

NS-139 - Harnessing Municipal Waste of big Cities of Pakistan to Generate Electricity

Pakistan

NAMA Seeking Support for Preparation

A Overview

A.1 Party

Pakistan

A.2 Title of Mitigation Action

Harnessing Municipal Waste of big Cities of Pakistan to Generate Electricity

A.3 Description of mitigation action

Biomass/Waste-to-Energy (BM/WTE) is a recognized and reliable alternative source of energy; technology has been developed to produce clean energy through wastes in specially designed power plants, with pollution control equipment. Depending upon the composition of WTE material, plants can be designed with the capacities of processing 1-1500 tons/day of Hospital Waste, Municipal solid Waste Water, Industrial Effluent, Industrial Wastes, Mixed Waste plus tires, Mixed Waste Plus Dried Sewage Sludge, Crop Residue, etc. Rice Husk, Cotton Stalk, Jute Waste, Bagasse, Livestock Manure and other organic waste can also be used for power generation and high grade organic fertilizer production. Municipal solid waste is considered as the one that can be collected and deployed for generation of electricity at least in large cities of the country and can supplement in combating energy crises in the country. As per estimates, around 54,888 tons per day of municipal solid waste is generated in Pakistan. The studies reveal that the rate of waste generation on average from all type of municipal controlled areas varied from 0.283 kg/capita/day to 0.613 kg/capita/day or from 1.896/kg/household/day to 4.29 kg/house/day. [\[1\]](#)

Project Description

This NAMA is designed to develop regulatory, legislative and financial instrumental streams for the development and promotion of municipal waste management system and deploying them for energy generation. The NAMA program as envisaged in this document is based on fact that Waste management can surely improve the environment, and besides addressing several social and environmental aspects can facilitate in reducing Green House Gases (GHGs). It is estimated that the potential for reducing GHGs from waste management systems is around 3.0 million tCO₂ on annual basis [\[2\]](#). There is a need to establish such a regulatory regime that would promote development of such projects that would address waste management issues being faced in the country. The project will result in establishing a Guarantee Support fund of US\$ 5 million that would be used to help the financing sector to finance the end customers through soft financing schemes for installing waste to energy power plants to cover initial higher capital cost for installing these systems.

Project Impact

By undertaking this NAMA, the GoP would be able to set a clear direction towards developing waste to energy market in Pakistan. This will enable easy financing available for the projects in the country and will smoothen the ways for setting up 0.5-0.8 GW waste to energy power into its national energy mix. This will also help in reducing GHGs to the tune of 3.0 million tCO₂ annually. Further, the NAMA is designed to attract private sector to invest in the waste to energy power projects. It is estimated that through an investment of slightly more than US\$ 20 million, this NAMA will trigger an investment of US \$ 3 billion from the private sector till 2020 and quantum can increase more as the time passes and such options are being adopted by the end consumers in different sectors of economy. Development of waste to energy power projects will lead towards attaining goal of sustainable development, self-reliance and self-sufficiency in meeting energy needs of the end consumers and promoting clean sources of energy.

Project Output

The proposed interventions in the country by NAMA would hasten market transformation towards efficient waste collection and disposal in residential, domestic, industrial and outdoor sectors of Pakistan. The initiatives of the NAMA are likely to provide valuable inputs paving way for promoting and developing waste to energy sector in future. The outcomes from this NAMA activity are long term because of the complete phase out of the inefficient waste handling activities from all sectors of the country. This would enable the country to become clean by creating pollution free environment and productively using the waste. This will have a potential of reducing approximately 3.0 million tCO₂ annually.

Potential for Transformational Change

The proposed NAMA activities are in line with the Waste Management Guidelines, 2005 (WMG), wherein it is required that effective waste disposal strategy should be deployed. Though the WMG outlines disposal of solid waste in landfills, however, the waste hierarchy stated therein suggests recovery of every capturable component from waste and converting it to generation energy is one of those. The activity also complies with the National Climate Change Policy approved in 2012 that outlines goals and strategies to achieve targets in the Adaptation and Mitigation sectors. It guides the implementing agencies to productively use the waste collected from various sources.

