



REPUBLIC OF BOTSWANA
MINISTRY OF FINANCE AND ECONOMIC DEVELOPMENT

REF: MFED 170/1/4 A

22nd May, 2019

Prof. Nnyaladzi Batisani
Chief Executive Director
Botswana Institute For Technolgy Research and Innovation
Machel Drive
Private Bag 0082
Gaborone, Botswana



Dear Prof. Batisani,

Subject: Southern African Power Pool (SAPP) – Climate Technology Centre and Network (CTCN) Multi-Country Efficient Appliances and Equipment Regional Equipment Strategy for Southern Africa

Reference is made to your letter ref: BITRI 551.5 I (101) dated 15th May, 2019 regarding the above subject matter.

The serves to inform you that the NDA has endorsed the request for technical assistance to assess the potential of increasing energy efficiency of appliances and equipment in Botswana. It is anticipated that this assessment will provide a roadmap for the adoption, promotion and implementation of technologies with the highest efficiency, and in turn support the country's energy efficiency goals in line with its international climate action commitments.

We will continue to engage with you and the Department of Energy for the successful implementation of this project.

Yours Sincerely,

Boniface G. Mphetlhe
For/**PERMANENT SECRETARY**

cc: Permanent Secretary, Ministry of Land Management,
Water and Sanitation Services
Director, Department of Energy

ES-NEM

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:	Botswana
Request title:	Leapfrogging Botswana's market to energy-efficient refrigerators and distribution transformers
NDE	Ms. Penny Lesolle, Researcher, Botswana Institute for Technology Research plesolle@bitri.co.bw ; plesolle@gmail.com
Request Applicant:	Department of Energy

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):

The high level of electrification of Botswana's households presents significant opportunities for ensuring that new uses of electricity are of the highest level of energy efficiency. Thus, while challenges

remain associated with income levels and rural electrification, encouraging adoption of more energy efficient equipment and products amongst users is an important policy opportunity. Mitigating the potential for growth in demand will also help the country achieve its energy diversification goals while limiting the need for importing electricity to meet peak power demand. Given that there is virtually no indigenous manufacturing of these products, a regional market transformation strategy, combined with regional harmonized standards and labels, in-country educational campaigns and utility support is considered the best approach achieving meaningful change in Botswana.

Energy efficiency (and this project in particular) is not the primary priority of the NDEs. Electrification, food, water, housing and other more pressing and relevant issues understandably have higher priority. Due to generally high levels of poverty in Southern Africa, the markets are extremely price sensitive. Energy efficiency typically comes at a cost and any additional costs have large impacts on short term cashflows. For example, additional costs for a higher efficiency refrigerator must be secondary to filling the existing one. The entire African continent consumes less than 5% of all electricity in the world. Therefore, it is understandable that manufacturers have little interest in spending time and resources to invest into, let alone track, the African market, and even less so if you look at the specific countries.

Energy Efficiency is perceived as a conflict of interest for utilities. Reducing the sales of electricity by promoting energy efficiency effectively reduces some potential revenue from the utility. On the turn side, current lack of sufficient capacity results in regular power outages, so reduced consumption could be redistributed. Since the utility is state owned, this enables the state to use the utility to drive energy efficiency roll outs, despite the apparent conflict.

Botswana electric charges are low compared to Europe at 0.08 – 0.10 USD per kWh for residential customers. These are government subsidised tariffs, which result in longer payback periods for energy savings projects or energy efficient technologies than if full utility costs were charged. This negatively impacts the sales of higher efficiency units, compared to their cheaper but less efficient competitors. Unfortunately, the low average incomes prevent the state-owned utilities from increasing the tariffs to be fully cost reflective, as many people would then not be able to afford electricity, which in turn would adversely affect both the economy and the uptake of electrification.

Like several other countries in the region, Botswana has an energy policy [1] in draft, but this is at a very high level, does not address any technologies, does not have any specific regulations and provides no enforcement mandate. Despite the limitations noted, including low population density and low incomes, Botswana has much to gain by adopting energy efficient standards and technologies.

