CTCN Technical Assistance

Request Submission Form

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:	TANZANIA
Request title:	Technical Assistance for Development of Geothermal Direct Use Projects for Kiejo-Mbaka prospect
NDE	Dr. Gerald Majella Kafuku Principal Research Officer Tanzania Commission for Science and Technology, P.O. Box 4302, Dar-Es-Salaam, United Republic of Tanzania, Telephone: +255 766 604977 E-mail: kafukugm@gmail.com ; gerald.kafuku@costech.or.tz
Request Applicant:	Eng. Kato T.Kabaka, General Manager, Tanzania Geothermal Development Company Limited (TGDC), Mwai Kibaki Road, Ursino, House No.25, P.O.BOX 14801, Dar es Salaam-Tanzania. Email: kato.kabaka@tanesco.co.tz tkkabaka@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):

This section should answer the question "what is the problem?" Please summarise the problem related to climate change and/or the negative impacts of climate change in the country that the request aims to address.

Climate change is increasingly becoming a global concern because, it poses a challenge to sustainable livehooods, economic development and global security. Tanzania is like other developing countries that are evidencing the impacts of global climatic change manifesting in different economic sectors essential for Tanzanians livelihood and subsistence which include , water resource, energy generation, food security, ecosystem , biodiversity and human health. Developing Countries such as Tanzania are vulnerable to the impacts of climatic change because of high dependence on climatic sensitive livelihood activities and low adoptive capacity. The participation of Tanzania in the global efforts to mitigate climate change provides an opportunity for Tanzania to build climate resilience and promote sustainable economic growth.

The recently development on climate change has shown that Nationally appropriate mitigation actions (NAMAS) are important contributions to the global mitigation efforts. Tanzania has prepared the National Adaptation Programme Action (NAPA) which its preparation involved vulnerability assessment across essential economic sectors and established venerability areas from the respective sectors. The NAPA come up with 14 activities to address the venerability and among other activities were: alternative farming system and water harvesting, exploration and investment in alternative clean energy sources, implement sustainable tourism activities in the coast areas and reallocation of communities from low –laying areas. It is from this ground that TGDC intend to develop geothermal resources as alternative energy for both power generation and development of direct use applications projects from its priority prospects.

For a long period of time Tanzania has traditionally depended on hydropower and fossil fuel to generate its power but this generation mix has been unsustainable largely due to persistent and frequent draughts and fossil price fluctuations which have adversely resulted to power shortage in the country. The lessons have been learnt and now the government focus in diversifying its energy portfolio is on developing renewable sources of energy and geothermal energy is among them. In addition, to develop alternative sources of energy such geothermal in Tanzania is not only the question of NAPA, or National climate change strategy(2012) rather is consistent with the Power system Master Plan (2016 update) which target to diversify the generation mix and for geothermal in particular, the target is to generate 200MW by 2025. TGDC has already completed detailed surfaces studies on some of its priority prospects and is looking forward to conduct test drilling programme. These prospects includes, Ngozi, and Kiejo-Mbaka located in Mbeya region, Songwe, in Songwe region and Luhoi – Coast region. Ngozi and Songwe prospects studies were undertaken with ARGeo/UNEP consultant support while Kiejo-Mbaka and Luhoi prospects were under ICEIDA/MFA –Iceland support.

The studies results from respective prospects are promising for power generation and development of direct use projects. TGDC's focus is to fully exploit all opportunities emanating from geothermal energy ie from power generation and direct use applications as it has been the case of countries like Kenya and Iceland which have managed to development geothermal resource. Development of power and likewise direct use projects is subject to drilling wells, and given that TGDC is looking to start test drilling for Ngozi, Songwe and Kiejo Mbaka prospects. It is therefore imperative to have wider understanding with regard to the existing opportunities for direct use projects from both technical, financial, market viability perspectives. Understanding of these opportunities will help TGDC to make informed decisions regarding the direct use opportunities to exploit. Further, implementation

of direct use projects have direct impacts to the community in terms of livelihood income generation and employment creation. This in turn is expected to contribute to the national efforts of resilience climate change

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

This section should answer the question "what has been done or is currently being done to address the problem?" Please describe past and on-going processes, projects or initiatives implemented in the country or region to tackle the climate problem as described above.

