

Country	Zimbabwe
Request ID#	201500081
Title	<i>Technical Assistance for piloting rapid uptake of industrial energy efficiency and efficient water utilisation in the industrial sector in Zimbabwe</i>
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Summary of the CTCN technical assistance

Zimbabwe is struggling with the adverse effects of climate change on the country's water supply, while at the same time the energy supply often cannot meet the industry's demand creating a strain on the power grid. Previous studies that indicated a high resource efficiency improvement potential in key industries in the country have triggered policy initiatives, however these could not be implemented successfully due to a number of barriers. To mitigate these challenges the Government of Zimbabwe approached the Climate Technology Centre and Network (CTCN) for Technical Assistance. The request to the included support for technical guidance to carry out energy and water efficiency audits in ten selected companies, guidance on the implementation on ISO 50001 Energy Management System, and awareness raising of the importance of resource efficiency for business.

To address these challenges the CTCN developed this response plan that will produce the below outputs within a nine-month implementation period. The overarching aim being to create showcase examples of successful resource efficiency improvements that are replicable by local technical staff to benefit industries nationwide.

- Identification and selection of ten pilot companies for energy and water efficiency audits
- Energy and water efficiency audits in the ten selected pilot companies
- Analysis of renewable energy supply side opportunities for each pilot company and development of recommendations
- Awareness raising of the benefits of resource efficiency from a sustainable business perspective and hands-on training of technical staff to identify and implement resource efficiency process and technology improvement opportunities
- Development and sharing of guiding material and communication of recommendations to key stakeholders

Agreement:

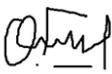
(If possible, please use electronic signatures in Microsoft Word file format)

National Designated Entity to the UNFCCC Technology Mechanism for which the Climate Technology Centre and Network is the operative arm

Name: Elisha N. Moyo

Title: Principal Climate Change Researcher

Date: 23 August, 2017

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1. Background and context

Zimbabwe has requested technical assistance from the CTCN with the ambition to improve energy and water efficiency in the country's industrial sector. The aims are to reduce greenhouse gas emissions, to improve grid stability, to increase resilience against current and future limitations in water supply and to improve economic competitiveness. Compared to international sectoral benchmarks of resource efficiency, Zimbabwe underperforms, which indicates a high improvement potential. It is worth mentioning, however, that various policy instruments have been enacted to address the issue. The reasons for the nonetheless low efficiency are, among others, limited success in implementing the instruments, low investments in technology to upgrade and replace outdated and obsolete equipment, lack of capacities and awareness to carry out improvement measures, and absence of economic incentives to pursue such measures.

As the power generation capacity in Zimbabwe is insufficient to meet the demand from the industry and residential sector, the two largest consumers (see Table 1), frequent grid overload has become a problem with significant implications. The import of electricity from neighbouring countries has eased the situation, but load shedding is used on a routinely basis. Key industrial sectors with high energy or water intensity that have been highlighted in the request to the CTCN are food and beverages, leather tanning and processing and chemicals. While the electricity grid supplies a large share of the energy used by the industry, other energy sources used as direct fuels, fossil fuel in particular, also create costs and greenhouse gas emissions and will therefore be taken into account in the assessments carried out by the CTCN.

Table 1: Energy consumption breakdown by sector for the years 2000 and 2014, as well as the average of the years in between (IEA; 15 February 2017)

Sector	2000	2014	Ave
Industry	15%	7%	10%
Transport	7%	9%	6%
Agriculture	10%	6%	8%
Commercial & Public Services	4%	1%	3%
Residential	63%	74%	71%
Unspecified	1.1%	1.3%	1%
Non-energy uses	0.3%	0.2%	0%

Energy and water consumption should not be considered as separate issues. As much of the water used in industrial processes (e.g. cleaning) has to be heated and/or pumped, high water use directly impacts energy consumption. It is for this reason that the CTCN will approach this intervention with an integrated resource efficiency and cleaner production (RECP) approach.