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

In 2009 Botswana developed BEST plans. To date more than 820,000 CFL bulbs have been distributed to replace incandescent bulbs in 2010. In 2013 implementation of ripple control to remotely turn on and off domestic hot-water heaters was introduced. In December 2016, the Government of Botswana, through support from the World Bank, completed a National Energy Efficiency Strategy document with key short and medium-term initiatives required to achieve 10–15% energy savings. Botswana is also selling imported high-efficiency stoves through the BPC Lesedi programme. Botswana published a set of



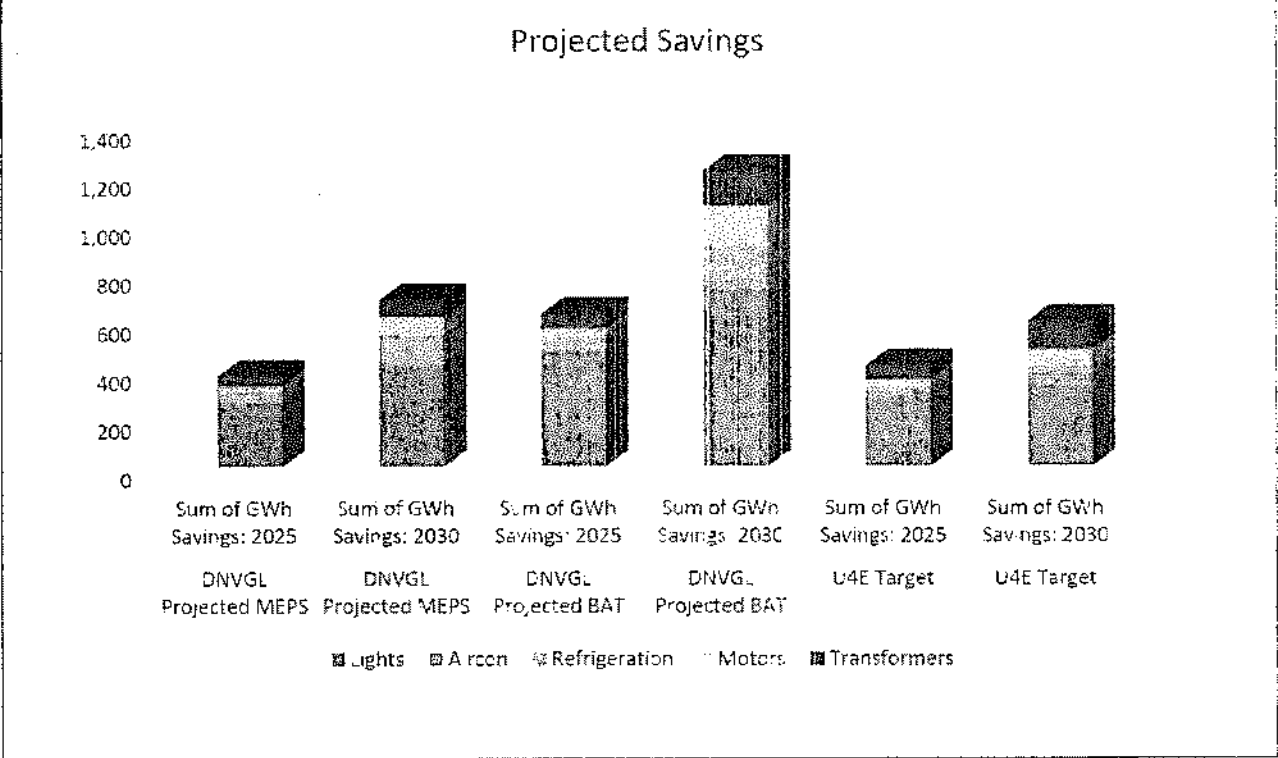
energy-efficient design guidelines for buildings in 2010 and has made progress improving energy efficiency in existing and new buildings. The country was also host to major donor-funded projects on energy efficiency in commercial and institutional buildings in 2010 and 2011 and has developed guidelines for energy-efficient design.

Solutions being implemented and/or reviewed to address the dependence on imports include building new generation, transmission and distribution infrastructure, including the construction of a transmission line between Botswana and South Africa (BoSA), refurbishing existing infrastructure, procuring additional power through IPP's and putting energy frameworks and policies in place to promote investment. The 2010 version of the Draft Energy Policy targeted having biodiesel contributing 10% to energy mix by 2020 and for 25% peak electricity demand from renewable energy by 2030.

