



**Course CME 310**  
**Solar Power For Africa**



## **NGOs and SITUATION OF ELECTRICITY IN RWANDA**

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# RWANDA



Capital (and largest city)

Official languages

Demonym

Government

President

Prime Minister

Independence (from Belgium)

Area

Water (%)

Population

Density

GDP (ppp)

Currency

Kigali

Kinyarwanda, English, French

Rwandan, Rwandese

Unitary parliamentary democracy and presidential republic

Paul Kagame

Pierre Habumuremyi

1 July 1962

26,338 km<sup>2</sup> or 10,169 sq mi (138<sup>th</sup>/236)

5.3

2011 estimate: 11,370,425 (81<sup>rd</sup>/225)

2001 census: 8,162,715

419.8/ km<sup>2</sup> or 1,087.2/ sq mi (31<sup>st</sup>/241)

2011 estimate: total \$13.109 billion

per capita: \$1,284

Rwandan franc (RWF)

# NGOs

- This term was mentioned in 1945 when UN was created. Refers organizations that do not form part of the government and are not conventional for profit-business. In cases in which NGOs are funded totally or partially by governments, NGO maintains its non-governmental status by excluding government representatives from membership in the organization. In many jurisdictions, these NGOs are called civil society organizations (CSOs) or referred to by other names.
- NGOs are mainly involved in humanitarian issues, development aid and sustainable development.



# Role of NGOs in aftermath of Rwanda genocide

- In the aftermath of the genocide, NGOs emerged to help in addressing social needs, including assistance to widows and orphans, child-headed households, and traumatized survivors.
- Today, 128 NGOs are registered in Rwanda and operating in different districts
- NGOs continue to provide essential social assistance to the Rwandan people. Approximately 80 percent of NGOs in Rwanda carry out health and education-related activities, while 20 percent provide other social services.

# Role of NGOs in aftermath of Rwanda genocide

- Aid effectiveness: transparent in the management of resources, minimize the operational cost, development activities with impact on the ground.
- Should not get engaged in subversive political activities contrary to ethics governing NGOs or present the government programmes as their owns to get more funds.
- Recently, it was revealed that some NGOs are not transparent in the management of their resources and indicate in their reports having spent more than 75 % of their budget on operational costs. Other NGOs operate without registration and donors continue to deal with them

**Table 6.5: Main Donors per category of NGO mapped**

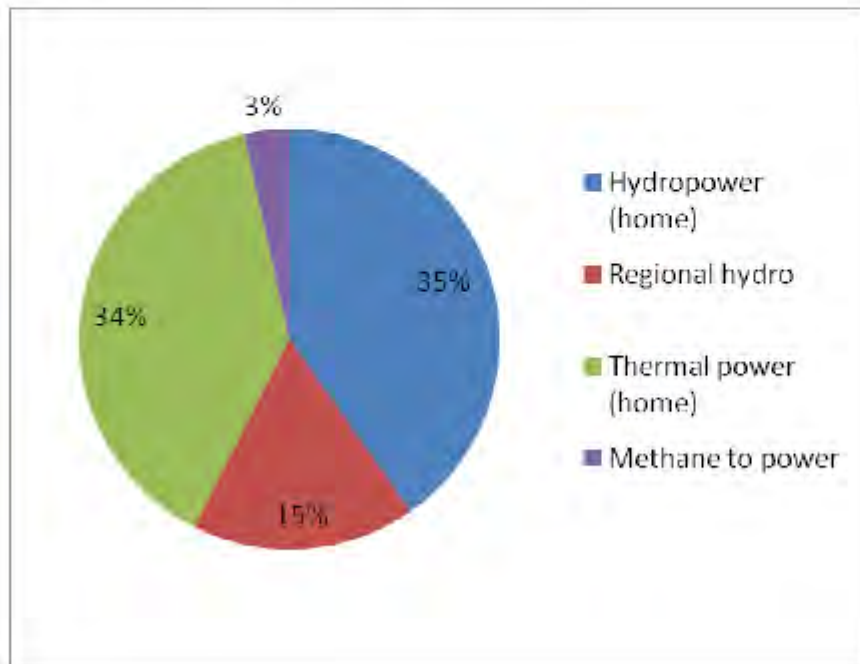
Category	Main Donors
Rural development NGOs	INGO: SNV, ACDI/VOCA, AGRITERRA, TROCAIRE, CONCERN, NOVIB, MISEREOR,...
	International federations: ICCO, CARITAS INTERNATIONALIS, WACC,...
	COOPERATION AGENCIES: BTC, DGCD, USAID...
Faith based NGOs	International federations: CARITAS INTERNATIONALIS, WACC,...
	Sister organizations in different countries: CARITAS Belgium, CARITAS JAPAN, Radio Suisse Romande,...
	Own funds (from member Churches)
Human rights protection NGOs	INGO: SNV, ACDI/VOCA, AGRITERRA, TROCAIRE, CONCERN, NOVIB, MISEREOR,...
	GoR projects & Agency: FARG, RHRC, NURC
Health & HIV/AIDS NGOs	INGO: CHAMP
	GoR projects & Agency: CNLS, MAP
	Bilateral & Multilateral agencies: WORLD BANK, CANADIAN COOPERATION, BTC, IFAD, ILO

