery and treatment projects throughout the world, Waste NAMA processes may help to implement improved solid waste management in the future.

## PROPOSED WASTE NAMA DEVELOPMENT SCHEMATIC



## FOR MORE INFORMATION

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