In Botswana, 66% of the population have access to electricity, making it one of only five countries in SSA with electrification rates in excess of 50% in rural areas. The country's Rural Electrification Collective Scheme (RECS), which includes the roll-out of some renewable energy, has played a significant role in increasing electricity access.

Botswana is a member of the Southern African Power Pool (SAPP), which began in 1996 as the first formal international power pool in Africa with a mission to provide reliable and economical electricity supply to consumers in SAPP member countries. Botswana also joined the International Renewable Energy Agency (IRENA) - a global initiative to promote and reduce barriers to the uptake of renewable energy.

Botswana with 9 other SADC countries benefitted from CTCN Technical Assistance: Through this TA CTCN developed detailed country assessments for the five priority products (i.e. lighting, refrigerators, air conditioners, electric motors and distribution transformers). This assistance was required in order to more accurately define the current situation and the future objectives for climate-related policy actions. Each country report contains information on the status/trends of energy-efficient products, status of policies and potential savings of energy efficient products. The overall savings potentially yielded by the adoption of MEPS and BAT are as illustrated below;



Specific technology¹ 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(is) 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).

The entire African continent consumes less than 5% of all electricity globally. Therefore, it is understandable that manufacturers have little interest in spending time and resources to invest into, let alone track the African market, and even less so if you look at specific countries. markets are extremely price sensitive. Energy efficient products such as those being investigated through this TA typically come at a premium cost over standard models, and any additional costs have large impacts on short term cashflows. This TA therefore investigates technology approach that Namibia can address current lack of energy efficiency throughout the country through the assessment of the 5 products; Aircons, Lighting, Motors, refrigeration and transformers.

Sectors:

Please indicate the main sectors related to the request:

Coastal zones
 Early Warning and Environmental
 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)



Assessment

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

Please add other relevant sectors:

Cross-sectoral enablers and approaches:

Please indicate the main cross-sectoral enablers and approaches

- | | | | |
|--|--|--|--|
| <input type="checkbox"/> Communication and awareness | <input type="checkbox"/> Economics and financial decision-making | <input 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):

In coordination with similar CTCN projects in neighbouring countries, will assess the potential for increasing the energy efficiency of products in Botswana by providing a technical market assessment of current conditions and policies. This targets specific product categories: refrigerators and transformers

The specific objectives of this technical assistance are to:

- Validate the data collected by the CTCN from stakeholders (e.g. manufacturers, retailers, suppliers, utilities) on the existing initiatives and use of refrigerators and distribution transformers.
- Undertake detailed market assessments and feasibility of implementation of technologies with highest efficiency.
- Develop a technology roadmap and action plan for promoting and adoption of efficient appliance in the country.
- Propose draft minimum energy performance standards (MEPS) and labelling for refrigerators (building off the United for Efficiency Model Regulations) and procurement specifications for distribution transformers.
- Assist decision makers and stakeholders to put the draft MEPS for refrigerators and procurement specifications for distribution transformers into practice.
- Gather information on financing lines and business models for financing energy-efficient refrigerators and/or distribution transformers.
- Develop proposal for financial/market-based mechanism on energy-efficient refrigerators and/or distribution transformers.

Expected timeframe:

18 months

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.

The gender gap in access to inheritance and property rights, finance and information can limit the capacity of women home and business owners to invest in energy-efficient appliances. Energy use in the home may also be reduced by about 20 per cent through changes in behaviour. Women and men respond differently to policies encouraging behavioural changes. The success of these policies will depend heavily on how they affect the workload and well-being of both women and men. Energy efficiency policies and investment will be designed based on a gender-differentiated understanding of opportunities and constraints to optimize their social and climate impact.

The project will provide gender and other co-benefits, such as energy-efficient and higher quality refrigerators allowing users to save funds for other economic opportunities, reducing food waste from spoiled foods and providing increased economic opportunities by increasing the ability to store food instead of frequent trips to the market. In addition, distribution transformers and other energy-efficient products will result in reduced demand on the electricity grid provide more stable electricity distribution and economic opportunities for the entire population.

