

Africa-EU Renewable Energy Cooperation Programme (RECP):
Higher Education for Renewable Energy

Country Mapping



Rwanda

May 2015



Figure 1: Flag and map of Rwanda (CIA, 2014)

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1 Rwanda at a Glance

1.1 Population and Geography

Table 1: Population¹ (World Bank, 2014b), (CIA, 2014), (UNDP, 2014)

Population, total (2013)	11,776,522
Population, growth (2013)	2.7%
Population density (2013)	477.4 / km ² (second highest value in Africa)
Urban population (2013)	19.7%
Life expectancy at birth (2013)	64.1 years
Major Cities	Kigali 1,004,000
Language	Official: Kinyarwanda 100%, French 0.1%, English 0.1% Other: Swahili 0.02%, other 0.03%, unspecified 0.3% (2002 est.)
Ethnic Groups	Hutu (Bantu) 84%, Tutsi (Hamitic) 15%, Twa (Pygmy) 1%. Against the background of Rwanda's colonial history and the 1994 genocide this categorisation is no longer accepted within the country. (Mazimpaka, 2014)
Religion	Roman Catholic 49.5%, Protestant 39.4%, other Christian 4.5%, Muslim 1.8%, animist 0.1%, other 0.6%, none 3.6% (2001), unspecified 0.5% (2002 est.)

Table 2: Geography and climate (CIA, 2014), (Republic of Rwanda, 2014)

Location	Central-East Africa, landlocked
Area	26,338 km ²
Neighbouring Countries	Uganda, Tanzania, Burundi and Democratic Republic of Congo
Climate	Temperate; two rainy seasons: February to April, November to January
Terrain	Mostly grassy uplands and hills, mountainous relief
Natural hazards	Droughts; one historically active volcano: Visoke, located on the border with the Democratic Republic of Congo

¹ The numbers of the National Institute of Statistics of Rwanda are slightly different (National Institute of Statistics of Rwanda, 2013).

1.2 Government and Legislation

Table 3: Government system Rwanda (CIA, 2014), (Commonwealth Network, Rwanda, 2014), (Transparency International, 2013)

Official name	Republic of Rwanda
Conventional short form	Rwanda
Form of state	Republic, presidential, multiparty system
Administrative divisions	5 provinces: Kigali City, Eastern Province, Western Province, Northern Province and Southern Province. The capital, Kigali, is the country's largest city and is also Rwanda's commercial capital.
Chief of state	President Paul Kagame (since 2002), next presidential selection 2017
Head of Government	Prime Minister Anastase Murekezi (since 24 July 2014)
Independence	1 July 1962 (from Belgium-administered UN trusteeship)
Corruption perception index ²	49 (of 100), Rank 55 (of 175 countries in total) (2014)

Though the government has announced the country to be stable 20 years after the genocide, there are many news of disturbing aspect of reconciliation process written by international journalists. According to BBC news (BBC News, 2013), there have been economic reforms admired but also criticism about suppressed opposition by the government.

The Economist (The Economist, 2012) wrote that under President Kagame, Rwanda has advanced economically, with a GDP increase of more than 50% between 2005 and 2011. Further progress has been made in health care (including family planning and the provision of anti-malaria bed-nets), education, agriculture, internet technology and women's right (half the members of parliament are female, an African record). But it also draws the attention towards the president's deteriorating human rights record, both at home and abroad.

With a Corruption Perception Index of 53, Rwanda ranks 49 in the list and performs relatively well compared to many African countries. According to an article (ANTICORP, 2014), controlling corruption was one of the reasons for Rwanda's success at demographic and economic recovery after the genocide.

² The corruption perception index is developed by Transparency International. A value of 0 is counted as highly corrupt and 100 as very clean.

