Annex 4: Request Submission Form for CTCN Technical Assistance (version 1.0)

APPLICANT/CONTACT:

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COUNTRY: Mozambique

TITLE: Feasibility Study to use waste as fuel for cement factories

GEOGRAPHICAL FOCUS: *{Select the most relevant geographical level}*

☐ *Community-based* ☐ *Sub-national* X *National* ☐ *Multi-country*

SECTOR/THEME *{Select the most relevant sector}*

Mitigation:	X *Energy*	☐ *Forestry*
	☐ *Transport*	☐ *Water Resources*
	☐ *Industry*	☐ *Coastal Zones/Oceans*
	☐ *Agriculture*	☐ *Terrestrial Ecosystems*
	☐ *Forestry*	☐ *Human Health*
	X *Waste*	☐ *Infrastructure/Human Settlement*
	X Cross-sectorial (see below)	☐ *Tourism*
Adaptation:	☐ *Early Warning/*	☐ *Businesses*
	☐ *Disaster Reduction*	☐ *Education*
	☐ *Agriculture/Fisheries*	☐ *Cross-sectorial*

OTHER RELEVANT SECTORS:

{Indicate relevant sectors, only from those included in the list above} Waste, Energy.

PROBLEM STATEMENT (up to half a page)

{Describe the main problems that the CTCN assistance will help address.}

Municipal solid waste management is a growing problem in Mozambique. It can be estimated that Mozambique generates approximately 2.5 million tons of municipal solid waste per year, organic waste constituting approximately 60% of the waste. The final destination of solid waste in Mozambique is mostly open bins and uncontrolled dumpsites, with no or very little waste treatment.

Simultaneously, the cement industry in Mozambique has been developing rapidly in recent years, with clinker and cement sales increasing by 13.7% in 2010 and Cimentos de Moçambique's sales rising by 9.8% in 2013. According to Global Cement, the cement production capacity in Mozambique shall raise from 2.66 million tons / year today to 5.5 million tons / year in the coming years[1]. However, the cement manufacturing process requires extremely high temperatures, which consume about ten times more energy than the average amount required by other manufacturing processes[2].

As such, employing waste as an alternative fuel has greatly helped the cement industry to manage its environmental impact, while addressing waste management challenges. This makes a lot of sense in Mozambique, where both the production of waste as well as the production of cement are dramatically increasing.

DEVELOPMENT OF THE REQUEST (up to half a page)

{Explain how the request was developed at the national level and the process used by NDE to approve before submitting it (who was the lead organization, who were the stakeholders and what were their roles, and describe any meetings or other consultations that took place to develop and select this request).}

The consultation process on the use of waste as fuel for cement factory was initially started by AMOR, the Mozambican Association for Recycling in 2011. Several meetings were organized between 2011 and 2015 with cement factories, such as CimPor, Cimentos de Mocambique, and recently, InterCement, the largest player in the industry, which operates through a number of subsidiaries and other arrangements. Information has been compiled by AMOR, with on-going contact with the cement industry.

In parallel, institutional meetings took place during which the use of waste as fuel for cement factories has been discussed, for instance at the Working Group, created in 2014, to identify climate finance opportunities for the treatment of Municipal waste. The working group is led by MITADER (Ministry of Earth, Environment and Rural Development) with the participation of ANAMM – the Association of the Mozambican Municipalities, but also FUNAB, Carbon Africa and AMOR. All are aware and supportive of this option, and so are a number of municipal stakeholders. Actually, waste to energy will be part of the NAMA in the waste sector that is currently being developed by the Government.

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[1] http://www.globalcement.com/magazine/articles/894-the-cement-industries-of-southern-africa - *Cement Industries of Southern Africa* - Accessed on 2015 03 18

[2] http://www.waste-management-world.com/articles/print/volume-10/issue-6/features/recycling-rdf-cement.html *Recycling = RDF = cement* - Accessed on 2015 03 18

In summary, the interest of both the private sector as well as the public sector to use municipal waste as fuel for cement factories has been proven. Moreover, the company 3R is developing Waste Transfer and Recycling Centers : these are facilities that receive municipal waste as well as waste from the private sector for posterior recycling. Actually, 3R is now opening a Waste Transfer and Recycling Center in the Municipality of Beira, and plans to open 4 additional Waste Transfer and Recycling Centers within the next years, these being facilities where waste to be used as fuel can be easily conditioned.

ASSISTANCE REQUESTED (up to one page)

{Describe the purpose of the technical assistance requested from the CTCN and the results expected from the assistance.

How will the results of the CTCN assistance be used to resolve the problems stated above (list specific actions).}

Alternative fuels are frequently prepared and blended outside the cement plant. Waste materials that are generally reusable as Refuse Derived Fuel (RDF, fuel produced by shredding and dehydrating solid waste) include tires, rubber, paper, textiles, exhausted oils, wood, plastics, industrial waste, hazardous waste, and solid urban waste. Cement kilns require a homogeneous RDF composition that is uniform not only in shape and size but also in calorific value.

To achieve a uniform size, it is generally required that waste has to go through an adequate process of size reduction to make it reusable as a quality RDF. The material has to be uniform in size to facilitate transportation and provide a uniform heating value. As such, it is important to guarantee a homogeneous composition of waste allowing the material to burn releasing the same constant quantity of heat.[3]

Note that burning waste produces toxic gases such as hydrogen chloride and sulphur dioxide, which usually require expensive filters to avoid their release in the environment. Conveniently, the raw material used to produce cement contains a high degree of lime and alkaline material that, when it is introduced into a kiln at very high temperatures (1600–2000°C), is supposed to absorb and neutralize hazardous gases in the kiln chamber.

Recently, AMOR, the Mozambican Association of Recycling, together with Carbon Africa created the company 3R - Reduce, Reuse, Recycle, in order to implement Waste Transfer and Recycling Centers throughout the country. These WTRCs aim at receiving municipal waste as well as private waste (separated at source) for posterior recycling. Waste streams such as organic waste will be turned into charcoal, together with paper and cardboard, whereas plastics, cans, metal and glass will be forwarded for posterior recycling.

[3] http://www.waste-management-world.com/articles/print/volume-10/issue-6/features/recycling-rdf-cement.html Accessed on 2015 03 18

However, an important fraction of the waste is not easily recyclable, but does have a very interesting calorific value. This is why the conditioning of waste to be used as fuel by cement factories can be done at WTRC level, to match the specific requirements in order to use RDF from municipal waste in cement factories.

Technical support is needed for assessing the technical and financial feasibility for the production and use of RDF from municipal solid waste in cement factories in Mozambique..

Plus, during the on-going exchange with the cement factories, it appeared that most of them are interested but they might not know what are the exact technical needs to use waste as fuel, especially in terms of filters, chimneys, etc.

As such, a technical study supported by the CTCN would on the one hand support the supply part of the project, focusing on the technical specifications needed to turn waste into RDF. On the other hand, it would support the cement factories to know exactly how to adapt their infrastructure to receive RDF.

Possibly, the study could also include an examination of the implications for the municipalities: what is the legal framework that the municipality can draw for the recycling actors as well as for the cement factories? Ideally, it should also include a market study, taking into account the production costs compared to selling price taking into account traditional fuel.

Finally, the study shall also help the stakeholders to estimate the impact in terms of greenhouse gases by developing a Monitoring, Reporting and Verifying system, taking into account the fact that potential climate funding opportunities might be tapped into to finance the infrastructure.

ALIGNMENT WITH NATIONAL PRIORITIES (up to half a page)

{Explain how the assistance requested fits with documented national priorities (examples of national priorities are: national development, poverty reduction, climate change and technologies, plans and strategies, LEDS, NAMAs, TAPs, NAPs, etc.).}

The Strategy for Integrated Municipal Solid Waste Management in Mozambique and the National Strategy for Climate Change Adaptation and Mitigation 2013-2025 provide important policy guidance for sustainable waste management in the country. Both documents appeal for large waste producers and industrial actors to implement integrated waste management practices, including recycling.

To finance the investments that are required to use waste as RDF for cement factories, international sources of climate finance can be tapped into. Both Carbon Africa and AMOR participate actively in the Working Group led by the MITADER to identify climate finance opportunities for municipal waste treatment.

The Working Group aims at formulating and prioritizing appropriate mitigation activities in the waste sector in Mozambique, identifying (international) climate finance opportunities for the development and implementation of low carbon measures and activities in the waste sector in Mozambique.

Once identified, the Working Group assists the MITADER to prepare and formulate climate finance proposals on waste for submission to international climate finance donors (such as NAMA proposals, but also application to the Green Climate Fund, the Climate Investment Fund, etc.).

PAST AND ONGOING EFFORTS (up to half a page)

{Describe past and on-going national processes, projects and initiatives that the assistance could build on, or link to.}

Cimentos de Moçambique SA operates as a subsidiary of CIMPOR, SGPS, S.A, a cement group present in 9 countries all over the world with a cement capacity of 38 Mton/year. In Portugal, CIMPOR seems to also have experience in co-generation of energy. In Brazil, the *João Pessoa* plant has already been co-processing alternative fuels and raw materials such as used tires, footwear industry waste and other substitutes for natural raw materials such as those from the aluminum industry. Today, Cimentos de Moçambique mainly uses natural gas or coal as fuel in the fabrication process. As such, some information could surely be obtained by comparing the composition and pre-treatment of municipal waste used as fuel in Brazil and adapt it to the Mozambican context.

