GISele
Logo

years

Electrification of rural areas: Mozambique

This report illustrates the analysis the electrification system for community “x” in “Zambezia”, Uganda. The study is based on GIS data sets, in order to properly map information about the considered area. The ultimate goal is to define the LCOE (Levelized Cost of Electricity) of decentralized and grid connected solutions and give as output the best option

ADD A SENTENCE ON SDG 7

Summar of the project

Add a brief description of main results and tables

General Overview

Country: Capital: Official Language(s): Population: GDP (PPP): GDP (nominal): HDI: GINI:	

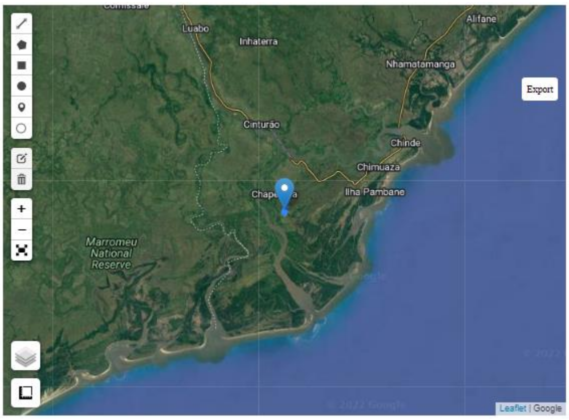
Introduction

Mozambique is a “Sub-Saharan” country where “65%” of the population lives in rural areas. Mozambique is one of the poorest countries in the world, with about “54.7 %” of the population living below the poverty line. National access to electricity is “35%”. The main actor of the energy sector are: “MIREME (Ministerio dos Recursos Minerais e Energia)”; “ARENE” (The energy regulatory authority); “FUNAE” (Fundo de Energia).

The “Zambezia Province” is characterised by many of the country's criticalities in terms of development and energy. It is the “second” most populated region with a “35%” increase in population over the last 10 years. In Zambezia, that hosts one fifth of the country population, the 93% of people is living in rural areas, characterized by a very low resilience in the face of climate change and external shocks: the 70.5% of the population lives below the poverty line. Energy access rate is also among the lowest in the country, together with the provinces of Cabo Delgado and Niassa.

Community overview

The cluster named 0 is located in Mozambique. More precisely, with respect to the first level administrative division it is in missing word, while in missing word when considering the second level.

Name [-]: Coordinates [N;E]: Population [-]: Energy Access [%]: Average wealth index: HDI:	 Figure 1. Community

In it there are 305 buildings where between 1216 and 1777 people are estimated to live. The community develops itself over approximately 0.69 km2, resulting in a population density of 1774.11 people per km2 and a building density of 444.72 buildings per km2. It seems it reached its maximum population in 2013, with a growth of 1.7 percent from 2000 to 2020.

Population growth

Since 1992 population has grown of about “x%”. In 2020, there were “x” people according to facebook estimation and “y” according to WorldPop estimatio. The difference can be explained through the different parameters used as inputs. As shown in figure “Y” the maximum population has been reached in “2000” with “350” people.

Energy acces trend

Since 1992 energy access has grown of about “x%”. It seems that in 2018 (our most recent data) the village lacked access to electricity as when looking at it from the sky during the night we were not able to see any light. In particular, it seems this community never experienced any form of electrification. As shown in figure “W” the maximum share of energy acces has been reached in “2020” with a level of “15%”. However, still the “x%” of people do not have access to reliable, affordable e safe energy.

Terrain analysis

The analysed area is covered by croplant for “add percentage”, by trees for “add percentage” and grass for “add percentage”. Crops production reach “add tons” tons per year, mainly “add the three most produced crops”. Those data are shown in Figure “x”.

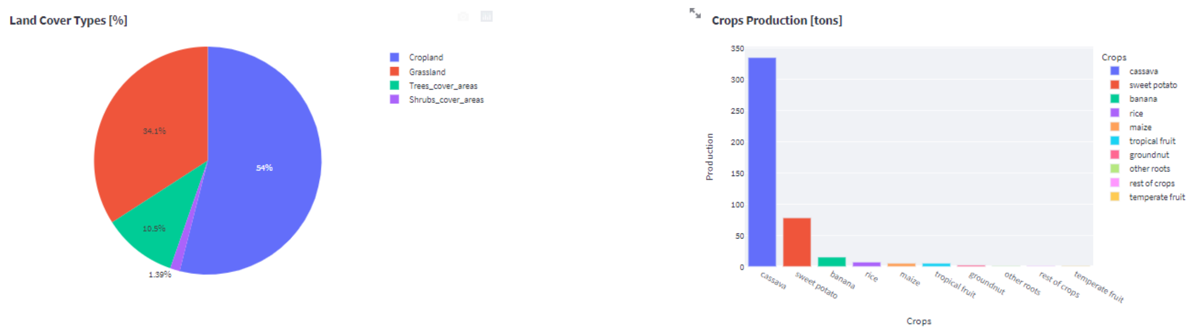


Figure 1. LAnd cover types and crops production

Energy system

GISele, through a multi level algoritm is able to analyse different solutions for electrification, comparing the extension of the national/existing grid with an off-grid system based on PV, hydro and BESS. In this chapter the main results are shown and commented.

The calculation of the load profile is required for a reliable desing of a hybrid rural system.

The proposed solution is characterised by in initial investment of “xxxx” $, obtaining an LCOE of “yy”.

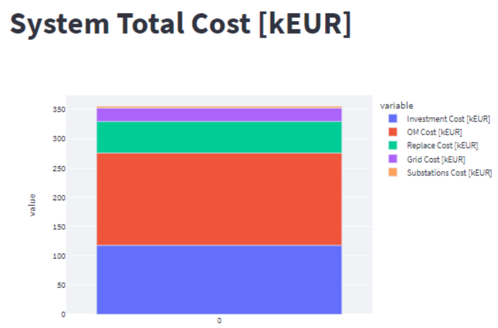
- ### The proposed solution is “off-grid”.

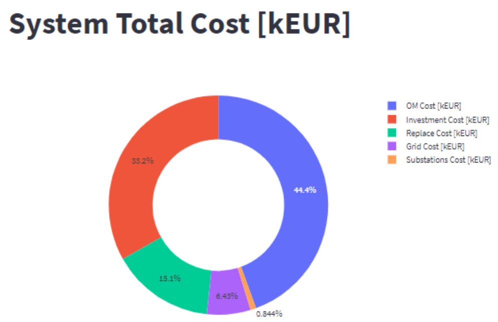
ADD A TYPICAL SCHEME OF OFF-GRID

In the following tables the main results for the off-grid solution are displayed:

Economic impact:

Investment cost	k€	
O&M Cost	k€	
Replace cost	k€	
LCOE	€/kWh	





Cash Flow grafico

Energy system:

PV modules	kW	

Wind turbines	kW	
Hydro turbines	kW	
BESS	kWh	
Inverter	kW	

Environmental impact:

CO_2	kg	
Other factors		

- The proposed solution is "the extension of the national GRID"

ADD THE IMAGE OF THE NATIONAL GRID

Internal Grid

GISele is also able to size the internal grid thanks to the approach (add the name). In the following table the main results are displayed: