



Micro Hydroelectricity for Zege Village Electrification

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Mitigation Workshop

Maputo

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What is the Project Idea

- Zege village is 50 km from Lushoto Township.
- Total population is 3118 and 607 households.
- 100% of the villagers use kerosene for lighting
- Kerosene is obtained from the nearby town, about 15km away
- The income of the people is mainly from agriculture.
- The area has adequate water for irrigation.



Emission Estimation



- Project belongs to Project type 1, Renewable energy Project under category IA , Electricity generation by the user
- Emission calculated as:

The annual electrical energy consumed by households multiplied by 4 to account for the emissions from a diesel system supporting incandescent bulbs and then multiplied by emission factor of diesel generator.



Emission Reduction cont.

Baseline scenario

$$\begin{aligned}\text{CO}_2\text{t/yr} &= \text{Annual output} \times \text{emission factor of diesel generator} \\ &= 70\text{kW} \times 50\% \times 24 \times 365 \times 4 \\ &= 1226400 \times 0.9 \text{ kg CO}_2\text{/year} \\ &= \underline{1103 \text{ tonnes CO}_2\text{/year}}\end{aligned}$$

GHG emission from the project activity

- Calculated as fuel for transportation x total distance covered x fuel emission factor
- Found insignificant

Emission reduction due to the project

- Same as the baseline



What problem does the project respond to?