# SITUATION OF ELECTRICITY IN RWANDA

## Electricity Generation

The available electricity generation capacity in Rwanda by July 2009 is at 69 MW and is produced from:

- Hydro power (home): 35%
- Regional Hydro power: 15%
- Thermal power (home): 34%
- Thermal power (rental): 13%
- Methane to power: 3%





**Electricity Generation Capacity (MW) – Rwanda July 2009 (grid- connected)**

Category	Name	Installed Capacity (MW)	Available Capacity (MW)
Hydropower	Ntaruka	11.5	7.25
	Mukungwa	12	12
	Gihira	1.8	0.7
	Gisenyi	1.2	0
Regional Hydropower	Rusizi I	3.5	3.5
	Rusizi II	12	8
Thermal Power	Jabana HFO	20.5	20.5
	Jabana Diesel	6.24	4.8
Rented Thermal Power	Gikondo Diesel	10	10
Solar Power	Kigali Solar	0.25	0.25
Methane Gas	KP1	4.2	1.8
<b>Total</b>		<b>85.3</b>	<b>69.10</b>

Country	Generation capacity (MW)
Angola	343
Botswana	400
DRC	1136
Lesotho	28
Malawi	104
Mozambique	912
Namibia	800
RSA	6639
Swaziland	20
Tanzania	260
Zambia	1350
Zimbabwe	1315
<b>Total</b>	<b>13307</b>