Apart from outdated equipment, inefficient processes are also a key contributor to high water consumption. Water leakages and limited application of recycling technologies are only two examples. This indicates good potential to capture significant improvements through simple adjustments. Aside from the high water costs of inefficient processing for the respective industrial enterprises, high water consumption comes to the detriment of neighboring communities by exposing them to higher risk of suffering water shortages. Already today this has become an increasingly prevalent problem caused or at least enhanced by the effects of climate change.

The CTCN assistance also firmly supports Zimbabwe in meeting the greenhouse gas reduction targets outlined in its Nationally Determined Contributions (NDC) to the Paris Agreement. Energy efficiency improvements are listed to produce the second highest GHG emission reductions (1.278 MtCO₂eq) by 2030 at the lowest cost (46.9 US\$/tCO₂eq) compared to all other measures listed. At the same time “water stress” is the first issue mentioned in the NDC’s adaptation component and “strengthening management of water resources” is a key target.

2. Problem statement

As mentioned above, in Zimbabwe energy providers and water supply infrastructure struggle to meet the country's increasing demand for energy and water. One reason for the high water and energy consumption from industries is that most plants were designed and built at a time when energy and water efficiency were no points of concern and therefore also lack metering (both at process and plant level) for electricity, steam or water.

Some barriers that have prevented significant development in the past have been mentioned in the background section already, but will be listed here again. The anticipated impact of the CTCN assistance is to have contributed to removing such barriers.

- Lack of investment in new energy and water efficient technologies
- Lack of awareness by key decision makers
- Lack of economic incentives, such as inappropriate tariff structures, and therefore of commitment by top management
- Limited access to climate change mitigation/adaptation technologies
- Limited availability of capacities and skills
- Lack of compliance with energy and water management systems in industry

Most of these barriers are interlinked. To set a baseline to address these challenges the request for CTCN technical assistance included support with conducting energy and water efficiency audits in ten pilot companies, guidance on the implementation of ISO 50001 Energy Management System, and awareness raising of the benefits of such measures for a sustainable business. The logical framework below outlines the intervention developed in response to the request.

3. Logical Framework for the CTCN Technical Assistance

Objective: To improve the capacity to develop and implement a preliminary integrated Water & Energy Efficiency and Demand Side Management and Renewable Energy Supply Side options for 10 demonstration companies and create capacities to replicate such interventions autonomously in companies across the country.												
Outcome: The energy and water consumption, and in direct relationship the greenhouse gas emissions, of 10 demonstration companies have been reduced to an extent that profitability will increase and strengthen the competitiveness of the respective industries and local consultants will have been trained to replicate interventions of this kind.												
	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Output 1: Development of implementation planning and communication documents												
Activity 1: <i>All implementers must undertake the following activities at the beginning and at the end of the CTCN technical assistance.</i> i) A detailed work plan of all activities, deliveries, outputs, deadlines and responsible persons/organisations and detailed budget to implement the Response Plan. The detailed work plan and budget must be based directly on this Response Plan; ii) Based on the work plan, a monitoring and evaluation plan with specific, measurable, achievable, relevant, and time-bound indicators used to monitor and evaluate the timeliness and appropriateness of the implementation. The monitoring and evaluation plan should apply selected indicators from the Closure and Data Collection report template and enable the lead implementer to complete the CTCN Closure and Data collection report at the end of the assignment (please refer to item iv below and section 14 in the Response Plan); iii) A two-page CTCN Impact Description formulated in the beginning of the technical assistance and update/revised once the technical assistance is fully delivered (a template will be provided); iv) A Closure and Data Collection report completed at the end of the technical assistance (a template will be provided).												
<u>Deliverable 1:</u> i) Detailed work plan ii) Monitoring and evaluation plan iii) CTCN Impact Description iv) Closure and Data Collection report												

	management & local expert, 5 days					
Total Output 1					2,250	2,500
Activity 2.1	Lead experts on energy and water management & local expert, 4 days	International travel to Zimbabwe. Local travel, 2 days	Project kick-off meeting, 20 participants, 2 days	Hire venue., Refreshments.	7,200	8,000
Activity 2.2	Lead experts on energy and water management & local expert, 4 days				7,200	8,000
Total Output 2					14,400	16,000
Activity 3.1	Lead experts on water and energy management supported by local expert, 20 days	International experts carry out audits in local companies, international and local travel, 10x 2 days	10 audits, 2-5 training participants each, 2 days each		51,750	57,500
Activity 3.2	Lead experts on energy and water management, 5 days				2,250	2,500
Activity 3.3	Lead experts on water and energy management supported by local expert, 20 days				9,000	10,000
Total Output 3					63,000	70,000
Activity 4.1	Lead expert on renewable energy supported by local expert, 2 days				900	1,000

