

Guidelines:

- This Request Submission Form should be completed by the organisation requesting technical assistance from the Climate Technology Centre & Network (CTCN) in collaboration with the National Designated Entity (NDE) of the country in question
- The Form must be signed by the NDE. Please see updated contact list of NDEs here: <http://unfccc.int/ttclear/support/national-designated-entity.html>
- The Form can be submitted as a Word file containing a digital signature or as a signed and scanned PDF file in combination with an un-signed Word file
- For requests submitted by multiple countries, all the NDEs of the respective countries shall sign identical Forms before official submission to the CTCN
- NDEs have the opportunity to submit CTCN requests in collaboration with National Designated Authorities (NDAs) for the Green Climate Fund (GCF) if targeting the GCF Readiness Programme.

Requesting country or countries:	Zimbabwe
Request title:	Development of a Deep Decarbonization Roadmap in the Cement Sector through Advanced Technology Upgradation and Enhanced Standards.
NDE	Climate Change Management Department, Ministry of Environment, Climate, Tourism and Hospitality Industry Ms Munashe Mukonoweshuro NDE Focal Point munamuko@gmail.com 11th Floor, Kaguvi Building Cnr S.V Muzenda, Harare
Request Applicant:	Ministry of Industry and Commerce Dr Utete Wushe Permanent Secretary mic.permsec@gmail.com Climate Change Management Department, Ministry of Environment, Climate, Tourism and Hospitality Industry Mr T Kamuroko tapiwakamuruko@gmail.com

Climate objective:

- Adaptation to climate change
- Mitigation of climate change
- Combination of adaptation and mitigation of climate change

Geographical scope:

- Community level
- Sub-national
- National
- Multi-country

If the request is at a sub-national or multi-country level, please describe specific geographical areas (provinces, states, countries, regions, etc.).

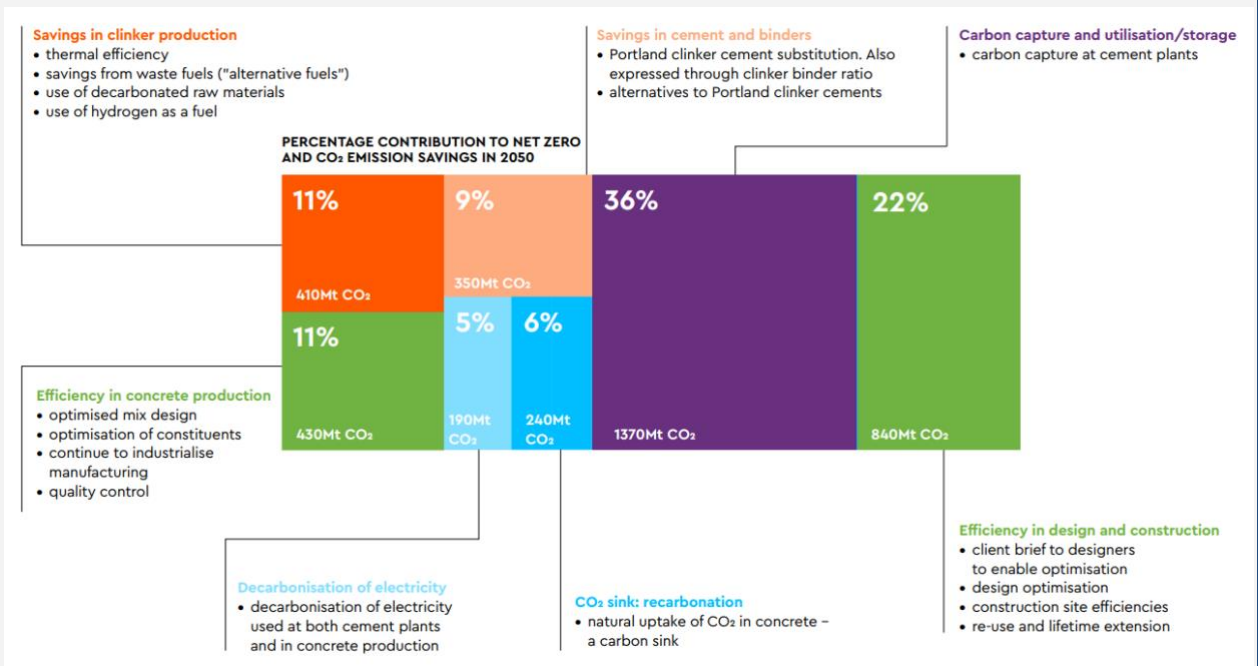
Problem statement related to climate change (up to one page):