Tanzania has undertaken different initiatives towards addressing climatic change issues and the most remarkable step was the ratification of UNFCCCC and Kyoto protocols' in 1996 and 2002 respectively. The other initiatives includes, the formulation of Tanzania National Adaptation Programmes of Action (NAPA) in 2007 that formed a clear basis for identifying and implementing adaptation actions at both sectoral and local levels, development of Tanzania Climate Change Strategy in 2012 that posed out both adaptation, mitigation and crosscutting interventions to tackle climate change, and submission of country's Intended Nationally Determines Contributions (INDCs) to the United Nations Framework Convention on climate change in 2015. Implementation of these initiatives is part of the broader implementation of national policies and efforts to reduce poverty and support sustainable development at national level, local and individual level.

Through Development Vision 2025, Tanzania envisages to transform its economy to middle income country by the year 2025 that will be supported by high productivity in manufacturing and industrial sector. To achieve this target, energy sector and in particular electricity has been recognized as key a catalyst towards archiving the target. The past lessons of relying on hydro power generation have been learnt in Tanzania and now the government focus is on diversification of power generation mix using alternative sources of energy and geothermal energy is one of the targeted mix. The power system master plan updated in 2016 projects to increase the installed capacity from 1435.5MW to 10,798.23 MW by 2025 using different sources of energy and 200MW out of the total forecasted installed capacity is expected to be generated from geothermal energy.

Further, to expedite development of renewable energy in Tanzania, the government developed Scale Up Renewable Progamme (SREP IP, 2013) partly in order to benefits with the financing opportunities from International communities such as the Climate Investment Fund (CIF), WB, and UN. The SREP programme is implemented by AfDB on behalf of CIF and TGDC is the implementing agency for geothermal programme on behalf of the government of Tanzania. The AfDB has already provided project preparation grant for geothermal programme amount to USD 700,000 and now the bank is looking forward to provide grant and concessional loans for confirmation of geothermal resources for Ngozi and Songwe prospects. Also, UNEP/ARGeo has already supported the respective prospects through technical assistance on detailed surface studies together with explorations equipment. The Geothermal Risk Mitigation Facility (GRMF) expect to finance Kiejo-Mbaka, and Ngozi drilling programme and detailed surface study for Natron prospect because the three projects have already qualified for grant support of GRMF.

Therefore, should the resources be confirmed, further development will be required for both power generation and direct use projects. In that case TGDC is required to understand the direct use opportunities and specific viable direct use projects from its priority prospects for development of demonstration (pilot) projects in a short run and commercial projects in long run.

Specific technology[1] barriers (up to one page):

This section should answer the questions "what are the technology barriers that hinder national efforts described above" and "how will the CTCN technical assistance complement these efforts?" Building upon the problem statement and taking into consideration the existing efforts described above, please describe the specific technology barriers encountered by the requesting applicant to identify, assess or deploy climate technology (ies) in an effort to address the problem statement. The described barriers should be within the scope of the requested CTCN technical assistance (described in the section below).

Addressing climate change is an economic necessity to avoid serious disruption to national socio-economic development. While the Government of Tanzania is proactively addressing climate change at national and local level, there are number of barriers that hinder national efforts towards combating climate change through adaptation and mitigations strategies. The main barrier is technical (capacity + technology transfer and development) and financial support. Accessing appropriate clean energy technology is crucial for the nation to promote green growth of the economy but, most of these technology are cost intensive to acquire. Geothermal related technologies faces the same case described.