Activity 4.2	Lead expert on renewable energy supported by local expert, 20 days				9,000	10,000
Total Output 4					9,900	11,000
Activity 5.1	Lead experts on energy & water management and local experts, 10 days		Energy management training, 20-30 participants, 10 days	Venue rental, 10 days	54,000	60,000
Activity 5.2	Lead experts on energy & water management supported by local experts, 10 days				27,000	30,000
Total Output 5					81,000	90,000
Activity 6.1	Lead experts on energy & water management supported by local experts, 30 days				13,500	15,000
Activity 6.2	Lead experts on energy & water management and local experts, 5 days	Travel for sponsored participants, 1 day	Final presentation of results, 50-100 participants, 1 day	Venue rental, 1 day	13,500	15,000
Total Output 6					27,000	30,000
Gender component	1 % of contract value to ensure gender mainstreaming				1,980	2,200
Estimated range of costing for the entire Response Plan					199,530	221,700

5. Profile and experience of experts

For an effective implementation it is imperative that the implementer has on the ground knowledge and expertise and easy access to the business community and therefore collaborates with local stakeholders, such as the BCSDZ.

Experts required	Brief description of required profile
Lead expert on industrial energy efficiency and (renewable) energy management	The lead expert on energy management for industries (and renewable energy) is a qualified engineer, or equivalent, with a minimum of 15 years of experience in energy auditing and management as well as renewable energy project planning. Demonstrated knowledge and experiences in relevant industries (e.g. food and beverages, leather tanning and processing and chemicals industries), especially in the region is desired. Understanding and experience with the application of renewable energy in an integrated manner with demand-side management will be an added advantage. Experience with hands-on training and sound didactic skills are considered an asset. Proficiency in English is a prerequisite.
Lead expert on water management	The lead expert on water management is a qualified engineer or equivalent with a minimum of 15 years of experience in water auditing and management in industrial process. Demonstrated knowledge and experiences in relevant industries (e.g. food and beverages, leather tanning and processing and chemicals industries), especially in the region is desired. Experience with hands-on training and sound didactic skills are considered an asset. Proficiency in English is a prerequisite.
Local expert	The local expert is a qualified engineer or equivalent from the country or region, with a minimum of 5 years of experience with industrial process design and management, energy, water and resource efficiency management or auditing in the country. Demonstrated knowledge and experiences in relevant industries (e.g. food and beverages, leather tanning and processing and chemicals industries) is desired. Proficiency in English is a prerequisite. Proficiency in relevant local languages considered an asset.

6. Intended contribution to impact over time

An estimated impact will be quantified during the course of the project, but a specific and reliable quantification can only be determined after the implementation of identified options to increase energy and water efficiency through an integrated approach that includes ongoing monitoring and evaluation. Advice on the implementation of monitoring equipment and processes to facilitate the latter will be considered as a recommendation, if viable.

Contributing to the removal of the barriers described in Section 2 will furthermore be a key aspect contributing to a meaningful impact in the long term.

Furthermore the recommendations produced by this technical assistance can readily be applied in other companies and SME's.

7. Relevance to NDCs and other national priorities

Although Zimbabwe’s contribution to GHG emissions is rather insignificant in international comparison, the country has suffered the brunt of climate change in recent years especially through the increased frequency of droughts, floods and epidemics. The country’s NDC adaptation component expresses this by highlighting “water stress” and the need for “strengthening management of water resources”. The implementation of the recommendations provided by this technical assistance, especially upon widespread replication across water intensive industries, has strong potential to reduce water consumption and thereby vulnerability to water shortages.