Cement is the most widely consumed building product in the world. Due to the huge volume produced, cement production is responsible for around 7 to 8% of man-made CO₂ emissions. In 2020, the level of cement consumption worldwide reached 4.2 billion tons with a constant growth trajectory for the next decades due to rapid urbanization and population increase.

The Paris Agreement is a legally binding international treaty on climate change which was adopted by 196 Parties at COP 21 in Paris on 12 December 2015 and entered into force on 4 November 2016. Its goal is to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels.

The Global Cement and Concrete Association (GCCA) representing 80% of the world cement capacity outside China, has decided to follow the 1.5 degrees Celsius objective. In order for the cement industry to achieve this objective GCCA has elaborated a global Roadmap that is to be adapted to each country individually, the “Net Zero Accelerator Roadmap”. The roadmap will follow and thus tackle all the levers identified by GCCA.

The graphic below, produced by the GCCA in the context of their Concrete Future Roadmap to 2050, illustrates the different decarbonization options for cement production in more details.



In line with the GCCA roadmap, the IEA emphasizes that reduction levers such as carbon capture and clinker content reduction in cement have been determined to provide the largest cumulative CO₂ emissions reductions.

Further among the principal CO₂ reduction levers for the cement industry developed by the International Energy Agency (IEA), reducing clinker in cement is by far the most effective. Moreover, of the different potential alternatives to clinker, calcined clay is the most sustainable and promising. Limestone together with calcined clay are unique among supplementary cementitious material (SCMs), as they not only offer excellent properties when used in combination with cement, but conversely to other SCM's their availability is unlimited. Limestone calcined clay cements (LC3) are blended cements that combine clinker, calcined clay, limestone, and gypsum. They take advantage of the high reactivity of calcined clay and the synergistic reaction between limestone and clay, offering equivalent mechanical performance to Ordinary Portland Cement (CEM I/OPC), with the benefit of decreasing clinker factors to 50%. LC3, while retaining the mechanical behavior of OPC, also significantly improves some relevant properties such as resistance to chloride ingress and alkali silica reaction as compared to other cements. Furthermore, limestone and calcined clays are among the few raw materials available in the quantities required to constitute a technology suitable for coping with the projected worldwide demand for cement. In addition to these technical advantages of LC3, this technology also allows significant CO₂ emission savings. A detailed assessment of the environmental benefits of the LC3-50 formulation, as compared to OPC, shows that this technology can offer up to 40% CO₂ savings beyond that of the technology used to produce calcined clay and clinker. Such technology has also the advantage of using locally available raw material in countries relying so far on imported clinker or cement, therefore further reducing the emissions related to seaborne freight and saving hard currencies for the local central banks.

Other important immediately available lever is the use of Alternative Fuels instead of nonrenewable coal and pet coke. Some cement plants in Europe generates up to 90% of their energy needs from Alternative Fuels whether it is municipal waste, agricultural waste, industrial waste, etc. Such waste has generally much less CO₂ emissions than standard fuels. In case of biomass the IPCC considers the emissions to be "0". Using locally available waste instead of imported nonrenewable fuel will also reduce the emissions from freight and save hard currencies for the local central banks.

Finally, depending on the age and technology of the production units, energy efficiency levers like for example waste heat recovery, clinker cooler, co-generation shall be assessed.

In order to guide the decarbonization of the cement and concrete industry at a country level, a national decarbonization roadmap is required that identifies and prioritizes effective technology and policy levers. Furthermore, the introduction or updating of cement standards is to be conducted, in countries where need be. The collaboration of the public and private sector in the development of such roadmaps will be key to its success.