1.3 Economy and Infrastructure

Table 4: Economic figures Rwanda (World Bank, 2014), (UNDP, 2014)

Overview			
World Bank Rating	Low income		
Human Development Index HDI (2013)	0.506 (Rank: 151/187)		
GINI Index (2011)	50.8		
Population living below poverty line	44.9% (2011)		
Currency	Rwandan franc		
Economic Indicators	2011	2012	2013
GDP (in constant 2005 Billion US\$)	4.06	4.36	4.56
GDP per capita PPP (constant 2011 international \$)	1,324	1,381	1,406
GDP per capita growth (annual %)	4.5	4.4	1.7
Unemployment, total (% of total labour force) (modelled ILO estimate)	0.6	0.6	0.6
Unemployment, youth (% of total labour force aged 15-24) (ILO)	0.7	0.7	0.7
Ease-of-doing-business index (1: most business friendly)	--	54	32
Inflation, consumer prices (annual %)	5.7	6.3	4.2
Structure of Economy			
Agriculture, value added (as % of GDP)	32	32	33
Industry, value added (as % of GDP)	15	14	14
Services, etc. value added (as % of GDP)	53	53	52

Rwanda is ranked 151st in the global Human Development Index, as published in the Human Development Report 2014 by UNDP (UNDP, 2014). About 90% of the population is engaged in agriculture and some mineral and agro-processing (CIA, 2014). Sources of foreign included tourism as well as exports of minerals, coffee and tea. Even though a significant percentage of the population lives below the official poverty line, Rwanda has made substantial progress in stabilising and rehabilitating its economy since the 1994 genocide.

The World Bank rates Rwanda as a low income country. The GDP per capita (PPP intl. \$) of \$1,406 in 2013 is only one third of the SSA average of \$3,269 and similar to that of Mozambique. The annual GDP per capita increased constantly until 2012 but the growth rate

decreased significantly (from 4.4% to 1.7%) in 2013. The annual GDP growth rate decreased also from 7.3% in 2012 to 4.6% in 2013.

According to the African Economic Outlook (Edward Batte Sennoga, 2014), the lower than forecasted performance in agriculture and the aid-related delays in the implementation of strategic public investments following the suspension of budget support disbursements in 2012 are the reasons for the decrease in GDP growth. Growth is projected to recover to 7% and 7.4% in 2014 and 2015 respectively, following the recovery in services, improvements in agriculture productivity and sustained implementation of the public investment programme.

Rwanda's economy is largely based on agriculture (33% in 2013) and services (52%). The share of industry is only 14% and shows that the industrial sector is not strong in the country. However, Rwanda is ranked as one of the most business-friendly countries in sub-Saharan Africa, as stated by the ease-of-doing –business index, only bested by South Africa and Mauritius.

The unemployment rate according to ILO estimations is very low; 0.6% of the total population is unemployed, while the sub-Saharan African average stood at 7.5% in 2012. The unemployment rate among youth aged between 15 to 24 years was only 0.7% in 2013.

The recent inflation rate of 4.2% is comparably low in relation to the expansionary fiscal stance of the government (World Bank, 2014c). The World Bank has endorsed a new Country Partnership Strategy (CPS) for Rwanda which will accelerate private sector-driven growth to create jobs, improve productivity and raise poor peoples' incomes and support transparent, accountable governance. The CPS is fully aligned with the Government's Second Economic Development and Poverty Reduction Strategy (World Bank, 2014a).

Table 5: Infrastructure (CIA, 2014), (Internet World Stats, 2013)

Roads	4,700 km, of which 1,207 km paved
Airports (2013)	7 including 4 with paved runways
Telephones (main lines in use) (2012)	44,400
Telephones - Mobile cellular (2012)	5.69 million
Internet users (2013)	1.1 million (8.7%)

The ICT bus project run by the Rwanda Development Board since 2009 has been providing internet technology to the people of the countryside (eLearning Africa, 2011). The busses act as mobile centres for rural citizens providing access to internet, printer, scanner, photocopy and other services, with independent electricity supply. These mobile computer labs will benefit farmers, traders, students, women, youth groups, entrepreneurs and other rural based Rwandans (The Rwanda Focus, 2009).