On the mitigation side energy efficiency improvements are listed to produce the second highest GHG emission reductions (1.278 MtCO₂eq) by 2030 at the lowest cost (46.9 US\$/tCO₂eq) compared to all other mentioned mitigation measures.

8. Linkages to relevant parallel on-going activities:

This CTCN response plan will be aligned to and contribute to the following ongoing Zimbabwean national policies and strategies.

- Zimbabwe’s National Climate Change Response Strategy, published by the Zimbabwean Ministry of Environment, Water and Climate.(no date given)
- Industrial Development Policy 2-12-2016, published by the Zimbabwean Ministry of Industry and Commerce. (no date given)
- Zimbabwe National Energy Policy (NEP) produced by the Ministry of Energy and Power Development (no date given)

The National Climate Change Response Strategy was among the processes that sought to establish specific provisions for dealing with climate change issues, understanding the extent of the threat and putting in place specific actions to manage potential impacts. For the industrial sector the National Climate Change Response Plan has outlined the following strategies:

- a) Introduce policies that promote the use and adoption of clean and efficient energy in industry.
- b) Create a policy and regulatory framework that promotes resource use efficiency and cleaner production in industry
- c) Create an enabling policy and legal framework that encourages the setting up and operation of climate resilient industries.

The Industrial Development Policy has prioritized the following sectors and highlights the adequate provision of energy and water as necessary conditions to expand Zimbabwe’s industrial sector.

- a) Agri-business
- b) Clothing & textiles
- c) Leather & footwear

The purpose of the National Energy Policy (NEP) is to provide objectives and strategies to address key challenges regarding use and distribution of the various energy sources in Zimbabwe. Specific targets intend to empower stakeholders to take action to improve the difficult energy situation in the country, both on the demand and supply side. For this CTCN assistance particularly sections 7 (Supply-Side Policy Measures) and specifically 7.5 (Renewable Energy Sub-Sector), and 8.4.2 (Mining and Industry) describe the policy framework in which the specific recommendations from the CTCN will be developed.

9. Anticipated follow up activities after this technical assistance is completed:

After the CTCN technical assistance is completed the industry and government stakeholders can use the outputs for scaling up the interventions into other companies and SME’s that have similar needs as those which were identified during the initial stages of implementing this technical assistance. Industrial and government stakeholders must continue to follow up on the sustainability

of the outcomes through monitoring and tracking of the performance of follow up interventions. Consideration must be given to tracking of parameters such as electricity consumption per capita, energy sector GHGs per capita, and contribution of renewable energy in the energy mix on an annual basis.

10. Gender and co-benefits:

Imbedded in design of the activities:	During the planning and execution of all activities, in particular training components, it will be ensured that women will be included in agreement with gender mainstreaming standards.
Gender and co-benefits intended as result of the activities:	As women are significantly impacted by the effects of water and energy shortages it is intended that they benefit from efficiency improvement measures in the long term. The direct and equal involvement of women in any awareness raising and capacity building activities is furthermore expected to create opportunities of quality employment.

11. Main in-country stakeholders in implementation of the technical assistance activities:

In country stakeholder	Role in implementation of the technical assistance
Government of Zimbabwe Ministry of Environment Water and Climate (NDE)	Liaison with CTCN Guidance on national priorities on environment, water and climate
Government of Zimbabwe Ministry of Energy and Power Development	Guidance on national policy priorities in the energy sector, technical input on energy efficiency and renewable energy
Business Council for Sustainable Development Zimbabwe (BCSDZ) Private Sector	Requesting organization Liaison with NDE and CTCN Helping to coordinate the organization of capacity building events Assisting in identification of potential industries and demonstration projects Progress updates to NDE, Lead Implementer and CTCN on the project. Identifying the technical needs of the private sector
UNIDO Office in Zimbabwe	Technical guidance on Resource Efficient and Cleaner Production (RECP) options
Scientific and Industrial Research and Development Organisation (SIRDC)	Technical input on proposed RECP measures at company level
Zimbabwe Energy Regulatory Authority (ZERA)	Input on the priority energy efficiency measures and renewable energy for productive use. Policy framework for promoting private sector harnessing of renewable energy for productive use