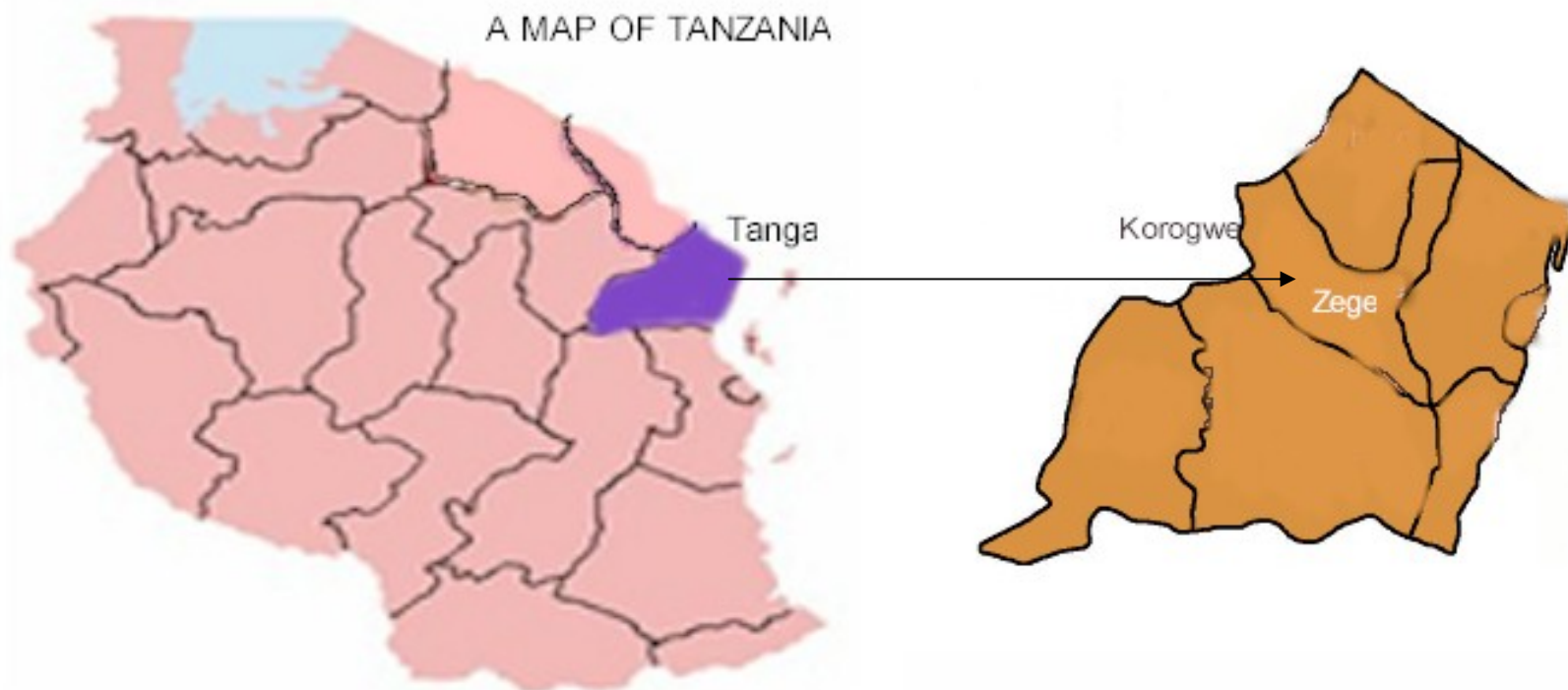


- Reduce greenhouse gases emission
- Reduce country dependence on imported kerosene
- Improve livelihood and poverty alleviation among people
- Lack electricity services in the rural areas



Map of the Project Siting

- Location





Project Overview

How?

- By replacing use of kerosene in a wicked lamps with electricity in:-
 - 607 households
 - 9 Institutions
 - 2 Small enterprises (milling machine and sawmills)



Wicked Lamp



Project Details

- Project implementer- TaTEDO
- Project beneficiaries:
 - ✓ Zege villagers,
 - ✓ Institution like schools and dispensaries,
 - ✓ TaTEDO,
 - ✓ TaNESCO
 - ✓ Tanzania Government



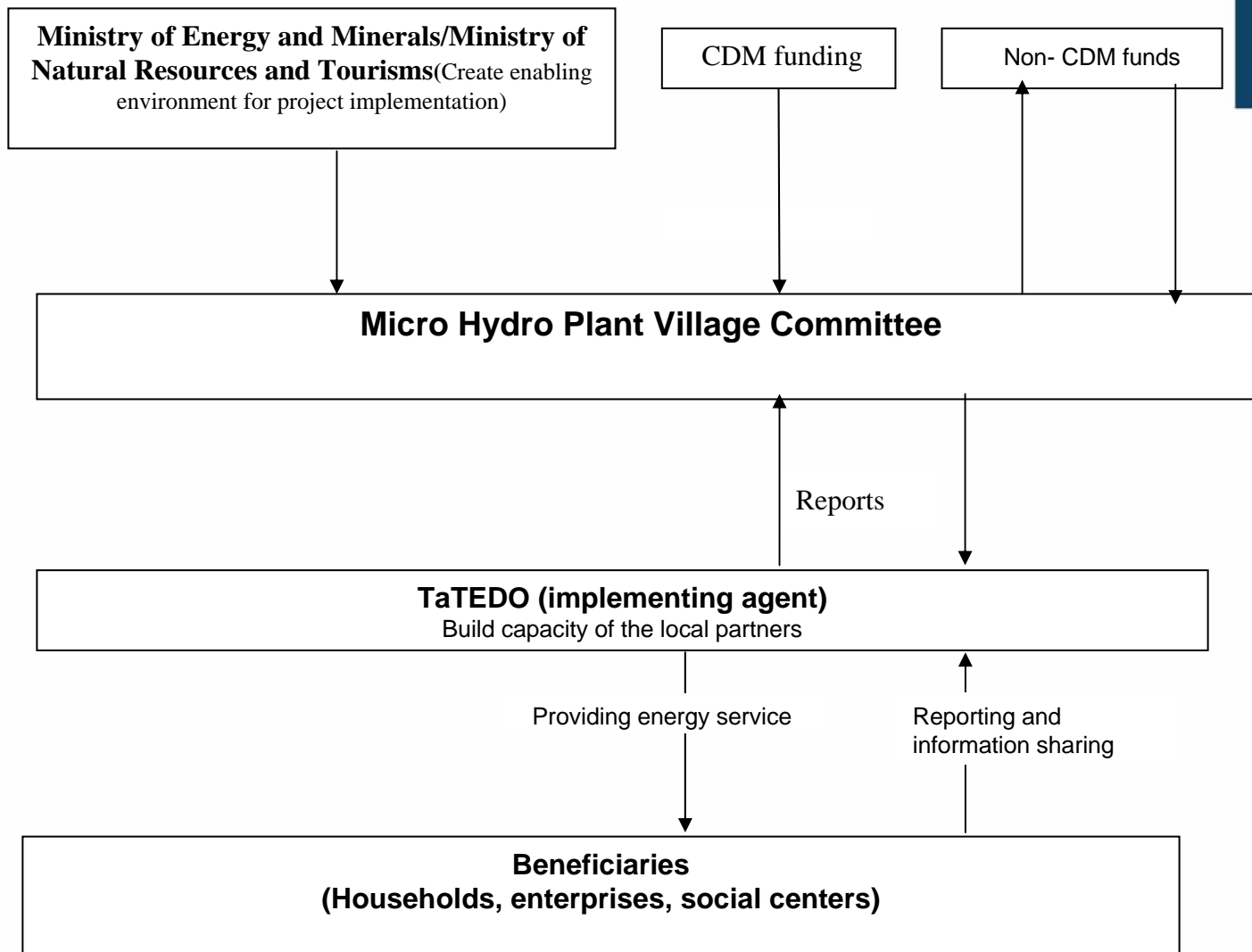
What do They Get?