2 Energy and Renewable Energy

2.1 Overview

Table 6: Country Energy Overview (EIA, 2014), (National Institute of Statistics of Rwanda, 2011), (Rwanda Energy Water and Sanitation Limited, 2014), (Reegle, 2012)

	2001	2011
Energy use (TWh)	3.52	3.81
Energy production (TWh)	0.29	0.29
Net import of energy (% of Energy use)	91.76	92.39
Electricity consumption (TWh)	0.205	0.352
Electricity production (TWh)	0.09	0.3
Electricity consumption per capita (kWh/person)	23.40	31.60 ³
Total electricity capacity (MW)	43	85
Electric power transmission and distribution losses (% of output)	6.7	7
Access to electricity, total	4% (2005)	11% (2011) ⁴
Urban	23%	46%
Rural	<1%	5%
Electricity production by source (in % of the total electricity production)	(2009)	(2014)
Hydro	59.1%	53%
Thermal	40.5%	43%
Methane and solar	Solar: 0.4%	4%
Share of biomass in overall primary energy consumption	85% (2014)	
Share of petroleum products in overall primary energy consumption	11% (2014)	

The energy production in the country remained constant between 2001 and 2011 with 0.29 TWh per year. This is very low compared to the energy use which increased from 3.52 TWh in 2001 to 3.81 TWh in 2011, which translates to a high import share of more than 90% (EIA, 2014).

³ 41 kWh/person in 2014 (Rwanda Energy Water and Sanitation Limited, 2014)

⁴ 18% in 2012 (National Institute of Statistics of Rwanda, 2012)

With its Electricity Master Plan targeting access to electricity for more than 90% of the population by 2025 the Rwandan government estimates a peak electricity demand of 1,5 GW during the same year (AFDB, 2013, p. 13).

In 2011, 0.3 TWh of electricity was produced while the consumption for the same year was 0.352 TWh (EIA, 2014). This indicates some progress as the production increased from 0.09 TWh in 2009. However, still only 18% of the households had access to electricity in 2012 (National Institute of Statistics of Rwanda, 2012). Although this is a considerable development compared to only four per cent in 2005. The increase in electricity access can be found in both urban and rural areas.

Firewood is the most common fuel, used by 86% of households in urban and 93% in rural areas (National Institute of Statistics of Rwanda, 2011).

According to an article in allAfrica (allAfrica, 2012), Rwanda is looking to exploit methane gas deposits, solar, geothermal, biogas and peat to reach the target of 1,000 MW by 2017, out of which 310 MW is targeted from geothermal energy alone.

2.2 Energy Policy

Table 7: Rwanda Energy Policy (MININFRA, 2014), (RURA, 2014), (Reegle, 2012), (Republic of Rwanda, 2014)

Organisations responsible for energy policies	The Ministry of State in Charge of Energy, Water and Sanitation under Minister of Infrastructure
Energy regulator	Rwanda Utilities Regulatory Authority (RURA)
Government Agency	Rwanda Environment Management Authority (REMA)
Energy policy publications	Law N°21/2011 of 23/06/2011 (Electricity law) Grid Code Second Economic Development and Poverty Reduction Strategy (EDPRS2) in 2013 Electricity licensing regulations adopted by the Regulatory Board of Rwanda Utilities Regulatory Authority (RURA) Number 002/Energy/EL/RURA/2013 of 25 July 2013 Poverty Reduction Strategy Paper (World Bank, 2008) Second Poverty Reduction Strategy Paper (September 2008)
Targets to increase use of Renewable Energy	70% targeted electrification rate by 2017 Targeted Hydropower installed capacity: 333 MW by 2017 Targeted Geothermal installed capacity: 310 MW by 2017 90% targeted share of renewables in electricity generation 20 MW targeted total installed solar capacity by 2017 42 MW targeted small hydropower capacity by 2015
Subsidies/Incentives for RE	Feed-in tariff for hydropower and mini hydropower plants exists: feed in tariff of 16.6 US\$ cents per kWh for installed capacity of 50 kW up to 6.7 US\$ cents per kWh for installed

capacity of 10 MW (RURA, 2012)

72 million US\$ by EU in Rural Energy (REN21, 2014)

The Ministry of Infrastructure (MININFRA) is the main governing body responsible for energy policy. In 2013, Rwanda Utilities Regulatory Authority (RURA) was established to regulate renewable and non-renewable energy, industrial gases, pipelines and storage facilities among other public regulated utility. RURA's mandate in the energy sector is to control and regulate an efficient, sustainable and reliable energy sector in a transparent and fair manner for the benefit of all stakeholders (RURA, 2014).