Past and on-going efforts to address the problem (up to half a page):

The Cement Industry Technology Roadmap produced in April 2018 by the IEA and Cement Sustainability Initiative (CSI) built on the December 2015 Paris Agreement's objective to limit the rise in global temperatures this century to less than 2°C above preindustrial levels. Realizing this 2-degree Celsius Scenario (2DS) by 2050 implies a 24% reduction in current levels of global direct CO₂ emissions from

cement manufacture, despite a projected increase in global cement production. An updated Roadmap has since been developed by the Global Cement and Concrete Association (GCCA), aligning to the 1.5-degree Celsius target. GCCA has been founded in 2018 as a CEO-led industry initiative that drives the shift to a net-zero cement and concrete industry with strong engagement of private and public sector entities. GCCA has already been successful in supporting the development of net-zero roadmaps at corporate and national levels, such as in [Countries] and for [companies].

Actions to decarbonize the cement and concrete industry are taken at multiple levels, including through technology and policy levers. The last years have seen a diversification of technology, process and material innovation to reduce GHG emissions in the cement industry, reaching from energy efficiency optimization, material substitution, renewable energies utilization and carbon capture. On a policy level, European countries have published an updated version of the cement standards EN-197-5 to allow for the production of a new generation of cement (LC3) with only 50% clinker content versus 65% of the former EN-197. A corresponding application in concrete (EN-206) will be published in March 2023. Though EN-197-5 is not the only cement standard (US standard is ASTM), most African countries will follow the EN-197-5.

Specific technology¹ barriers (up to one page):

On the path to decarbonizing cement and concrete at a national level, countries are confronted with challenges related to a lack of transparency on economically viable decarbonization options, of standards and incentives, and of governance. These challenges are further detailed below:

- **Decarbonization options:** Multiple decarbonization options are available with some being technically mature and others still in an R&D phase, and with a higher and lower CO₂ reduction potential. Countries require transparency on viable options for the national context as the choice strongly depends on production volumes, technology setup and raw material.
- **Standards and incentives:** Outdated or a lack of standards and policies for cement and concrete products, but also for energy performance of buildings lead to excess material usage, energy inefficiency and a lack of transparency.
- **Governance:** A clear and actionable decarbonization roadmap, as well as monitoring, verification, and enforcement (MV&E) with regards to transparency on CO₂ emissions and reduction targets is fundamental for the path to decarbonize cement and concrete.

Sectors:

Please indicate the main sectors related to the request:

- Coastal zones
 Early Warning and Environmental Assessment
 Human Health
 Infrastructure and Urban planning

¹ “any equipment, techniques, practical knowledge and skills needed for reducing greenhouse gas emissions and adapting to climate change” (Special Report on Technology Transfer, IPCC, 2000)

- | | | | |
|---|--|--|--|
| <input type="checkbox"/> Marine and Fisheries | <input type="checkbox"/> Water | <input type="checkbox"/> Agriculture | <input checked="" type="checkbox"/> Carbon fixation |
| <input checked="" type="checkbox"/> Energy Efficiency | <input type="checkbox"/> Forestry | <input checked="" type="checkbox"/> Industry | <input checked="" type="checkbox"/> Renewable energy |
| <input type="checkbox"/> Transport | <input checked="" type="checkbox"/> Waste management | | |

Please add other relevant sectors:

Cross-sectoral enablers and approaches:

Please indicate the main cross-sectoral enablers and approaches

- | | | | |
|---|---|---|--|
| <input checked="" type="checkbox"/> Communication and awareness | <input checked="" type="checkbox"/> Economics and financial decision-making | <input checked="" type="checkbox"/> Governance and planning | <input type="checkbox"/> Community based |
| <input type="checkbox"/> Disaster risk reduction | <input type="checkbox"/> Ecosystems and biodiversity | <input type="checkbox"/> Gender | |

Technical assistance requested (up to one page):

The objective of this technical assistance is to develop a national deep decarbonization roadmap for the cement sector which includes assessing evaluating viable technology options and scenarios, and identifying requirements for technology adoption, including standards and policy interventions, MV&E and private sector engagement. The expected outcomes of this technical assistance are on a short- and medium-term to establish the market requirements and incentives for low-carbon cement and concrete technology, and on a long-term to significantly reduce CO₂ emissions in this sector.

