

**SMALL GRANTS FACILITY PROPOSAL FOR FINAL CONSIDERATION**
**Project Fact Sheet**

<b>C101 - TANZANIA - KIKULETWA POWER STATION AND HYDROPOWER TRAINING CENTRE</b>	
<b>Partner Agency</b>	Norwegian Ministry of Foreign Affairs (MFA)
<b>Executing Agency</b>	Norwegian Ministry of Foreign Affairs (MFA)
<b>Sector</b>	CRS Code: 23110 (Energy policy and administrative management)
<b>Region or Country</b>	Tanzania
<b>Budget<sup>1</sup></b>	<b>EUR 11.4 million</b>
- NDF	EUR 0.5 million
- Partner Agency	NOK 29.0 million
- Implementing Agency	(~ EUR 3.3 million)
-Private Investor	EUR 0.5 million
- Other Funder <sup>2</sup>	EUR 6.5 million
	EUR 0.6 million
<b>Project Period</b>	2014 - 2019
<b>Mode of Finance</b>	Joint co-finance grant
<b>Previous Support to Country</b>	Credits: EUR 23.5 million; SDR 6.7 million Grants: EUR 9.0 million
<b>Rio Markers</b>	Mitigation: 2 = principal objective Adaptation: 1 = significant objective
<b>Gender Marker</b>	1=significant objective
<b>Climate Screening Satisfied</b>	Yes
<b>Processing Schedule</b>	Final - Apr 2017 Signature - May 2017 Effective - May 2017

<sup>1</sup> The following exchange rates of 10.2.2017 have been used: 1 EUR=8.9055 NOK=1.0629 USD

<sup>2</sup> Financing has been requested from Power Africa. To be confirmed.

## **PROJECT SUMMARY**

NDF grant EUR 0.5 million

Project Period: 2014 –2019

Partner Agency: Norway

Implementing Agency: Arusha Technical College (ATC)

### **Objective**

The overall goal of the project is to develop reliable, economically accessible and appropriately priced energy supply to facilitate the development of other activities in the economy while ensuring environmental sustainability.

### **The following outcomes are expected**

- **ATC is established as a regionally renowned hydropower training centre**  
ATC is planning to transform and develop Kikuletwa hydropower station into a regionally renowned hydropower training and research centre and as a Centre of Excellence with a focus on mini and small hydropower stations. Training will be provided. The centre shall also carry out research to address problems associated with hydropower generation and the research will include design, fabrication, testing and installation of micro hydropower plants and turbines manufactured by ATC and the local community.
- **The hydropower potential at Kikuletwa is developed in a sustainable way**  
ATC is planning to rehabilitate Kikuletwa 1 as a 1.65 MW small hydropower plant delivering an estimated 8.8 GWh/year of much needed renewable electricity to the national grid. It is foreseen that the investment can be financed through a public private partnership with a regionally experienced investor.
- **Income opportunities are created in the project area.**  
The project aims at supporting technical and vocational education and training, which is regarded as an important tool for the socio-economic development of the country. It enhances skill development which is expected to reduce unemployment and alleviate poverty.

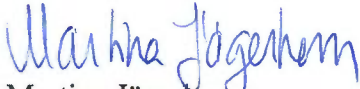
### **Financing**

The total project cost estimate is EUR 11.4 million. NDF is proposed to provide EUR 0.5 million in grant while Norway provides NOK 29.0 million (~EUR 3.3 million), a private investor an estimated EUR 6.5 million, the Government of Tanzania approximately EUR 0.5 million), and other donors approximately EUR 0.6 million

***Recommendation for Management resolution:***

***Management approved grant financing of up to EUR 0.5 million to the project C101 TANZANIA – KIKULETWA POWER STATION AND HYDROPOWER TRAINING CENTRE.***

Helsinki, 7 April 2017



Martina Jägerhorn  
Country Program Manager

***Approval of grant financing of up to EUR 0.5 million to the project C101 TANZANIA – KIKULETWA POWER STATION AND HYDROPOWER TRAINING CENTRE.***

Helsinki, 7 April 2017



Pasi Hellman  
Managing Director

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## ABBREVIATIONS

ATC	Arusha Technical College
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
HPP	Hydropower Plant
ICH	International Centre for Hydropower
INDC	Intended Nationally Determined Contributions
IRR	Internal Rate of Return
MFA	Ministry of Foreign Affairs of Norway
NACTE	National Council for Technical Education
NTNU	Norwegian University of Science and Technology
NVE	Norwegian Water Resources and Energy Directorate
PPP	Public Private Partnership
TANESCO	Tanzania Electric Supply Company Ltd
VETA	Vocational Education and Training Authority

MAP of project area





## 1. INTRODUCTION AND PROJECT BACKGROUND

Kikuletwa river is situated in the Kilimanjaro region between Arusha and Moshi in Northern Tanzania. Kikuletwa Hydropower Plant (HPP) dates back to 1935, with an extension in the 50s. Kikuletwa Power Station was operated by TANESCO, and generated power of approximately 1.3 MW, which was fed into the national grid. It has been out of operation since 1989, and in 2012/2013 changed ownership from TANESCO to Arusha Technical College (ATC).