RURA plays a pivotal role between policy makers, licensed service providers and customers. The authority reports to the Office of the Prime Minister and coordinates with the line ministers responsible for each regulated sector (RURA, 2014).

The national utility company, Energy Water and Sanitation Authority (EWSA), has unveiled the target of 70% electrification rate in Rwanda by 2017 with a 90% share of renewable energy (Republic of Rwanda, 2014). According to the Director General of EWSA, Yves Muyange, access to electricity has increased from six per cent of the population in 2008 to 18% in 2012. According to (Mazimpaka, 2014) the rate is currently 22%. The target of connecting half of the population to the electricity grid within the next five years requires three times higher connection activities than currently done. The government also intends to engage the private sector through public-private partnerships to ensure additional generation capacity of at least 1,000 MW. This target is composed of 333 MW from hydropower, 310 MW from geothermal and 200 MW from peat energy source. The government plans to invest 4.7 billion US\$ to achieve its objective (REN21, 2014).

ELECTROGAZ (nowadays REG) is the sole integrated electricity supplier in the country. Yet, to meet the demand of the country, Rwanda imports electricity through cross-border interconnections of about 15.5 MW from the Democratic Republic of Congo and SINELAC⁵ and about 3 MW from Uganda in 2009 (REMA, 2009). In spite of these imports, there is a gap in electricity generation of about 50% resulting in regular load shedding. Additional disadvantages of the power crisis are an increase in power price and an increase in deforestation due to charcoal production. In 2006, the cost of diesel was estimated to be approximately US \$65,000 per day, which was used in diesel powered generators to lower the electricity supply gap.

2.3 Renewable Energy

The ambitious target of 70% electrification rate with 90% share of renewable energy by 2017 has opened many project opportunities. The government started a programme to provide all

⁵ French abbreviation of the International Society for Electrify Great Lakes

health centres and administrative centres and 100% of the schools which are too far from the grid with solar power by 2017. A number of RE projects are already installed, or currently in the planning and implementation stage. Rwanda is looking at developing geothermal, hydropower, methane gas, solar, biogas, and peat, with an ultimate goal to reach 1,000 MW of production capacity in 2017 (Daly, 2012) It is planned e.g. to install 12, 000 Solar Home Systems by 2015 (Gakuba, 2014).

2.3.1 Potential and Projects

Geothermal: According to a study by the Geothermal Energy Association, geothermal potential in Rwanda ranges from 170 to 340 MW (Energypedia, 2014). The target of 310 MW electricity generation by 2017 shows that geothermal energy is a policy priority. A Geothermal Act and a geothermal exploration and development paper have been drafted, a proposal for a feed-in tariff for geothermal still needs to be developed. According to RURA (Rwanda Utilities Regulatory Authority), geothermal energy resources have been identified since 1980's with research focusing on the Virunga volcanic zones. The four main areas identified as geothermal prospects from surface manifestations, comprising mainly of hot springs are: Bugarama in the South, Gisenyi, Karisimbi and Kinigi to the North Western part of the country. Three exploration wells started to be drilled in July 2013 to remove the risks associated with geothermal exploration and development, and a wellhead power plant of 10 MW is planned to be set up upon the successfulness of the exploratory drills.