Attempts to develop geothermal resources in developing countries like Tanzania is confronted with many barriers and among others is financial barriers and the technical know-how capacity. In this case TGDC request technical assistance for Development of Geothermal Direct use projects in Tanzania .So far, TGDC has no in-house expertise with extensive experience on geothermal and in particular on geothermal direct use applications. The geothermal industry is still a new field with limited experts in Tanzania. The technical assistance requested is expected to support TGDC, on identification of direct use opportunities, pre-feasibility studies on priority direct use applications, projects design and development of pilot projects on direct use applications at Kiejo-Mbaka prospect. Detailed surface study for the this prospect was completed in 2017 and way forward is to conduct test drilling programe

Taking into consideration the past and on-going national effort on development of geothermal resource, the Climate Technology Centre & Network (CTCN) technical assistance is expected to supplement the on-going efforts undertaken by the Government of Tanzania as one of the strategic intervention to tackle climate change specific in energy sector.

[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)*

Sectors:

Please indicate the main sectors related to the request:

☐ Coastal zones	☒ Early Warning and Environmental Assessment	☐ Human Health	☐ Infrastructure and Urban planning
☐ Marine and Fisheries	☒ Water	☒ Agriculture	☐ Carbon fixation
☒ Energy Efficiency	☐ Forestry	☐ Industry	☒ Renewable energy
☐ Transport	☒ Waste management		

Please add other relevant sectors:

Cross-sectoral enablers and approaches:

Please indicate the main cross-sectoral enablers and approaches

☒ Communication and awareness	☒ Economics and financial decision-making	☒ Governance and planning	☒ Community based
☒ Disaster risk reduction	☒ Ecosystems and biodiversity	☒ Gender	

Technical assistance requested (up to one page):

Founded on the problem statement, past/on-going efforts and technology barriers, please describe the requested technical assistance. The technical assistance should clearly contribute to mitigation or adaptation to climate change as described in the problem statement and contribute to overcome the specific technology barriers.

Within a clearly defined scope, the description of technical assistance should be structured into the following:

- Overall objective
- Anticipated groups of activities to be performed by the technical assistance
- Anticipated products to be delivered by the technical assistance.

Please note that the CTCN facilitates technical assistance and is not a project financing mechanism.

The requested technical assistance has three major components, the first component is related with feasibility studies, and the second component is capacity building programme to TGDC staff, and lastly development of direct use pilot project for Kiejo-Mbaka geothermal prospect as described from below.

a) Pre- Feasibility studies

This activity will involve identification of drect use opportunities and d priority few direct use applications for the prospect for further development. It will also,involve to undertake pre-feasibility studies for at least four (4) priotized direct use applications.

b) Capacity building programme

Considering the fact that TGDC does not have extensive on geothermal and in particular on direct use applications , it is thus request assistance on capacity building to its staff. This will involve training staff on desining direct use projects, materials and equipment, cost estimations and modelling the projects. The aim of this capacity building is to strengthen TGDC stafff capacity to undertake similar activities on other geothermal prospect. TGDC will facilitate training venues, and transport during training and field visits to the geothermal prospects. It will also facilitate its own staffs who will be involved on the feasibility study.

c) Support TGDC to develop direct use demonstration or pilot projects for Kiejo-Mbaka prospect

TGDC has interest of developing direct use demonstration projects / pilot projects for Kiejo-Mbaka as a short term plan, and In a long run will develop commercial projects through different arrangements such as with the Local Government Authority from the respective area, potential investors and community around the kiejo-mbaka prospect. Direct use projects such as green house farming, acquculture, drying crops uses clean technologies which are freiendly to the environment. Therefore, development of direct use projects at large scale will contribute to the ongoing initiatitives of mitigating climate change through low emmission geothermal energy development for social and economic benefit of the Mbeya region and country in general

The overall Objective

The overall objective of the technical assistance is to support TGDC on Development of Geothermal Direct Use Projects for Kiejo-Mbaka prospects. Detailed surface study for prospect was completed in 2017 with support from ICEIDA/ Ministry of foreign affairs of Iceland and TGDC now is looking forward to conduct test drilling programme. Considering the nature of the facility support, the technical assistance is anticipated to perform the following activities ;

i) To support TGDC on identification of direct use opportunities and priotize direct use applications for future development for Kiejo-Mbaka prospect
ii) Conduct pre-feasibility studies on at least four (04) prioritized direct use applications for Kiejo-Mbaka prospect.
iii) Conduct capacity building on direct use project designing, material selection and equipment requirements, engineering cost estimations, project evaluation and Modelling the projects.
iv) To support TGDC on development of direct use pilot/ demonstration projects for Kiejo-Mbaka prospect