ATC is planning to rehabilitate the power plant “Kikuletwa 1” as a 1.65 MW small HPP delivering an estimated 8.8 GWh/year of much needed renewable electricity to the national grid. ATC did not have the resources required to take the plans forward on its own.

Norway has supported ATC since 2014. Included in this support is a study on operation and maintenance and electro-mechanical history of the old Kikuletwa 1 Hydropower plant. The study concluded that repair of existing turbines is not feasible, but the existing buildings can be used for training purposes. Moreover, based on feasibility studies and business plans the construction of a new HPP has been found to be technically, environmentally and financially feasible. Therefore it recommended that a new HPP shall be constructed.

The grant agreement between Norway and Tanzania covers technical cooperation for the development of Kikuletwa power station as a hydropower training centre and for electricity generation. The government of Tanzania is also contributing to the project. In addition, it is foreseen that a new plant will be constructed through a public private partnership (PPP) between ATC and a regionally experienced private investor.

As very few renewable partnerships between public institutions and private industrial investors have been realized in Tanzania, this project will surely prove to be a showcase for the country, the investors, and development partners involved.

The Norwegian Water Resources and Energy Directorate (NVE), Norwegian University of Science and Technology (NTNU), and International Centre for Hydropower (ICH) of Norway are also involved in the project as technical cooperation partners of the hydropower training centre.

Apart from the funds required for construction of new Kikuletwa 1 HPP, more funding is required for the project for the purpose of capacity building, establishment of hydropower engineering laboratory, construction of residential houses, and access road to Kikuletwa 1 HPP and the training centre. The Norwegian Embassy in Tanzania has requested NDF to join the partnership linking several Nordic actors also from the private sector in this project that ultimately hopes to leverage private sector funding and support local capacity in the region to develop, implement and maintain hydropower projects in the region. In addition, funds have been sought and are needed also from Power Africa<sup>3</sup>.

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<sup>3</sup> Power Africa aims at increasing electricity access in sub-Saharan Africa by adding cleaner energy and efficient electricity generation capacity. Power Africa partners include US Government agencies, World Bank group, the African Development Bank, the Government of Sweden, the Government of Norway, the UK Department for International Development, the International Renewable Energy Agency, African Governments, and private sector partners.

## 2. RELEVANCE AND RATIONALE

### 2.1. Project Relevance

At the present, approximately 24 percent of households in Tanzania have electricity. Therefore more efforts are required to ensure that many people have access to electricity. The need for electricity is particularly huge in the project area in northern Tanzania.

Furthermore, at present only 12 percent of the hydro potential of about 4.7GW has been developed in Tanzania; therefore more efforts are needed to improve hydro generation capacity.<sup>4</sup> A total of 85 small-hydro sites have been identified in the country where installation of either small, micro or Pico turbines<sup>5</sup> can be installed with a total capacity of 187 MW<sup>6</sup>. This could respond to the market potential of 6 to 7 million unconnected households in large remote areas with low population.

Simultaneously, intermittent river flows resulting from droughts have decreased hydropower's reliability as a power source. Also in other countries in the region, e.g. Malawi and Zambia, most of the power comes from water, when it flows.

One of the key barriers to development of micro and small hydropower plants in Tanzania and in most African countries is lack of local capacity in terms of skills, knowhow, and self-initiatives.

In response to the demand of energy with specific emphasis on electricity in rural areas tied with the huge micro HPP potential, ATC took the challenge by engaging its resources in research relating to the development of micro HPP. The engagement of ATC in micro HPP research goes in line with the energy policy of the country.

Technical and vocational educational and training is regarded as an important tool in the socio-economic development of the country as it contributes greatly in the government's efforts to alleviate poverty. It provides solutions to the problems of unemployment and inadequate skills needed by the labour market so as to make the country address competently challenges of market globalization and technological advancement.

### 2.2. Relevance to NDF's Mandate and Strategy

The project will help Tanzania with **mitigation** of climate change, and it meets NDF's screening criteria. The greenhouse gas emissions relating to the planned hydropower plant have been estimated to be 4,655 tons of CO<sub>2</sub>e per year over the expected economic lifetime of the project of 30 years. The use of water resources is often also vulnerable to climate change; it is therefore relevant for this and future hydropower projects to take into consideration and **adapt** to climate change. The project satisfies **standard economic and social tests**.