Hydropower: Hydropower constitutes 59% of the current electricity share. According to Energy, Water and Sanitation Limited, there are more than 300 micro and pico hydro sites in different parts of the country (Rwanda Energy Water and Sanitation Limited, 2014). In addition, feasibility studies are under development for large dams with total capacity of 400 MW and more (Energypedia, 2014). Nyaborongo I is the largest domestic hydropower project with an installed capacity of 28 MW. Some hydropower projects with neighbouring countries are underway, including a 145 MW project shared by Burundi, DRC and Rwanda and a 90 MW project to be jointly developed by Tanzania, Burundi and Rwanda (Energy Private Developers, 2013).

Solar Energy: Rwanda has solar radiation intensity of approximately 5 kWh/m² per day and peak sun hours of approximately five hours per day (Energy Private Developers, 2013). With the target of 20 MW installed capacity from solar energy by 2017, the government is promoting both on-grid and off-grid solar PV systems. A number of potential operators have expressed interest in investing in the solar PV sector. One example is GigaWatt Global Rwanda Limited, who signed a Power Purchase Agreement on July 2013 to generate 8.5 MW from solar energy (RURA, 2014). But most of the installations are fully grant financed by donors with limited government coordination at the national level resulting in a broad range of different technologies and standards being applied by different projects and limited involvement of local companies in procurement and installation (Energypedia, 2014). There is an existing on-grid solar PV plant (Kigali Solar Project owned by Stadtwerke Mainz AG)

currently producing 0.25 MW and a number of off-grid solar PV systems installed in different health centres, administrative offices, schools and households in the rural area.

Solar water heating is gaining importance in the country replacing biomass and electricity as the primary water heating sources. It is also planned to make solar water heating mandatory for all new construction in the country and a subsidy scheme was recently designed by the Government (Energypedia, 2014).

The Government of Rwanda has obtained a grant from the Global Environment Facility Trust Fund (World Bank/GEF) of 4.5 million US\$ for Rwanda Sustainable Energy Development Project (SED Project) and a grant from the Nordic Development Fund of 4 Million Euros for the development of Solar Water Heaters (SWH) under the SolaRwanda Programme which is scheduled for four years starting from 2012 (RURA, 2014). According to RURA, the main objective of the SolaRwanda Programme is to promote the widespread utilisation of SWH of up to 200 Litres capacity with a goal of installing 12,000 SWH systems by the end of the year 2015 with a total estimated yearly saving of 23,328 MWh.

Bio-energy: A biogas program has been introduced in Rwanda with successful implementation in prisons and large institutes. One example is the setup of a pilot biogas project at Cyangugu Central Prison by the Kigali Institute of Science, Technology and Management (KIST) in 2001-2002. Financed by the Ministry of Internal Security and Penal Reform International, the plant treated toilet wastes from the entire prison generating 275 cubic meter of biogas (daily) used as alternative fuel for cooking purposes, and also with the possibility of recovering manure for production of food crops and woodlots. In 2008, the Government announced a policy to introduce biogas digesters in all boarding schools (approx. 600 schools), large health centres and institutions with canteens to reduce the consumption of firewood. Over the last decade, about 50 large biogas digesters have been constructed in different institutions. The biogas systems that have been installed in prisons have reduced firewood consumption by up to 40% and improved hygienic condition. The National Domestic Biogas Programme was started in 2007 funded by the Ministry and with technical assistance from SNV and GIZ/EnDev support was available from 2008 until 2011 (Energypedia, 2014).

According to RURA, some of the biogas plants installed for cooking, lighting, quality fertiliser and employment creation (in total 2,794 households and 68 institutions) are not yielding appropriate production due to a lack of sufficient knowledge in operation and maintenance (RURA, 2014).

Wind energy: Wind potential in Rwanda has not yet been fully exploited but may provide solutions for water pumping and electricity generation in future. According to a study performed in three sites (Kigali, Gisenyi and Butare) from 1985 to 1993, the wind speed varies from 2 to 5.5 m/s. Though there has been some research, more detailed wind assessment has to be performed in order to assess the feasibility (Energypedia, 2014).