An estimated amount of €20 Million as financial support is required for realizing various activities in the proposed NAMA. Out of the total requested amount, €10 million will be allocated specifically for Revolving Loan Fund (RLF) scheme whereas remaining amount will be required for technical, technology and capacity support needed for the implementation of other actions in the proposed NAMA. The objective of RLF will be to provide access to financing for the public and private sector in the pilot projects to undertake municipal solid waste management programmes that is otherwise not available and help address the high cost of transitioning to efficient SWM systems. This initial funding for the pilot projects will overcome the financial and technological barriers for the deployment of such interventions.

Mitigation Ambition

By successful implementation of NAMA, a way forward will be set forth for connecting 0.5-0.8 GW of waste to energy power projects to the national grid which would also help in mitigating 3.0 million tCO₂ annually. This will improve overall environmental conditions in the country.

[1] NTDC

[2] State of Industry Report, 2013

[1] **AEDB internal assessment.**

[1] http://epd.punjab.gov.pk/solid_waste

Khan T., Wastes from Various Sectors of Pakistan: Potential Raw Materials for Biofuels & Biomaterials, Department of Pharmacy, COMSATS, Abbottabad, Pakistan

A.4 Sector

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

<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"/> Waste to <input type="text"/> Energy
---	---

A.6 Type of action

<input type="checkbox"/> National/ Sectoral goal	<input type="checkbox"/> Project: Investment in machinery
<input checked="" 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"/> CO ₂	<input checked="" type="checkbox"/> CH ₄
<input type="checkbox"/> N ₂ O	<input type="checkbox"/> HFCs
<input type="checkbox"/> PFCs	<input type="checkbox"/> SF ₆

<input type="checkbox"/> Other	<input type="text"/>
--------------------------------	----------------------

B National Implementing Entity

B.1.0 Name

Alternative Energy Development Board, Ministry of Water and Power

B.1.1 Contact Person 1

Mr. Irfan Yousuf

B.1.2 Address

2nd Floor, OPF Building G-5/2, Islamabad

B.1.3 Phone

+92-51-9241288

B.1.4 Email irfanyousuf@aedb.org
 B.1.5 Contact Person 2
 B.1.6 Address
 B.1.7 Phone
 B.1.8 Email
 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 36

D Currency

D.1 Used Currency
 Conversion to USD: 1

E Cost

E.1.1 Estimated full cost of preparation 20000000

E.1.2 Comments on full cost of preparation

Pakistan's performance in international financial markets, its lower credit rating and difficulty in handling financing related issues like circular debt has made it very difficult for the lenders to easily finance the power projects in Pakistan. The lenders who choose to finance the projects charge very high financing rates that make the power generated through waste to energy power plants expensive. If the situation is not handled adequately then materializing GoP plans for developing AREs would be difficult. Further, the GoP has included coal as one of the sources for generation of electricity in its energy generation planning. Future perspective of cheap coal power will make it difficult for ARE projects to materialize. By undertaking this NAMA, the GoP would be able to set a clear direction towards developing waste to energy market in Pakistan. This will enable easy financing available for the projects in the country and will smoothen the ways for setting up 0.5-0.8 GW waste to energy power into its national energy mix. This will also help in reducing GHGs to the tune of 3.0 million tCO₂ annually.

Further, the NAMA is designed to attract private sector to invest in the waste to energy power projects. It is estimated that through an investment of slightly more than US\$ 20 million, this NAMA will trigger an investment of US \$ 3 billion from the private sector till 2020 and quantum can increase more as the time passes and such options are being adopted by the end consumers in different sectors of economy.

Development of waste to energy power projects will lead towards attaining goal of sustainable development, self-reliance and self-sufficiency in meeting energy needs of the end consumers and promoting clean sources of energy.

F Support required to prepare the mitigation action

F.1.1 Amount of Financial support

10942000

F.1.2 Type of required Financial support

<input checked="" type="checkbox"/> Grant <input type="checkbox"/> Loan (sovereign) <input type="checkbox"/> Loan (Private) <input type="checkbox"/> Concessional loan <input type="checkbox"/> Other <input style="width: 150px;" type="text"/>	<input type="checkbox"/> Guarantee <input type="checkbox"/> Equity <input type="checkbox"/> Carbon finance
--	--

F.1.3 Comments on Financial support

The proposed interventions in the country by NAMA would hasten market transformation towards efficient waste collection and disposal in residential, domestic, industrial and outdoor sectors of Pakistan. The initiatives of the NAMA are likely to provide valuable inputs paving way for promoting and developing waste to energy sector in future. The outcomes from this NAMA activity are long term because of the complete phase out of the inefficient waste handling activities from all sectors of the country. This would enable the country to become clean by creating pollution free environment and productively using the waste. This will have a potential of reducing approximately 3.0 million tCO₂ annually.