This technical assistance will be delivered as a multi-country GCF Readiness project. This will allow for periodic exchange of best practices and learnings between participating countries. Outputs and activities will be shaped to the country-specific requirements.

Proposed Activities

Activity 1: Analysis of the current (2023) national cement and concrete industry

- Determination of current CO₂ emissions from the cement industry through the main KPI like SPEC, STEC as well as all others KPI's needed.
- Analysis of cement market environment (stakeholders, regulations, laws, standards in place, future demand, etc.), including gender analysis

Activity 2: Evaluation of appropriate low-carbon cement technology options and decarbonization levers

- Identification of appropriate technology options and decarbonization levers along the value chain (based on GCCA low-carbon cement technology options and pathways)
- Workshop series with industry representatives, authorities and other stakeholders to prioritize technology options and decarbonization levers.

- Evaluation of technology and economics viability of prioritized technology options in the national context, including potential co-benefits for gender and youth

Activity 3: Development of a national deep decarbonization cement and concrete roadmap 2030 and 2050

- Roadmap development workshop with industry representatives, authorities and other stakeholders to define a set of objectives 2030 and 2050 for each identified decarbonization lever
- Policy workshop to discuss policy asks with authorities to find common ground and understanding to enable the industry to reach targets
- Development of a national deep decarbonization cement and concrete roadmap 2030 and 2050, including CO2 reduction targets, activities (technologies, policy asks, etc.), co-benefits (gender and youth), timelines, and budget

Activity 4: Operationalization of roadmap

- Development of a MV&E framework
- Development of GCF concept note(s) for the assessment and implementation of specific technologies of the roadmap
- Provision of capacity building and training

Activity 5: Introduction or updating of cement standards

- Preparation of the draft standard to align to norm EN-197-5
- Public consultation process and workshop to endorse draft standard
- Preparation of standard adoption process

Along the proposed activities, stakeholders from the public and private sector will be engaged regularly in form of a roadmap working group. A steering committee will be created to monitor the roadmap development at international level.

Anticipated products to be delivered

1. National Cement and Concrete Industry Analysis
2. Report on technology options and decarbonization levers
3. National deep decarbonization cement and concrete roadmap
4. MV&E Framework
5. GCF concept note(s)
6. Capacity building report and material
7. Draft cement standard
8. Public consultation report and workshop materials

Expected timeframe:

12 months

Anticipated gender and other co-benefits from the technical assistance:

Considerations for gender, youth and vulnerable groups will be integrated transversally in the technical assistance. The impact and opportunities for gender and youth will be evaluated under the market

analysis (Output 2), technology options will consider potential co-benefits (Output 3), and the roadmap will include a consideration for gender and youth (Output 3). Throughout the technical assistance, a fair representation of women will be expected.

Through this technical assistance, improved employment opportunities and other benefits for women and youth should result in the cement and concrete industry.

Key stakeholders:

Please list the stakeholders who will be involved in the implementation of the requested CTCN technical assistance and describe their role during the implementation (for example, government agencies and ministries, academic institutions and universities, private sector, community organizations, civil society, etc.).

Stakeholders	Role to support the implementation of the technical assistance
National Designated Entity – Climate Change Management Department	Technical assistance coordination, oversight and data provision, standards shaping
Request Applicant - Ministry of Industry and Commerce	Technical assistance coordination, stakeholder engagement, data and research input, standards shaping, action planning and operationalization of standards
Ministry of Finance and Economic Development	Data provision
Ministry of Energy and Power Development	Data and research input, standards shaping
Cement producing industry	Data and research input, standards shaping, action planning and operationalization of standards
Standards Association of Zimbabwe (SAZ)	Development and adoption of standards
Media	Communication and knowledge distribution on standards and green buildings
NGOs and Development Partners	Stakeholder engagement, potential follow-up funding

Alignment with national priorities (up to 2000 characters including spaces):

Please describe how the technical assistance is consistent with national climate priorities such as: Nationally Determined Contribution, national development plans, poverty reduction plans, technology needs assessments, Low Emission Development Strategies, Nationally Appropriate Mitigation Actions, Technology Action Plans, National Adaptation Plans, sectorial strategies and plans, etc.