Other: Other source of energy are methane gas extracted from the bottom of Lake Kivu, estimated to contain 55 billion cubic meter of dissolved methane gas; roughly equivalent to 700 MW continuous production for over a period of 55 years. In addition, the peat reserves are estimated to have the potential to replace wood, charcoal and fuel oil and to be used by improved cooked stove (REMA, 2009).

2.3.2 Market and Jobs

The ambitious target for renewable energy is expected to involve government, development partners as well as the private sector. So far, German development cooperation GIZ has provided financial and technical support in the areas of micro-hydro and biogas development. In particular, it supported and financed the Private Sector Micro-hydro Power Supply (PSP Hydro) for Rural Development (AFDB, 2013).

“The PSP Hydro Project implemented by EnDev Rwanda has been building the capacity of small and medium-sized enterprises to maintain and operate micro-hydro power plants since 2006. In this regard the GIZ project has initiated a model for private sector-driven approach that relies on local investors. While there were no private firms in Rwanda's micro-hydropower sector back in 2006, there are now more than 20” (GIZ, 2014).

Rheinisch-Westfälisches Institut für Wirtschaftsforschung (RWI) and the International Institute of Social Studies (ISS) in the Netherlands provided the evaluation of Rwanda's National Domestic Biogas Programme in April 2013. The report highlights that despite the difficulties and unmet targets, due to higher prices for biogas digesters than calculated, and other issues, 80% of users have received training and there are 42 active biogas construction companies in the country (SNV , 2013).

The Rwandan Association of Sustainable Energy (ARED) has been founded in 2008. It is a grouping of economic operators in the energy sector (with representatives in different energy sub-sector) that hold a common awareness in promoting the use of renewable energy technologies and energy efficiency. Its mission is to promote Rwandan industry development in production and independent sale of energy, by mainstreaming renewable energy resource (ARED).

2.4 Conclusion: Barriers, Trends and Patterns

Considering the government target of 70% electrification rate and 90% share of renewable energy by 2017, a remarkable development in the energy sector can be expected, particularly when considering the current energy import rate of more than 90%. The government is also open to foreign aid and investments in addition to private (national) investments including its own share. However, the lack of trained manpower and financial resources might obstruct the development in energy sector (Bakri, 2011).

The achievement of the sustainable development goals will require comprehensive policy support for environmentally friendly technologies, including the utilisation of renewable energy sources. Furthermore, the application of tools such as Strategic Environment

Assessment (SEA), the Environment Impact Assessment (EIA) as well as the operationalisation of the legislative framework and other regulatory instruments all present opportunities for an effective contribution of energy options towards poverty reduction and sustainable national economic growth (REMA, 2009). Yet, for the use of renewable energy technologies in rural areas, an infrastructural framework that can mobilise, co-ordinate and facilitate private and public initiatives is needed.

3 Education and Higher Education

3.1 Primary and Secondary Education

The Rwandese education sector follows a 6-3-3 system comprising primary, junior secondary and senior secondary education. It is compulsory to attend nine years of schooling from age 7 to age 15. That covers primary and lower secondary school and is known as “nine years basic Education: 9YBE” (Ministry of Education, 2013). Six years of primary and the three years of junior secondary school are followed by three years of senior secondary school and four years for a university bachelor’s degree (Embassy of the United States, 2014).

According to the Ministry of Education, the objective of primary education is “to ensure that all children receive civic, intellectual and physical education”. In order to continue with the secondary school, the children have to pass a national exam (Ministry of Education, 2013).

Secondary education is composed of two levels of three years each, the lower secondary and the upper secondary level. Both levels end with national examinations. After successful completion of the upper secondary level, students are eligible to enter a higher education institution (Ministry of Education, 2013).

The enrolment ratio for primary, secondary and tertiary education is shown in Table 8:

Table 8: Gross Enrolment Ratio in the primary, secondary and tertiary education sector (Ministry of Education, 2013), (UNESCO Institute for Statistics, 2014)

	Primary Education	Secondary Education	Tertiary Education
Gross Enrolment Ratio	123.2% (2012)	Junior: 49.2% (2012) Senior: 27.1% (2012)	7.2% (2011)

The enrolment ratio for tertiary education is barely above the Sub-Saharan average of 6.1% and far below the world average of 24% and the preferred 40% needed for economic take off (UNESCO Institute for Statistics, 2014).

