



## RWANDA PICO HYDRO SECTOR DEVELOPMENT (DPHER)

### Project Brief

#### Project overview

According to the Rwanda Energy Policy and the 'Energy Sector Strategic Plan' (ESSP, 2015), the country has set targets of increasing generation capacity to 563 MW by 2017/18, from the current 185 MW. With this capacity, the secondary target is to have electricity access rates improved to 70% national access rate – 48% of which is to be accounted for by on-grid connections, while the remaining 22% is to be from off-grid connections. The strategy also targets to have 100% electricity access for government institutions such as schools, health centres and administrative offices.

On the other side, the 'rural electrification strategy' (June 2016) prioritises the development of mini-grids and emphasizes that mini-grids will be developed by the private sector with Government playing a key role in identifying sites and establishing a framework through which these become financially viable investments.

In addition, the rural electrification strategy defines a clear operational framework, stating that, in order to reduce costs and de-risk investment for prospective mini-grid developers, the Government will first identify eligible sites and undertake a financial and technical feasibility study. Where the provision of access through a mini-grid represents the least cost option, the Government will undertake measures to stimulate demand, through either policy or investment. These sites will then be tendered out to private developers.



*Figure 1: Site works at Mutuntu pico-hydro site*

With respect to the above perspective and with an imperative to develop local capacities, the Netherlands Development Agency (SNV) is implementing a project on Development of Pico-Hydro Sector in Rwanda (DPHER) funded by AWAC (Agence Wallonne de l'Air et du Climat), which aims to contribute to the development of the pico-hydropower sector in Rwanda through strengthening the capacity of local entrepreneurs who run or install small hydroelectric plants with a capacity of less than 50 kW.

A steering committee for the project was set up formed by APEFE (Association pour la Promotion de l'Education et de la Formation a l'Etranger), EDCL (Energy Development Corporation Limited), BTC (Cooperation Technique Belge), WDA Kigali (Workforce Development Authority), GIZ (Gesellschaft für Internationale Zusammenarbeit), GVEP International (Global Village Initiative Partnership) now Energy4Impact, and JLA Hydro, a Belgian based engineering company.



*Figure 2: Practical session*

### **Main objective:**

Improve the living conditions of the rural population by increasing access to renewable energy through the development of pico-hydro electricity generation projects.

### **Specific objectives:**

- Develop in-depth trainings of local micro and small entrepreneur in the pico-hydropower sector (site identification, pico-hydro project design, turbine manufacture and plants operations and maintenance).
- Strengthen and create sustainable jobs in the Pico-hydropower sector.
- Support in setting up a local turbine manufacturing industry in Rwanda.
- Increase access to sustainable electricity for rural populations through the development of pico-hydropower connected to mini-grids projects with a possibility of linking to the grid when needed.

### **Implementation strategy:**

The project provides hands-on trainings to local technicians in turbine manufacturing and in better design, installation and maintenance of pico-hydropower plants. Thus, direct beneficiaries of this project are local micro and small entrepreneurs who will be trained, mentored and supported so they have the required skills to become active private actors in the development of pico-hydro projects. The trainings will enable them to acquire the essential knowledge and skills to better develop, install, operate and maintain pico-hydroelectric installations.

The project focuses on private contractors already identified as having developed a Pico-hydropower project, however, other candidates are also can included as the project expands.

To make the trainings practical, hands-on work is carried out at real sites which beside the skills development aspect of the project also increases access to electricity to beneficiary communities.

### Expected Outcomes:

1. Local technicians (entrepreneurs) in the pico-hydro sector (turbine manufacturing) are grouped into a representative association/nucleus under the Private Sector Federation and a recognized cluster under the Energy Private Developer Association which is an umbrella of all private sector actors in Rwanda.
2. Local technicians are able to identify suitable pico-hydroelectric sites and precisely determine their technical potential, manufacturing of cross-flow and pelton turbines, safety rules about production equipment and master the concepts of protection against lightning.
3. Local technicians are able to develop bankable projects that can access funding such as the GIZ results-based scheme for hydropower.
4. A partnership was established between APEFE and Workforce Development Authority in development of a curriculum and certification. The project will work with both partners to develop the curriculum in pico-hydroelectricity trainings.
5. A pilot pico-hydroelectric project implemented in a selected area (the Mutuntu site in Karongi District) where the population had no access to electricity.
6. Karongi District is able to achieve its performance targets in terms of access to electricity.



Figure 3: Classroom session

## I. Project duration and funding:

### Duration

From January 2014 to June 2017

### Total budget:

279,665 Euro



### Source of Funds:

Funding agency	Budget (Euros)
AWAC (Agence Wallonne de l’Air et du Climat)	279,665
JLA Hydro (Belgian company specialised in hydroelectricity expertise and equipment manufacturing)	8,500
<b>TOTAL EUROS</b>	<b>288,165</b>

#### Notes:

- AWAC funding is partially implemented by SNV and directly implemented by AWAC.
- SNV in-country funds implementation is €118,000
- As part of the project, other beneficiaries are considered such as households, schools or health centres and small industries that will have access to electricity produced by the pico-hydro generation plants built by the trainees through a pilot project to be implemented in Karongi District.



Figure 4: Field work

## II. Profile of the selected pilot site: Mukungu Pico hydro pilot project

### Description

Site name: Mukungu Pico Hydro Power Plant

Site location: Karongi District, Mutuntu Sector

GPS Coordinates: S 02° 13 931' and E 29°24.590'

Source of water: Small stream

Expected power generation capacity: 14.7 kW (increase from original 7 kW)

## Background information

In line with the set implementation plan for the DPHR, the Mukungu Pico Hydro pilot site was selected, to serve as training site. It is located in Karongi District, Mutuntu Sector. The 7kW pico-hydro power plant had been initially installed in 1993, but it is now completely out of service. It is to be redesigned and rehabilitated and equipped with a new turbine that will be manufactured during the multi-stage training sessions under close supervision of JLA Hydro Experts.

## Expected output

Upon completion of the pilot project, the production capacity of Mukungu Pico Hydro power plant is expected to increase from the initial 7 kW to 14 kW and will be providing access to electricity to more than 100 households, 1 Health Centre, 1 Primary school, 1 Secondary school, Sector and Cell administrative offices, a business centre and a parish.

## Status of the project

1. First training module conducted onsite identification and hydro-energetic potential analysis (theory and practical).
2. Following modules on electromechanical equipment, manufacturing of cross-flow turbines, manufacturing of pelton turbines, speed regulation on isolated site to be conducted in November 2016.
3. Maintenance of Mukungu pilot site is ongoing.