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
National Designated Entity	The NDE will support in getting the commitment and participation of the relevant stakeholders within the process and also in exchanging of best practices regionally.
Request Applicant	
Please add as many stakeholders and lines as required.	
Ministry of Minerals, Green Technology and Energy Security (MMGE)	These are key agencies responsible for energy policies They take the lead on the project development as a Project



Ministry of the Environment, Wildlife and Tourism (MEWT)	Proponent. Particularly in developing the national strategies and development of minimum energy performance standards and labelling.
• The Botswana Energy Regulatory Agency (BERA)	This is the main Energy regulators in Botswana and will contribute reviewing draft regulations and specifications that could be used within their existing demand side management programs in order to incentivize the purchase of energy-efficient products. In addition, utilities are the primary owner of distribution transformers.
• Botswana Power Corporation (BPC)	Main entity in the electricity market will help in formulation regulation on energy efficient products

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.

Botswana Nationally Determined Contribution to the United Nations Framework Convention on Climate Change's (UNFCCC's) Paris Agreement aims to adopt a low carbon development. The country intends to achieve an overall emissions reduction of 15% by 2030, taking 2010 as the base year. This will contribute to climate change abatement by implementing mitigation activities where energy sector is among the key target.

The Government of Botswana has implemented several strategies to advance the use of renewable energy in Botswana. In 2010, Botswana introduced a Renewable Energy Feed-In Tariff (REFIT) for biomass, biogas landfill gas-based generation and solar PV and Concentrated Solar Production (CSP) ranging from 5kW to 5MW. The Renewable Energy Based Rural Electrification Programme for Botswana (RE Botswana) is a major programme implemented under an agreement between the Government of Botswana and Global Environment Facility (GEF) managed by United Nations Development Programme (UNDP). In 2009, Botswana's 10th National Development Plan (NDP 10) stated that the strategy for energy conservation and demand management were to "target efficient utilisation of energy in buildings, transport and industry, promotion of energy efficient equipment, and the development of policy and legislation for demand-side management including price as a regulator of demand". By 2013, activities to strengthen regulatory functions were undertaken by developing and revising several policy documents and the development of an Energy Efficiency Programme.

Reference document
20/05/2009

Botswana intends to achieve an overall emissions reduction of 15% by 2030, taking 2010 as the base year. Base year emission estimation is 8307 Gg of CO2 equivalent. The targeted emissions reduction will be achieved domestically through strategies and measures which are relevant for the implementation of the target. Consequently, achieving such targets is a function of resource availability and appropriate legal frameworks. Achieving the 15% greenhouse gases (GHGs) emissions reduction target requires robust and comprehensive planning within the sectors. Consequently, it is essential that there are conducive legal frameworks in place to enable the achievement of the national target. This proposed emission



	reduction path will be subjected to legislative review and endorsement by Parliament.
Nationally Determined Contribution (NDC)	https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Botswana%20First/BOTSWANA.pdf
Technology Needs Assessment	https://slideplayer.com/slide/2375889/
National Adaptation Plans	
Nationally Appropriate Mitigation Actions	
Add others here as relevant	

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 were their roles?) and describe any consultations or other meetings that took place to develop and select this request, etc.

Botswana was among the SADC countries which participated in a workshop organized by CTCN, United 4 Efficiency, and the Southern Africa Power Pool on Country Profiles on Leapfrogging to Energy Efficient Lighting, Appliances and Equipment. The country assessments developed in the framework of CTCN technical assistance were discussed. Botswana and other participating countries reviewed the use, future trends and energy efficiency savings of the five-leading energy consuming products (besides lighting) to engage funding agencies for the development of policy framework. A need was identified to look at the potential for increasing the energy efficiency of products in Botswana by providing a technical market assessment of current conditions and policies. Five specific product categories have been looked at: lighting, air conditioning, refrigerators, motors and transformers. However, from a regional perspective the maximum energy efficiency potential was in transformers and refrigerators in the region besides the lighting sector which is being implemented through different mechanisms.

Background documents and other information relevant for the request:

- Please list all relevant documents that will help the CTCN analyze 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: Mr. Boniface G. Mphetlhe

Date: 22/05/2019

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: Penny M. Lesolle

Date: 15th May 2019

Signature:

² Please see:

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

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.