During the past five years, Pakistan has faced significant electricity shortages due to demand growth, no addition in generation capacity and high systems losses (generation, transmission and distribution). During year 2011-12, energy outages in the country continued to be the dominant constraint to its growth and are considered to be the primary cause of lesser production activities in the industrial sector. The power sector being in total disarray has technical and financial issues; the prime reasons are non-payment to generation companies for fuel charges, shortage of gas supply, inefficiency of generation plants, transmission lines and distribution network losses, circular debt and usage of highly inefficient household appliances.

The GoP is emphasizing to encourage electricity customers to put up generation facilities within their territories and get it connected to the distribution grid as distributed generation. This is an entirely a new venue in Pakistan. However, this can be promoted within the country to put up 0.5-0.8 GW installed capacity through waste to energy power plants in next 5-8 years.

Main issues that are foreseeing can be major hurdles in propagating this aspect are policy instruments, implementing mechanisms, financing facilities, capacity building of distribution companies & customers and proper marketing. Among these, establishment of a financing instrument is a key financial component that is foreseen in this NAMA Support project. A Waste to Energy Financing Instrument will be created

under this NAMA Support project to guarantee finance such activities. International NAMA donors and financiers will be requested to finance this fund. This NAMA would enable the country to proficiently develop ARE sector in Pakistan and contribute in mitigating GHG emissions.

F.2.1 Amount of Technical support

9058000

F.2.2 Comments on Technical support

The NAMA Support Project would result mitigating the risks involved in diversion from Business As Usual (BAU) growth trajectories. This will be done through removing policy, legislative, technical, technological and financial barriers and improving the systems in vogue. This NAMA Support project is expected play an important role in overall Greening of Economy and Green Growth as is envisaged in Pakistan National Climate Change Policy of Government of Pakistan.

Development of waste to energy power projects as envisaged under the NAMA Support project with a vision to encourage private sector investment coming to the development. This NAMA Support project is expected to leverage the private sector investment and create an enabling environment for trigger development of waste to energy power projects in the country. This NAMA Support project targets developing this entirely a new venue in Pakistan to level that 0.5-0.8 GW may be installed through DGs by 2020.

Main issues that are foreseeing can be major hurdles in propagating this aspect are policy instruments, implementing mechanisms, financing facilities, capacity building of distribution companies & customers and proper marketing. *This NAMA is designed to address afore-stated issues. This NAMA would enable the country to proficiently develop Waste to Energy sector in Pakistan and contribute in mitigating GHG emissions.*

F.3.1 Amount of capacity building support

F.3.2 Type of required capacity building support

<input type="checkbox"/> Individual level
<input checked="" type="checkbox"/> Institutional level
<input type="checkbox"/> Systemic level
<input type="checkbox"/> Other <input type="text"/>

F.3.3 Comments on Capacity Building support

Human resource development, its capacity building and orientation towards latest models, techniques and trends is one of the components of this NAMA. The country would benefit from the experience of developed human resource in implementing similar projects in other parts of the country.

F.4 Financial support required

F.5 Technological support required

F.6 Capacity support required

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

G.1 Relevant National Policies

National Climate Change Policy approved in 2012 outlines goals and strategies to achieve targets in the Adaptation and Mitigation sectors. It guides the implementing agencies to exploit clean energy sources (i.e. alternative and renewable energy resources) to generate electricity, improve efficiency of currently installed thermal power plants, improve efficiency of the national grid system and deploy AREs including waste to energy for domestic uses.

Moreover, Policy of Development of Renewable Energy for Power Generation, 2006 has been announced by the Government of Pakistan to attract private sector investment for developing clean ARE power projects with objectives of sustainable development, energy security, environmental protection and socio-economic uplift. The Power Policy 2013 of the Government of Pakistan (GoP) emphasises development of AREs for providing inexpensive and clean electricity to every household in Pakistan with deep interest of reducing GHG emissions. Please describe the national and international climate policy context: Describe the current framework for addressing climate change in the target country. Please include a description of the country's mitigation strategy and plans to address climate change. Specify whether/how national targets relate to international agreements, especially to emission reduction pledges.

G.2 Link to other NAMAs

H Attachments

H	Attachments	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	Nil
I.2 Within the Registry	Support provided SupportType Amount Comment Date