Reference document (please include date of document)	Extract (please include chapter, page number, etc.).
Vision 2030	Vision 2030, highlights the need to become an upper-middle income society by the year 2030. Page 30 highlights the need for innovation,

	technological advancement, research and development in order to boost productivity, competitiveness and efficiency levels in the manufacturing industry.
National Development Strategy (NDS) 1	The National Development Strategy (NDS) 1 is an economic blueprint for Zimbabwe to move towards an 'Empowered and prosperous upper middle-income society by 2030'. One of the more specific objectives of the Strategy is to 'Ensure sustainable environmental protection and resilience' with key priorities being Housing Delivery; Transport, Infrastructure & Utilities and Climate Resilience and Natural Resource Management' (p. x-xi, Chapter 6 p.112)
Nationally Determined Contribution (NDC)	Revised NDCs 2021, chapter 4, page 25 – As highlighted in Zimbabwe's Revised NDCs, the assistance will enhance the ability to implement the mitigation actions related to cement production, specifically clinker substitution with blast furnace sludge or fly ash. Key to this will be capacity building to both private players as well as government such that good governance structures to decarbonize in this sector can be developed and implemented
Low Emissions Development Strategy	LEDS 2022, chapter 4, pages 12-17. The LEDS of Zimbabwe prioritize clinker substitution in the production of cement as one of the key actions to mitigate emissions. Using the Marginal Abatement Cost modelling methodology, the LEDS highlight the high costs associated with implementing this action, as such, the technical assistance under this project is paramount in developing the necessary capacity for skills development, technology transfer and resource mobilisation to implement this mitigation action.

Development of the request (up to 2000 characters including spaces):

This multi-country request results from an expression of interest in such a technical assistance at Africa Climate Week 2022 in Libreville, Gabon. The request was developed in coordination with the National Designated Entities, respective Ministries of Environment and Industry and national cement associations and companies, with the support of CTCN and the Global Cement and Concrete Association (GCCA).

Background documents and other information relevant for the request:

- Please list all relevant documents that will help the CTCN analyse the context of the request and national priorities. Please note that all documents listed/provided should be mentioned in this request in the relevant section(s), and that their linkages with the request should be clearly indicated. For each document, please provide web-links (if available) or attach to the submission form. Please add any other relevant information as required.
- Please indicate if this request has been developed with the support of the CTCN Request Incubator.

OPTIONAL: Linkages to Green Climate Fund Readiness and Preparatory Support

The CTCN is collaborating with the GCF in order to facilitate access to environmentally sound technologies that address climate change and its effects, including through the provision of readiness

and preparatory support delivered directly to countries through their GCF NDA. These actions are in line with the guidance of the GCF Board (Decision B.14/02) and the UNFCCC, particularly paragraphs 4 and 7 of 14/CP.22 that addresses Linkages between the Technology and the Financial Mechanisms². The CTCN is therefore implementing some of its technical assistance using GCF readiness funds accessed via the country's NDA. Any application for GCF support, including the amount of support provided, is subject to the terms and conditions of the GCF and should be developed in conjunction with the NDA.

Please indicate whether this request has been identified as preliminarily eligible by the NDA to be considered for readiness support from the GCF.

Initial engagement: The GCF NDA of the requesting country has been engaged in the design of this request and the NDA will be involved in the further process leading to an official agreement for accessing GCF readiness support.

Advanced engagement (preferred): The GCF NDA of the requesting country has been directly involved in the design of this request and is a co-signer of this request, the signature indicating provisional agreement to use readiness national funds to support the implementation of the technical assistance.

NDA name:

Date:

Signature:

Monitoring and impact of the assistance:

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

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.

Signature:

NDE name: Ms Munashe Mukonoweshuro

Date: 29/02/2024

Signature: 

² Please see:

https://unfccc.int/files/meetings/marrakech_nov_2016/application/pdf/auv_cop22_i8b_tm_fm.pdf

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

The CTCN is available to answer all questions and provide guidance on the application process.