Further, the project is in line with of the following NDF strategic focal areas.

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<sup>4</sup> The National Energy Policy, 2015

<sup>5</sup> Pico: up to 5 kW, micro: 5kw - 100 kW, small: generally up to 10MW (but in China,USA, Canada: up to 50 MW)

<sup>6</sup> Renewable Energy in Africa: Tanzania Country Profile 2015 (African Development Bank 2015) assesses the potential of small hydropower resources (up to 10 MW) to be even bigger: 480 MW.

NDF's overall support to the project will contribute to **private sector** development as the project will showcase business opportunities in the renewable energy sector through the expected successful results of a concrete investment project in the area of hydro energy. Moreover, the project will demonstrate that collaboration between the public and the private sector provides direct benefits for all parties concerned.

The project will enhance **project preparatory funding** since it will strengthen the capacity and skills in Tanzania and in the region to plan, prepare and design hydropower plants.

The intervention seeks to **leverage** bigger investments as it seeks to inspire, encourage and pave the way for other investors to follow the project's example. An example of a potential bigger investment for an investor to look into is the whole cascade of the Kikuletwa river, with an energy potential of about 20 MW.

NDF's support to the Centre of Excellence will carry out not only training but also research and testing that may boost local **innovations** which is planned to be shared with other research and training institutes and universities in the region.

Education and climate change can be seen as an **emerging climate change issue** for which the co-benefits have not yet been fully recognised. Supporting training and education contributes to the upstream support building local capacity to prepare future clean energy investments.

**Vulnerable groups** are expected to benefit from the project as the training institute aims at enhancing skills needed to tap the huge domestic renewable energy resources that currently are underutilised. This can potentially supply clean electricity to energy deprived poor women, children and men also in remote rural areas. Improved access to clean hydropower energy will reduce the workload of women, improve women's and children's health, provide better economic opportunities for women, and enhance living standards. Moreover, the training centre at Kikuletwa is situated far away from urban areas and is expected to provide job opportunities for the local communities in the area.

The project will contribute to several NDF's **institutional level indicators**, in particular to the following: low income country, Sub-Saharan Africa, linkage to private sector (impact assessed to be high), leverage (high), project preparation (high), innovativeness (high) gender, and CO<sub>2</sub> reduction.

### 3. THE PROPOSED PROJECT

#### 3.1. Objective

The overall goal of the project is to develop reliable, economically accessible and appropriately priced energy supply to facilitate the development of other activities in the economy while ensuring environmental sustainability.

#### 3.2. Project Outputs

The following outcomes are expected:

- (i) ATC is established as a regionally renowned hydropower training centre;



- (ii) The hydropower potential at Kikuletwa is developed sustainably; and
- (iii) Income opportunities are created in the project area.

### **3.3. NDF Components**

NDF is proposed to support the entire project described in this document. NDF's funding is proposed to come in at a critical stage of the project in support of the training and capacity building at the centre, which otherwise risks receiving too little support both in terms of volume and depth.

To achieve the outcomes the following activities will be undertaken:

#### **A Planning, design, capacity building**

- A1 Feasibility Studies and Business Plan
- A2 Hydropower Training Centre at Kikuletwa

#### **B Tendering, preparatory work for reconstruction, implementation**

- B1 Kikuletwa 1 Reconstruction Preparations
- B2 Kikuletwa HPP Implementation

#### **C Administration, cooperation and backstopping**

Most of the activities relating to subcomponent A1 (Feasibility Studies and Business Plan) have been successfully completed. Some of the activities of the subcomponent A2 has been completed but more support is needed to make it a Centre of Excellence. NDF's support is expected in particular to strengthen this subcomponent and to enhance the sustainability of those activities that have already taken place. Component B has gone through a selection process and contract negotiations have recently been completed. For this component, more support is needed from NDF and other financiers.

The project activities are described in more detail below.

#### **A1 Feasibility Studies and Business Plan**

The electro-mechanical study on operation and maintenance history of Kikuletwa hydropower plant showed that reviving the old Kikuletwa 1 HPP for electricity generation was not economically feasible. The existing plant infrastructure is instead proposed to be rehabilitated for training purposes.

Hydrological studies have also been completed and confirm that the flow of the river is sufficient for hydropower production, and also concluded that during electricity generation the overall run-off of the river will not experience significant decrease in water flow. Feasibility studies have shown that there is a good potential for power generation for a new power house with total projected hydropower potential of 2MW. The planned installed capacity after rehabilitation of Kikuletwa 1 will be 1.65MW.

All studies concluded that the project is technically, economically and environmentally feasible. The cost estimates for the new power station is about USD 6.9 million and the time needed to complete the construction work is two years.