Standards Association of Zimbabwe (SAZ)	Technical input into the ISO 50001 Energy Management Systems and potential assessment of companies embarking on energy management systems.
Zimbabwe Electricity Transmission and Distribution Company (ZETDC)	Input on energy conservation measures
Local energy management and water experts	Supporting the project activities with require technical assistance in areas of energy and water management

12. SDG Contributions:

Goal	Sustainable Development Goal	Direct contribution from CTCN TA (1 sentence for top 1-3SDGs)
1	End poverty in all its forms everywhere	
2	End hunger, achieve food security and improved nutrition, and promote sustainable agriculture	
3	Ensure healthy lives and promote well-being for all at all ages	
4	Ensure inclusive and equitable quality education and promote life-long learning opportunities for all	
5	Achieve gender equality and empower all women and girls	
6	Ensure availability and sustainable management of water and sanitation for all	Substantially increase water use efficiency among the 10 demonstration companies, and contribute to the spreading of good practices of water management among industries in Zimbabwe.
7	Ensure access to affordable, reliable, sustainable, and modern energy for all(consider adding targets for 7)	*
	7.1 - By 2030, ensure universal access to affordable, reliable and modern energy services	
	7.2 - By 2030, increase substantially the share of renewable energy in the global energy mix	Substantially increase the use of renewable energy by Zimbabwe's industrial & commercial sectors
	7.3 - By 2030, double the global rate of improvement in energy efficiency	Substantially improve the energy efficiency levels of the 10 demonstration industrial enterprises.
	7.a - By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology	
	7.b - By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support	
8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	
9	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	Pathway to upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes.
10	Reduce inequality within and among countries	
11	Make cities and human settlements inclusive, safe, resilient and sustainable	
12	Ensure sustainable consumption and production patterns	
13	Take urgent action to combat climate change and its impacts	
	13.1 - Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries	More efficient use of water resources, hence better adaptation capacity of the country to water shortage due to climate change; more use of renewable energy and hence great resilience to changes in grid power supply disruptions due to climate-related hazards and natural disasters.
	13.2 - Integrate climate change measures into national policies, strategies and planning	

	13.3 - Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	x Improving the technical capacity of the selected industrial enterprises in climate change mitigation and adaptation through more efficient use of water and energy, and more effective use of renewable energy
	13.a - Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly \$100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible	
	13.b - Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities	
14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development	
15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	
16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	
17	Strengthen the means of implementation and revitalize the global partnership for sustainable development	

13. Classification of technical assistance:

<i>Please tick off the relevant boxes below</i>	<i>Primary</i>	<i>Secondary</i>
<input type="checkbox"/> 1. Technology identification and prioritization	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 2. Research and development of new climate technologies	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 3A. Feasibility studies for specific known climate technology options	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 3B. Piloting of known technologies in local conditions	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> 4A. Law, policy and regulatory reform recommendations	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 4B. Sector specific roadmap or strategy design	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 5. Finance facilitation and market creation	<input type="checkbox"/>	<input type="checkbox"/>

Please note that all CTCN technical assistance contributes to strengthening the capacity of in country actors.

14. Monitoring and Evaluation process

Upon contracting of the implementing partners to implement this Response Plan, the lead implementer will produce a monitoring and evaluation plan for the technical assistance. The monitoring and evaluation plan must include specific, measurable, achievable, relevant, and time-bound indicators that will be used to monitor and evaluate the timeliness and appropriateness of the implementation. The CTCN Technology Manager responsible for the technical assistance will monitor the timeliness and appropriateness of the Response Plan implementation. Upon completion of all activities and outputs, evaluation forms will be completed by the (i) NDE about overall satisfaction level with the technical assistance service provided; (ii) the Lead Implementer about the knowledge and learning gained through delivery of technical assistance; and (iii) the CTCN Director about timeliness and appropriateness of the delivery of the activities and outputs.

Please note that industrial activity and capacity utilisation have been decreasing since 1999. Energy (liquid petroleum and electricity) and water shortages, shortage of inputs, and use of old and obsolete equipment are some of the causes of low capacity utilisation