3.2 Higher Education

3.2.1 Shape of higher education

Since 2013, seven public universities in Rwanda are merged into the University of Rwanda (UR) with six colleges. The University of Rwanda is the leading higher education institution in the country with 28,800 students enrolled in the academic year 2013/2014 (University of Rwanda, 2014).

Depending on the field of study and the targeted qualification level, the length of study may vary between two and six years (Ministry of Education, 2013). Admission to Rwandan universities is highly competitive and despite limited material resources, education has a

reasonable quality. Rwandan universities have adopted a modular system, inter alia to attract more international students (Embassy of the United States, 2014).

In addition, Higher National Diplomas in Education, Technology, Human Health, Animal Health and Nursing are offered by nine public polytechnics with a length of three years. Several private polytechnics award Bachelor's degrees, which is the basic academic level to be eligible for the professional job market (Embassy of the United States, 2014).

Table 9 shows a list of 17 public universities (as already mentioned 7 public universities recently merged to the University of Rwanda) and other higher education institutions (8 are degree awarding while 9 are diploma awarding), which constitute for about 50 per cent of all higher education enrolments, with 14 private universities accounting for about 50 per cent as well (Ministry of Education, 2013).

Table 9: Universities and other higher education institutions in Rwanda (Ministry of Education, 2012)

State universities and other higher education institutions	Selected privately-owned universities
National University of Rwanda	Adventist University of Central Africa
School of Finance and Banking	Catholic University of Rwanda
Higher Institute of Agriculture and Animal Husbandry	Protestant Institute of Arts and Social Sciences
Institute of Legal Practice and Development	Institute Supérieur Pédagogique de Gitwe
Kigali Institute of Education	Institute Polytechnique de Byumba
Kavumu College of Education	Kigali Independent University
Rukara College of Education	Catholic Institute of Kabgayi
Kigali Institute of Science and Technology	Institute of Agriculture, Technology and Education of Kibungo
Tumba College of Technology	Independent Institute of Lay Adventist of Kigali
Kicukiro Colloge of Technology	Kigali Institute of Management
Umutara Polytechnic	Rwanda Tourism University College
Kigali Health Institute	Institut d'Enseignement Supérieur de Ruhengeri
Rwamagana School of Nursing and Midwifery	Grand Sèminaire de Nyakibanda
Byumba School of Nursing and Midwifery	Mount Kenya University
Kabgayi School of Nursing and Midwifery	Jomo Kenya University of Agriculture and technology
Kibungo School of Nursing and Midwifery	University of Kigali

Enrolment at the postgraduate level accounts for a very small proportion of the total enrolment in public and private higher education institutions in Rwanda. While there are more than 63,000 enrolments at undergraduate level, there are fewer than 2,500 students and therefore less than three per cent registered for master`s or doctoral degrees.

Table 10: Student enrolment in public and private higher education institutions in Rwanda in 2012 (Ministry of Education, 2013)

	Male		Female		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
Certificate	59	0%	46	0%	105	0%
Diploma	6,809	15%	4,175	12%	10,984	14%
Bachelor`s Degree	34,264	81%	28,847	85%	63,111	83%
Post graduate (incl. Master`s and doctorate degrees)	1,618	4%	811	3%	2,429	3%
Total	42,750	100%	33,879	100%	76,629	100%

3.2.2 Higher education policy

The Ministry of Education in Rwanda adopted the current Higher Education Policy in July 2008.