The technical assistance is anticipated to deliver the following products or outputs

i. Strengthening TGDC capacity on development of geothermal resources in Tanzania.
ii. Direct use opportunities identified and priotized based on viability and practicability (sites) for geothermal direct use business
iii. Pre-feasibility studies for at least four direct use applications conducted for further projects development.
iv. Direct use application pilot or demonstration project developed in a short run and commercial projects in a long run (later stages).

Expected timeframe:

Please indicate the expected duration period for the requested technical assistance. Please note CTCN technical assistance is limited to a maximum duration of 12 months.

SN	ACTIVITY	YEAR 2019											
		Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1	Preparation and CTCN a appprove the request												
2	**Pre-Feasibility Study**												
	To support TGDC on identification of direct use opportunities and priotize direct use applications for future development for Kiejo-Mbaka prospect												
	Conduct pre-feasibility studies on at least four (04) prioritized direct use applications for Kiejo-Mbaka prospect.												
3	**Capacity Building**												
	Conduct capacity building on direct use project designing, material selection and equipment requirements, engineering cost estimations, project evaluation and Modelling the projects												
4	**Direct use pilot project**												
	To support TGDC on development of direct use pilot/ demonstration projects for Kiejo-Mbaka prospects												
5	**CTCN Technical Assistance Wrap Up**												

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

Please describe the activities with gender linkages as well as the anticipated gender and other co-benefits (e.g. biodiversity, economic, social, cultural, etc.) that are likely to be generated as a result of the technical assistance.

In Tanzania, forests and woodlands cover, about 46% of the land and 75% of rural household are firewood dependency (Multi-Sector Country Gender Profile, AfDB 2015). Women are highly involved in collecting firewood's for cooking and sometimes lighting during night hours. The technical assistance will fast track the geothermal direct use projects development that will provide new patterns and opportunities to realize the benefits of clean energy in community development were women are more affected.

Women are more vulnerable from the impacts associated with climate change as there more involved in many activities that increases their physical and mental strains. The geothermal direct use projects will encourage and provide opportunities for women's to add value and invest to their related socio-economics activities and thus led to improved financial situations, automatically the firewood dependency will diminish slowly. To mention few, drying of agriculture products which of recent is highly dependent on sun drying (not reliable in some areas), greenhouse heating, and fish farming activities. The use of geothermal energy for heating/cooling will led to employment creation and new business interventions.

For more information you can find guidelines on the CTCN's website here:
https://www.ctc-n.org/technologies/ctcn-gender-mainstreaming-tool-response-plan-development

Further reading on gender can be found on the CTCN website here:
https://www.ctc-n.org/technology-sectors/gender

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
COSTECH	National Designated Entity. Play role of endorsing the application and submit to CTCN
National Environment Management Council (NEMC)	Issuing Environmental permits
Tanzania Electric Supply Company (TANESCO)	Finance TGDC staff and direct use projects
Ministry of Energy (MoE)	Finance direct use projects
Regional Office/Local Government Authority (LGA)	Partner on implementation of direct use projects and will provide information on opportunities available in their respective area
Community	Partner on development of direct use projects and will provide information on opportunities available.

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.

The technical assistance is consistence with National Adaptation Programme Action (NAPA) in which among the other 14 activities identified is exploration and investment on alternative sources of energy. Geothermal can be used for power generation and direct uses through thermal water utilization and the respective technologies are clean and are available in the market. The Government of Tanzania understood that the best and significant way of mitigating the effects of climate change is to diversifying its energy mix from the currently dependency of biomass and fossil fuels using alternatives sources such as geothermal energy. According to Tanzania Climate Change Strategy (TCCS), Tanzania will particularly do its part by improving the energy availability using renewables in order to reduce deforestation, improve energy diversification and energy efficiency of her major energy consuming sectors, including, power generation, manufacturing, and transportation . Therefore, the assistance requested aligns well with the National adaptation plan action programme and the climate change strategy.