In Mozambique, the Working Group already met 7 times so far and could definitely play an important role when it comes to stakeholder consultations, formulation of climate finance opportunities, approval of the strategy by the government, etc.

EXPECTED BENEFITS (up to half a page)

{Outline the long-term effects that will result from the CTCN assistance, including how the assistance will help in the transfer of climate technologies to mitigate and/or adapt to climate change, as well as the expected economic, social and environmental benefits.}

Worldwide, the cement industry is one of the most energy intensive sectors and also a significant source of greenhouse gas (GHG) emissions, accounting for about 5% of the annual global anthropogenic carbon dioxide emissions. According to the World Business Council for Sustainable Development (WBCSD), 80% of future CO2 emissions from the cement sector will be generated by developing and in transition countries particularly because they need to build much needed infrastructures.[4]

The use of alternative fuel is a well-known and consolidated technology that guarantees numerous environmental benefits. Primarily, avoiding the consumption of non-renewable resources and consequentially lowering greenhouse gas emissions since traditional fuel is actually replaced by a fuel derived from waste. Obviously, using waste as RDF also allow for a longer useful life of the waste disposal sites.

[4] Cement Sector in Africa & CDM - Investing in Clean Technologies and Energy Savings – World Bank Institute, 2009

Moreover, cement kilns are able to use the energy generated by the waste material, while traditional waste incinerators are less efficient converters of the heat content of waste.

The waste deposition in the Business as Usual scenario would result in emissions of GHG. As such, the conditioning of waste into RDF will not only allow for great environmental impact, it will also boost the recycling/waste management sector, as it will create an economic activity to condition the waste to be used for fuel[5].

EXPECTED TIME FRAME

{Indicate the duration of the proposed request.}

Ideally, the technical study shall be available by the 3rd quarter of 2015.

The objective will be to prepare the implementation of the strategy so that cement factories start to use RDF in 2016 already.

KEY STAKEHOLDERS

{List the main stakeholders who would be involved in the implementation of the requested CTCN assistance, and what would be their role in supporting the assistance (for example, government agencies and ministries, academic institutions and universities, private sector, community organizations, civil society, etc.).}

Stakeholder	Role in the response
Add as many lines as needed	
MITADER – Ministry of Earth, Environment and Rural Development	(Can support the application to CTCN)
ANAMM – Association of Municipalities	Can link Municipalities with Private sector
FUNAB – Fund of the Environment	Can formulate climate finance applications Can work on legislation. Can assist in the MRV
Carbon Africa –Climate Finance experts	Can help in the calculation of GHG emission.
AMOR – Mozambican Association of Recycling	Can help in data on the composition of waste.
Centro de Gestão de Conhecimento	Will benefit from the results of the study.
CPI – Center for the Promotion of the Investment	Can pass the information to the cement factory, create an enabling environment for investors.
Global Cement	Can share information.
3R – Reduce, Reuse, Recycle	Operational WTRC in Vilankulo, ready to start operating in Beira within the next months, wanting to start conditioning waste into RDF.
...	

[5] Ibid.

MONITORING AND EVALUATION

☑ By signing this request, I affirm that processes are in place in the country to monitor and evaluate the assistance provided by the CTCN. I understand that these processes will be explicitly identified in the Response Plan in collaboration with the CTC, and that they will be used in the country to monitor the implementation of the CTCN assistance.

☑ I understand that, after the completion of the requested assistance, I shall support CTCN efforts to measure the success and effects of the support provided, including its short, medium and long-term impacts in the country.

DATE AND SIGNATURE

NDE:MCTESTP	*Date: 06th of April 2015*
Responsible Person:	*Signature:*
António Jorge Raul Uaissone	

****PLEASE LIST ANY RELEVANT BACKGROUND DOCUMENTS AND PROVIDE THEIR WEB LINKS (IF WEB LINKS ARE NOT AVAILABLE PLEASE ATTACH THEM AS PDF FILES TO THE APPLICATION)**

THE COMPLETED FORM SHALL BE SENT TO THE CTCN@UNEP.ORG

Need help? The CTCN team is available to answer questions and guide you through the process of submitting a request. The CTCN team welcomes suggestions to improve this form.

>>> Contact the CTCN team at ctcn@unep.org