- Villagers and Institutions-Access to electricity
- TaTEDO- Build capacity in the Technology and CDM aspects
- TaNESCO- To meet goal of rural electrification
- Government- Achieve goal of alleviating poverty and shortage of power among rural population



Institutional Flow Diagram





What Are the Project Activities



- Conduct feasibility study
- Preparation of village level planning
- Organising management and operation structures
- Capacity building to villagers on how maintain and management of the catchment forests.
- Plant construction, transmission and distribution.



Project Financial



- Project's capital cost - **USD 331,100**
- Project run cost - USD 5315/y
- Project income – USD 109,756/yr
- Project cost by selling emissions reductions - USD 16,545/yr



Sustainable Development Benefits



Sustainable Development Indicators	Rate -2 to +2	Give explanation
Local Environment and sustainability		
A.1. Water quality and quantity	-1	Cause water turbidity
A.2. Air quality	2	Reduced indoor air pollution
A.3. Other pollutants	0	
A.4. Soil Condition	1	Disturbance due to construction of the
A.5. Contribution to biodiversity	0	Clearing of vegetations
A Total (A.1 + A.2 + A.3 + A.4 + A.5) / 5	0.4	



Social SD Benefits



Sustainable Development Indicators	Rate -2 to +2	Give explanation
B .1 . Quality of generated jobs		Temporary job during plant, construction. - Kerosene sellers
B .2 . Livelihoods of the poor *	$(1 + 0) / 2$ 0.5	
B .2 .1 . Income distribution	1	- Loose of income to the kerosene sellers, + Productive uses of electricity, + Savings from kerosene
B .2 .2 . Access to essential services (Housing, water, sewage treatment, health, education, welfare, etc)	0	None
B .3 . Access to clean energy sources	2	Provision of electricity
B .4 . Human and Institutional capacity	$(1 + 2) / 2$ 1.5	
B .4 .1 . Empowerment	1	Temporary job during plant construction, enterprises
B .4 .2 . Gender equality	2	Reduced workload to women (working distance)
B Total (B .1 + B .2 + B .3 + B .4)4	1.25	



Economic SD Benefits



Sustainable Development Indicators	Rate -2 to +2	Give explanation
C.1. Number of jobs created	1	+ Small scale enterprises, + casual labours- Wicked lamp sellers
C.2. Sustainability of the balance of payment	0	+ Reduced kerosene importation, - Importation of equipments
C.3. Replicability and contribution to technological self-reliance	2	Extend project boundary to include other projects under IA and IIC project type categories
C Total (C.1 + C.2 + C.3)/3	1	
Total (A + B + C) 3	1	