Figure 5 Transmission grid and location of generation

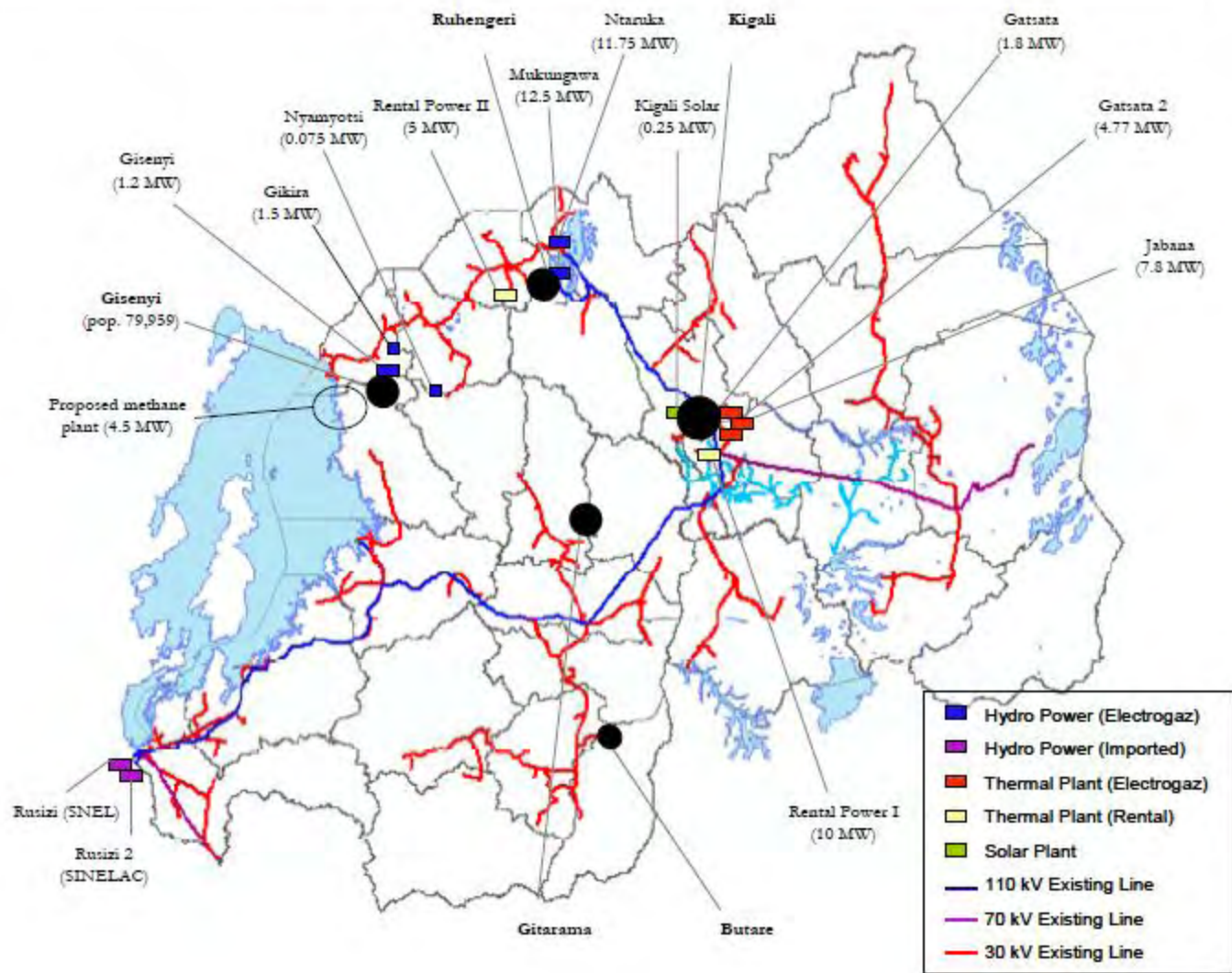
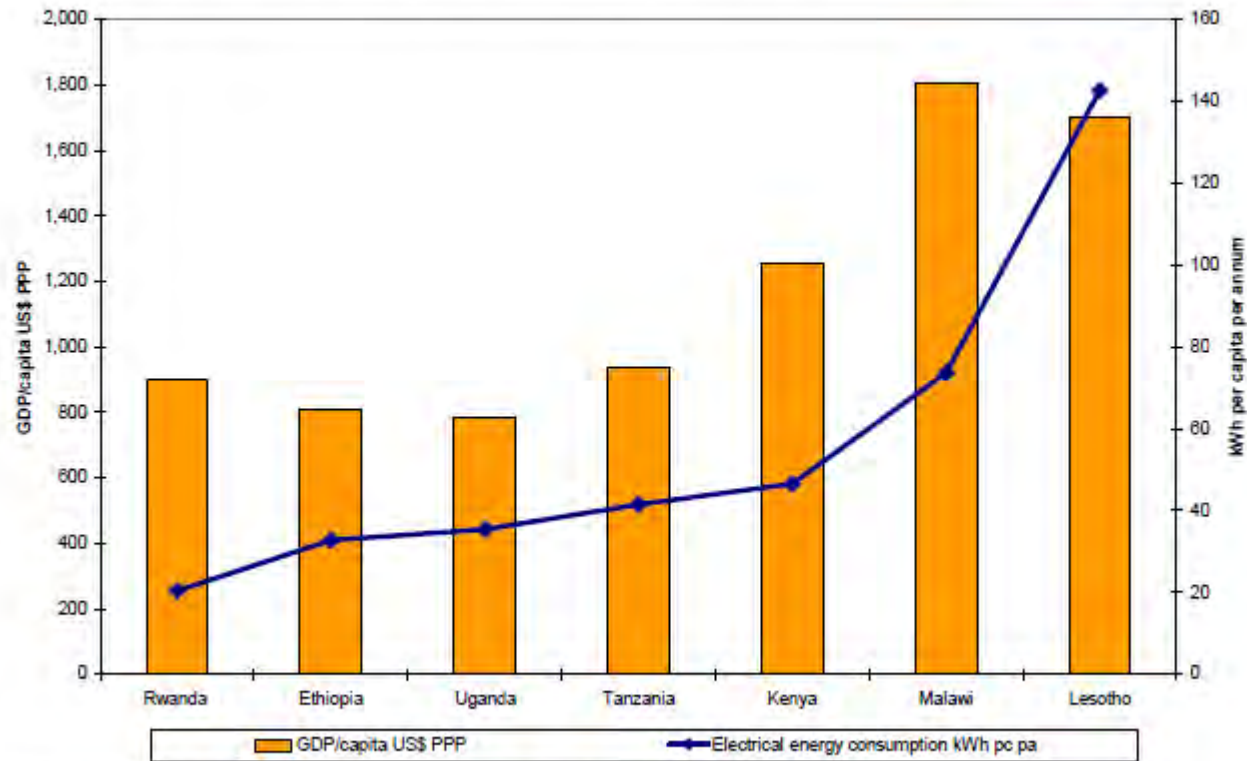


Figure 2 Comparative data on electricity consumption



Sources: IMF for economic data, national utilities for electricity data. PPP = purchasing power parity.

Energy cost: \$0.22/Kwh. Rest of the region: \$0.08 - \$0.10/KWh  
South Africa: \$0.04/KWh

## SOLAR ENERGY OVERVIEW

- Sun very basis of the existence of life on our planet
- Driving force behind other sources of energy such as wind, biomass and hydro.
- Sunlight can be transformed into electrical energy through solar photocell systems.