Reference document (please include date of document)	**Extract** (please include chapter, page number, etc.).
Technology Needs Assessment (2016)	Identify and priorities low carbon technology needs, which can help Tanzania to meet her energy development needs at the same time mitigating GHG emission. (Chapter 3 page 34&35)
National Adaptation Plans (2007)	Improving and increasing clean thermal power generation explore Invest in alternative energy sources, Develop community based mini-hydropower (Chapter 6 page 27)
Tanzania Climate Change	Improving the energy availability in order to reduce deforestation, energy

Strategy (2012)	diversification and efficiency of her major energy consuming sectors. Page ii).
National Five Year Development Plan 2016/17-2020/21	Energy production and distribution facilities have been at the centre of efforts to improve the quantity and quality of infrastructure for promoting socio-economic development in Tanzania. P(Chapter 2, Page 12)
Low Emissions Development Strategies (2012)	Enhancing capacity for low emission development and access to clean energy solutions. (Low emissions d.strategies)https://www.usea.org/sites/default/files/event-presentations/MadlerPPT.pdf

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

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

With regard to the application of the request, TGDC was informed by UN Environment on the CTCN technical assistance announcement. TGDC being a young company established in November 2013 always is looking for opportunities for development of geothermal resources in Tanzania including technical assistances. In this case the CTCN announcement on technical assistance is an opportunity for TGDC and would like to seize it specifically for the development of direct use application projects. The request has been prepared by TGDC and submitted to NDE for endorsement and submitting the CTCN as per requirement. It did not involve the other stakeholders. However, TGDC anticipate to involve other stakeholders at a later stage. So far, there have been no consultations meetings in developing this request.

Background documents and other information relevant for the request:

- Tanzania Climate Change Strategy (2012) https://www.google.com/search?q=tanzania+climate+change+strategy&ie=utf-8&oe=utf-8&client=firefox-b
- The Cost of Climate Change in Tanzania **https://www.google.com/search?q=%E2%80%A2%09The+Cost+of+Climate+Change+in+Tanzania&ie=utf-8&oe=utf-8&client=firefox-b**
- Tanzania Technology Need Assessment (2016) https://www.google.com/search?q=%E2%80%A2%09Tanzania+Technology+Need+Assessment+&ie=utf-8&oe=utf-8&client=firefox-b
- Tanzania National Five Year Development Plan https://www.google.com/search?q=Tanzania+National+Development+Plan&ie=utf-8&oe=utf-8&client=firefox-b
- Multi-Sector Country gender Profile (AfDB,2015) https://www.ctc-n.org/technologies/ctcn-gender-mainstreaming-tool-response-plan-development
- National Adaptation Programe of Action (NAPA, 2007) https://unfccc.int/resource/docs/napa/tza01.pdf
- Tanzania Climate Action Report (2016)

https://www.irishaid.ie/media/irishaid/allwebsitemedia/30whatwedo/climatechange/Tanzania-Country-Climate-Action-Report-2016.pdf

- United Republic of Tanzania: Poverty Reduction Strategy Paper (IMF, 2006)
  https://www.imf.org/external/pubs/ft/scr/2006/cr06142.pdf
- Low Emissions Development Strategies (2012) Enhancing capacity for low emission development and access to clean energy solutions (Workshop in Arusha)
  https://www.usea.org/sites/default/files/event-presentations/MadlerPPT.pdf

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 Mechanisms[2].

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

[2] Please see:
https://unfccc.int/files/meetings/marrakech_nov_2016/application/pdf/auv_cop22_i8b_tm_fm.pdf

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:	Dr. Gerald Majella Kafuku
Date:	December 14th 2018
Signature:	

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.