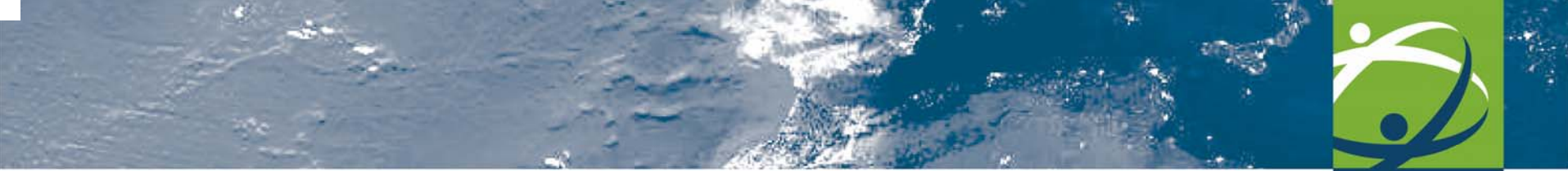
Barriers and how to overcome them



- Investment in the project –Hydropower projects requires large investment. Funding of the project will alleviate it.
- Technical -Use of water for irrigation especially in the dry seasons
 - Awareness on the opportunities and benefits of the project will be created.
 - Agree on water usage schedules

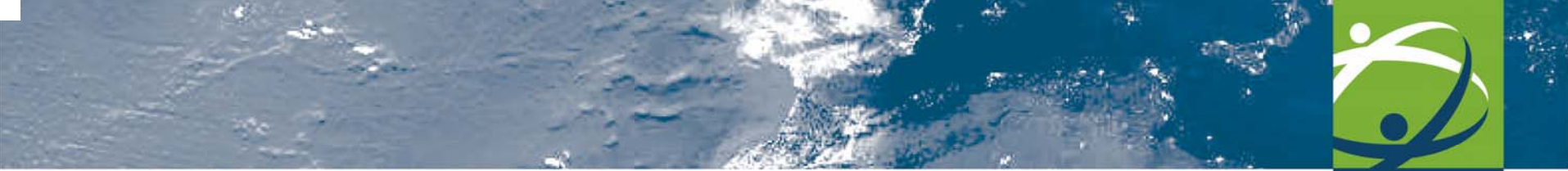


Factors	Explanation	Level of certainty on the factor	Relation to the aspects of the feasibility
STRENGTHS			
Previous experience	TaTEDO has long experience on energy projects and has good experience working with local communities.	High	Institutional
Existing partnership	Members of the Micro hydro plant committee will include TaTEDO, village government and District representatives	High	Institutional
Good client base	Up to about 60 percent of the villagers show willingness to pay service charges of up to 5 USD per month, 75 percent can pay 3 USD for lighting	High	Financial
		High	Technical
Transparency through members meeting	The annual general meeting will form a platform for discussion.	Medium	Institutional



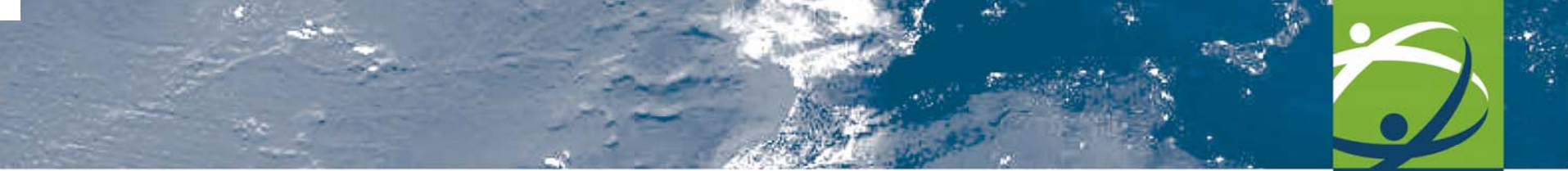
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WEAKNESS			
Limited capital	No links with financial institutions	High	Financial
Limited technical capacity	Limited educated manpower at the village level.	High	Technical
Access to water	Competition for water usage for irrigation and electricity generation	High	Institutional



HLNOS
HLNOS
NORTH

OPPORTUNITIES			
Income generating activities	There is possibility of using generated electricity for income generating activities like food processing industries, carpentry activity etc	High	Financial
Possibility of expanding the market	Neighboring village have no electricity extract power can be extended to this villages	High	Technical
Favorable National energy policy	The existing energy policy favors development of decentralized energy sources.	High	Institutional



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THREATS			
Clients have limited purchasing power	The income level of the people is relatively below 1 USD per day.	High	Financial
Client economy is vulnerable	Most of villagers depend on agriculture, which almost entirely depends on rainfall.	High	Financial
Water availability	There is no control on the water flow due to unpredictable whether	High	Technical