In Rwanda, solar energy has been exploited in recent decades by

- ❖ local and international organizations for the electrification of churches, schools and households in rural areas
- ❖ The potential for solar energy in Rwanda is **4.5-5.5 kWh/ m<sup>2</sup>/ day** at an average of 8 hours of sunshine a day.
- ❖ However, the relatively high cost of solar systems has been a barrier to widespread dissemination until now.

**Currently, solar energy is mainly used for two purposes in Rwanda:**

1. Electric power production through solar photovoltaic systems
2. Direct heating, for example solar water heaters

# Average Solar insolation figures (Measured in kWh/m<sup>2</sup>/day onto a horizontal surface)

## 1. Rwanda/Kigali

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.86	5.15	4.9	4.77	4.65	4.77	5.08	5.03	5	4.62	4.48	4.5

## 2. Germany/Muenchen

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.12	1.94	2.94	4.1	5.09	5.29	5.29	4.65	3.2	1.9	1.15	0.86

## 3. USA/Los Angeles

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2.93	3.62	5.12	6.6	7.49	7.83	7.54	6.87	5.7	4.45	3.34	2.73

## 4. Australia/Brisbanne

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
6.19	5.39	4.95	3.98	3.23	3.02	3.22	4.04	5.12	5.52	6.07	6.35

## 5. South Africa/Johannesburg

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
6.59	6.02	5.48	4.84	4.3	3.96	4.27	5.05	5.88	5.96	6.45	6.67



There are 6 players active in the Rwandan solar energy sector

1. SECAM
2. MODERN TECHNICAL SERVICES (MTS)
3. DAVIS & SHIRTIFF
4. GREAT LAKES ENERGY
5. EPS RENEWABLE
6. SOLAR ELECTRIC LIGHT FUND (SELF)

They are the primary repositories of solar skills as well as a number of independent contractors.

**Table 1: A Summary of Current Solar PV Market Activities in Rwanda**

Solar PV technology	Size of opportunity	Estimated kWp installed/year (2008)	Notes
Government administrative centres	>0.4 MWp	±15 kW	Good government contacts required
Government clinics and schools	>1 MWp	±40 kW	World Bank, EU, Belgium
NGO & NGO health sector	>0.3 MWp	<±5 kWp	PEPFAR
Solar Home System	>4 MWp	N/A	Low rural spending power
<b>TOTAL</b>	<b>&gt;6 MWp</b>	<b>&gt;50kWp</b>	

**Table 4: The SHS Market in Rwanda**

Type of solar home systems	Size of system (Wp)	Estimated % of households buying	Total number	Size of market (kWp)
No System	0	55.0%	944,690	-
Micro Systems	2	35.0%	601,166	1,202
One Light & Radio	10	7.3%	124,527	1,245
Two light and radio system	20	2.0%	34,352	687
Four light system or higher	50	0.5%	8,588	429
Larger systems (inverter or hybrid)	150	0.3%	4,294	644
<b>TOTAL</b>		<b>100.0%</b>	<b>1,717,618</b>	<b>4,208 kWp</b>

## Rubaya Health Center



- Synergy Rwanda** ➔
- K-Light Solar Lantern
  - Solar power system installation in East Africa



## Kirambo Health Center



## Solar Electric Light Fund (SELF)



Installation of solar power to PIH clinics in Eastern Rwanda.

- ✓ Supply of solar energy for refrigeration
- ✓ Computer recordkeeping
- ✓ In labs, powers microscopes, blood analysis machines, centrifuges, sterilization devices



Photovoltaic park on a hill near Kigali: Kigali Solar (peak output of 250 kW). Installation by **Mainz's utility Company (Rhineland-Palatinate/Germany)**





**Solar Light for Africa (SLA):** Non-profit Christian organization whose mission is to transform lives and empower the people of Africa by providing light and energy using the natural power of the sun.





Izuba (sun) energy solutions (local company): goal is to indulge in the renewable energy developments



**Ministry of infrastructure(MININFRA ) Project:** Idea of Solar Kiosks, which will consist of a central solar battery charging station, where rural communities can rent charged batteries for a small fee to power their lighting and equipment at home.

**Solar Power for Africa** in collaboration with **Solar Light for Africa**



The World Bank is currently supporting a major rural electrification initiative. It is expected to provide the government rural electrification programmes with considerable resources, a significant portion of which will be renewable.

Government administration: The energy supply of the 496 government offices is as follows: 146 centrally supplied by Electrogaz, 205 supplied by solar PV(116), diesel generators (86), micro hydro (3), and 145 un-electrified.