

# NS-212 - Waste-to-Energy (WtE) and improved waste management practices in Kigali

## Rwanda

### NAMA Seeking Support for Preparation

#### A Overview

A.1 Party

Rwanda

A.2 Title of Mitigation Action

Waste-to-Energy (WtE) and improved waste management practices in Kigali

A.3 Description of mitigation action

This Nationally Appropriate Mitigation Action (NAMA) targets mitigation in the solid waste sector in Rwanda and focuses on the development and implementation of one Waste-to-Energy (WtE) plant, under an Independent Power Producer (IPP) framework, addressing collected solid waste in the Kigali urban area. With potential for expansion to handle collected solid waste from other areas. This WtE plant will have a capacity to process / combust up to 800 tons of solid waste per day (or 292,000 t solid waste per year), and renewable electricity generation capacity of up to 15 MW. The NAMA will include improvement in mechanisms and execution of solid waste collection and disposal services in seven urban areas/cities of Rwanda, focusing on enabling growth of private sector involvement.

Emission reductions:

For the projected NAMA period of 2016 – 2030, the direct estimated net GHG emission reductions (of CH<sub>4</sub>) are approximately 3,000,000 tCO<sub>2</sub>e. Where the power generation of WtE plant has a potential to deliver 75,000 MWh per year, leading to a GHG emission reduction potential (of displaced on-grid electricity) for the NAMA period of 2016 – 2030 of approximately 430,000 tCO<sub>2</sub>e.

Sustainable Development Benefits:

The mitigation actions support Rwanda's national development and poverty reduction policies and strategic visions and goals. It is envisioned that significant sustainable co-benefits include:

- Jobs creation during the implementation and operation phases, including local skilled labour and their training.
- The electricity generated will be from domestic resources, and reduce the need to import fuels.
- Harmful pollutants (NO<sub>x</sub>, SO<sub>x</sub>, CH<sub>4</sub>, and particulates) from fossil fuel electricity power generation in Rwanda will be reduced.
- Water and soil pollution due to reduced leachate effluents from landfills will be reduced.
- Reduction of incinerator ash through use in construction of cement blocks of asphalt.

- Help reduce uncontrolled dumping and open burning of waste.
- Reduced pressure on land use by reducing the need for landfilling.

Private Sector Participation:

It is expected that the WtE plant will be operated as an Independent Power Producer (IPP), and thus be constituted as a fully private company receiving revenues through both Tipping Fees Agreements and Power Purchase Agreement under Rwandan regulations. This means that the WtE plants is expected to be private sector financed, with support from this NAMA and its activities. The waste collection system in Rwanda, and principally in the Kigali area, is already private sector driven and operated. This situation is expected to continue, and be strengthened under the NAMA actions.

A.4 Sector

|   |   |
|---|---|
| <input checked="" type="checkbox"/> Energy supply             | <input type="checkbox"/> Transport and its Infrastructure |
| <input type="checkbox"/> Residential and Commercial buildings | <input type="checkbox"/> Industry                         |
| <input type="checkbox"/> Agriculture                          | <input type="checkbox"/> Forestry                         |
| <input checked="" type="checkbox"/> Waste management          |   |
| <input type="checkbox"/> Other                                | <input type="text"/>                                      |

A.5 Technology

|   |  |
|---|--|
| <input type="checkbox"/> Bioenergy                  | <input type="checkbox"/> Cleaner fuels       |
| <input type="checkbox"/> Energy Efficiency          | <input type="checkbox"/> Geothermal Energy   |
| <input type="checkbox"/> Hydropower                 | <input type="checkbox"/> Solar Energy        |
| <input type="checkbox"/> Wind Energy                | <input type="checkbox"/> Ocean Energy        |
| <input type="checkbox"/> Carbon Capture and Storage | <input type="checkbox"/> Low till / No till  |
| <input type="checkbox"/> Land fill gas collection   |  |
| <input checked="" type="checkbox"/> Other           | <input type="text" value="Waste-to-energy"/> |

A.6 Type of action

|   |  |
|---|--|
| <input type="checkbox"/> National/ Sectoral goal                        | <input checked="" type="checkbox"/> Project: Investment in machinery |
| <input type="checkbox"/> Strategy                                       | <input type="checkbox"/> Project: Investment in infrastructure       |
| <input checked="" type="checkbox"/> National/Sectoral policy or program | <input type="checkbox"/> Project : other                             |
| <input type="checkbox"/> Other  | <input type="text"/>   |

A.7 Greenhouse gases covered by the action

|   |   |
|---|---|
| <input checked="" type="checkbox"/> CO2 | <input checked="" type="checkbox"/> CH4 |
| <input type="checkbox"/> N2O            | <input type="checkbox"/> HFCs           |
| <input type="checkbox"/> PFCs           | <input type="checkbox"/> SF6            |
| <input type="checkbox"/> Other          | <input type="text"/>                    |

B National Implementing Entity

|       |                  |  |
|-------|------------------|--|
| B.1.0 | Name             | Rwanda Ministry of Infrastructure (MININFRA) |
| B.1.1 | Contact Person 1 | Mrs. UWERA Mireille                          |
| B.1.2 | Address          | KG 7 Ave., P.O. BOX 24, Kigali, Rwanda       |
| B.1.3 | Phone            | +250788509527                                |
| B.1.4 | Email            | mireille.uwera@mininfra.gov.rw               |
| B.1.5 | Contact Person 2 | Mr. Jean Claude MUTABAZI                     |
| B.1.6 | Address          |  |
| B.1.7 | Phone            | +250786111181                                |

|        |                  |                                  |
|--------|------------------|----------------------------------|
| B.1.8  | Email            | jclaude.mutabazi@mininfra.gov.rw |
| B.1.9  | Contact Person 3 |                                  |
| B.1.10 | Address          |                                  |
| B.1.11 | Phone            |                                  |
| B.1.12 | Email            |                                  |
| B.1.13 | Comments         |                                  |

**C Expected timeframe for the preparation of the mitigation action**

|     |                                 |    |
|-----|---------------------------------|----|
| C.1 | Number of months for completion | 15 |
|-----|---------------------------------|----|

**D Currency**

|     |               |                             |
|-----|---------------|-----------------------------|
| D.1 | Used Currency | AED<br>Conversion to USD: 1 |
|-----|---------------|-----------------------------|

**E Cost**

|       |                                      |  |
|-------|--------------------------------------|--|
| E.1.1 | Estimated full cost of preparation   | 500000   |
| E.1.2 | Comments on full cost of preparation | The full cost of preparation covers the cost of preparation for the NAMA Design and Document, and a comprehensive Feasibility Study for the WtE plant and solid waste characterization. As well as institutional level Capacity Development Support for NAMA finance and MRV. Note that the Climate Change Focal Point (Rwanda Environmental Management Authority) and the National Implementing Entities will provide in-kind programme management, institutional coordination, and procurement services during the preparation phase of the NAMA. This in-kind contribution is not included in the estimated full cost of preparation. |

**F Support required to prepare the mitigation action**

|       |                                     |   |
|-------|-------------------------------------|---|
| F.1.1 | Amount of Financial support         | 410000  |
| F.1.2 | Type of required Financial support  | <input checked="" type="checkbox"/> Grant<br><input type="checkbox"/> Loan (sovereign)<br><input type="checkbox"/> Loan (Private)<br><input type="checkbox"/> Concessional loan<br><input type="checkbox"/> Other <input type="text"/> <input type="checkbox"/> Guarantee<br><input type="checkbox"/> Equity<br><input type="checkbox"/> Carbon finance   |
| F.1.3 | Comments on Financial support       | <p>Preparation of NAMA Design and Document:<br/>This consists of the activities and cost of full NAMA design and its documentation, including the institutional framework, implementation planning, financial structuring, support required, and MRV system design and management. (USD 110,000)</p> <p>Full Feasibility Study:<br/>The full feasibility study will focus on two key components of the NAMA, which are the technical feasibility and financial structure for implementing the WtE plant as an IPP, and the comprehensive study of waste characterization and collection/disposal volumes. (USD 300,000)</p> |
| F.2.1 | Amount of Technical support         |   |
| F.2.2 | Comments on Technical support       |   |
| F.3.1 | Amount of capacity building support | 90000   |

|  |  |
|--|--|
| F.3.2 Type of required capacity building support | <input type="checkbox"/> Individual level<br><input checked="" type="checkbox"/> Institutional level<br><input type="checkbox"/> Systemic level<br><input type="checkbox"/> Other <input type="text"/>   |
| F.3.3 Comments on Capacity Building support      | <p>Workshop for institutional capacity building for climate finance and financial structuring in priority sectors of NAMAs seeking support for implementation. Focus is on meeting general international requirements, and specific requirements of selected support facilities. (USD 45,000)</p> <p>Workshop for institutional capacity building for MRV systems and their structuring in priority sectors of NAMAs seeking support for implementation. Focus is on the institutional framework for MRV and the tracking of mitigation actions, finance and sustainable benefits in a performance based methodology. (USD 45,000)</p> |
| F.4 Financial support required                   | <input type="checkbox"/>   |
| F.5 Technological support required               | <input type="checkbox"/>   |
| F.6 Capacity support required                    | <input type="checkbox"/>   |

**G Relevant National Policies strategies, plans and programmes and/or other mitigation action**

|                                |   |
|--------------------------------|---|
| G.1 Relevant National Policies | <p>The planned NAMA is in line with all relevant national and sectoral policies, which are as follows:</p> <p>A) Key policy linkage to the national Green Growth and Climate Resilience strategy with a focus on low carbon development to 2020 and a vision for 2050. The key linking programmes are:</p> <ul style="list-style-type: none"> <li>- Programme 10: Low Carbon Urban Systems; Action 4: Utilisation of the Waste Stream (key indicator = Reduction in mass of landfill)</li> <li>- Programme 5: Low Carbon Energy Mix Powering the National Grid: Action 1 - Strategy for Oil-Fuelled Generation Phase Out (key indicator = % diesel generation mix); Action 2: Incentivise Private Investment in Energy (key indicator = % electricity generated by IPPs); Action 4: Strategy for Peat Phase Out (key indicator = % peat in energy mix).</li> </ul> <p>B) The City of Kigali has several priority actions for solid waste in its CKDP strategy for 2013 to 2018. Key among these is that waste management operators are trained for proper waste handling improvements (key indicator = training completed).</p> |
| G.2 Link to other NAMAs        | .   |

**H Attachments**

| H Attachments              | <table border="1"> <tr> <th>Title</th> <th>Description</th> </tr> </table> | Title | Description |
|----------------------------|---|-------|-------------|
| Title                      | Description   |       |             |
| H.1 Attachment description |   |       |             |
| H.2 File                   | <input type="text"/> <input type="button" value="Browse..."/>   |       |             |

**I Support received**

| I.1 Outside the Registry |   |                  |              |        |         |      |
|--------------------------|---|------------------|--------------|--------|---------|------|
| I.2 Within the Registry  | <table border="1"> <tr> <th>Support provided</th> <th>Support Type</th> <th>Amount</th> <th>Comment</th> <th>Date</th> </tr> </table> | Support provided | Support Type | Amount | Comment | Date |
| Support provided         | Support Type  | Amount           | Comment      | Date   |         |      |