The main specific objectives for this policy are:

- Better access to higher education
- Open and flexible learning systems supported by ICT
- Quality Management
- To modernise the teaching and learning process and to ensure that lectures and lecturers use internationally accepted methods
- To widen the capacity in science and technology education to bridge the science gap
- Improvement of governance and leadership of higher education
- Better cooperation between the several higher education institutions (even between private and public institutions)

(Ministry of Education, 2008)

3.2.3 Higher education staff

The qualification of staff in public and private higher education institutions is shown in Table 11. In public institutions nearly 40% of the academic staff has a bachelor`s degree, 40% a master`s degree and 15% a doctoral degree. In private institutions the percentage of

academic staff with a doctoral degree is similar but there are more people with master’s than bachelor’s degrees.

Table 11: Highest level of qualification for academic staff in 2012 (Ministry of Education, 2013)

	PhDs		Masters		Bachelors		Diploma	
	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage
State universities and other higher education institutions	224	15%	660	41%	676	42%	37	2%
Privately-owned universities	181	18%	632	64%	173	18%	0	0%

3.2.4 Funding of higher education

In 2007, 18.8% of the national budget was allocated to education, this ratio slightly decreased to 17.7% in 2012. The absolute expenditure for each student within tertiary education decreased by 50% during the same period, i.e. from \$2,570 in 2007 to \$1,230 in 2012 (UNESCO Institute for Statistics, 2014).

3.3 Renewable Energy Higher Education

The Kigali Institute of Science and Technology offers a 4 year lasting Bachelor of Science in Electrical Engineering (Kigali Institute of Science and Technology, 2014), the Umutara Polytechnic offers a degree course in Electrical Engineering since 2001 as well as diploma courses (Umutara Polytechnic, 2014). Another diploma course in Electrical Engineering is offered by Kicukiro College of Technology (Kicukiro College of Technology, 2014). The Tumba College of Technology offers a diploma in Alternative Energy, lasting two and a half years (Tumba College of Technology, 2014). The former National University of Rwanda was awarding a B.Sc. in Electrical Engineering.

The University of Rwanda plans to launch a four semester Renewable Energy Master Programme in 2015 (240 Credit Points). “The idea of developing a M.Sc. programme in Renewable Energy came as a result of the Nation’s need to improve energy access and services in general and renewable energy skills in particular to meet energy challenges faced by the country. These include lack of energy generation diversity where the country depend only on hydro power and thermal energy with associated problems in cases of drought (felt in 2004) and increase in petroleum product prices (regularly)” (Safari, 2014). The programme will be facilitated by the Department of Physics, the School of Engineering, as well as the School of Business and Economy. The projected yearly intake is 40 students for the first year and 80 students for the subsequent years, thereof 25% international students from neighbouring countries as well as worldwide (Safari, 2014).

3.4 Conclusions and Recommendations

With the University of Rwanda, as the merger of seven public universities, and additional private universities, there are a number of higher education institutions in Rwanda. The country is heading the global trend of rapid increase of tertiary enrolment in Africa for the period from 1985 until 2002, well ahead of Namibia and neighbouring Kenya, Tanzania and Uganda (Materu, 2007, p. 9). A relative high percentage of the teaching staff has a doctoral or master's degree, over 50% in public and over 80% in private higher education institutions, which indicates a reasonable quality of education.

The quality is supported as well from the current Higher Education Policy to ensure the use of international standards and methods. Especially the science and technology sector in higher education shall be widened.

The Rwandese Government declared its commitment to renewable energy, addressing the opening of the energy market, and addressing research and education in renewable energy, even if some of the goals (Safari, 2014) concerning the establishing of a new Renewable Energy Master (e.g. 30 national and 10 international students by 2015) look rather ambitious. Nevertheless, similar to other sub-Saharan countries also Rwandese Higher Education institutions require long term co-operation and access to research and education in that area. The Dutch SNV could play a role model when looking at its long-term and successful biogas dissemination programme in Rwanda.

Particularly the implementation of the new Renewable Energy Master Programme at the University of Rwanda could benefit from additional financial and personnel support by the RECP. As the government has a particular strong influence on Higher Education institutions in Rwanda, it is highly recommended to closely cooperate with these stakeholders during preparation and implementation of any RECP measure.

4 References

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