

IEEJ : July 2011



REPUBLIC OF RWANDA



Energy, Water and
Sanitation
Authority- Rwanda

Energy Policy

Japan Tokyo, July 2011

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Presentation Outline

- Country overview
- Electricity subsector
- ✓ Investment guiding documents
- ✓ Short and Medium term strategic papers
- EWSA overview
- Demand forecast by 2017
- Overall target by 2017
- Internal and Regional Investment environment
- Challenges and Recommendations

End

Country overview

- Rwanda is a land locked country in central eastern Africa borders; DRC, Burundi, Uganda and Tanzania
- Population : 10, 117, 029
- Land area (Square km): 26338
- GDP per capita: 520USD (2009 data)
- Average Temperature: 24.6 - 27.6°C
- Currency: Rwandan franc (RWF)

ENERGY SECTOR

Investment guiding documents

- Electricity Law
- National Energy Policy and National Energy Strategy
- Electricity Master Plan 2009-2025

Short and medium term strategic papers

- Investment Prospectus 2009-2013 (for EARP)
- Electricity Development strategy for the energy sector: 2011 – 2017

EWSA overview

- Installed and the imported capacity are 82.77MW and 16MW respectively.
- Peak demand 69MW.
- The HV transmission lines are 110 kV, 70kV and have in total 391.387km.
- The network has 18 substations.
- The network is monitored by SCADA System

Overview Continues

Projects	Current status (2011)	Targets/2017
Access	<ul style="list-style-type: none"> • 4900 Km MV & LV • 13% connections (195,085 connections) • 90% Health Centers • 26% Schools • 90% Administrative Centers 	<ul style="list-style-type: none"> • Additional of 1400Km of MV & LV length • 50% connections • 100% Health Centers • 100% Schools • 100% Administrative Centers

Overview Continues

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	GENERATION TYPE	GENERATION CAPACITY IN MW
National Installed capacity	Hydro	35.85
	Thermal	46.92
	PV	0.25
Total National Installed capacity		82.77
Import capacity		16
<i>Total (generation +import) capacity</i>		98.77

EVOLUTION OF NATIONAL OFFER IN KWH FROM 2000 TO 2010

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Year	2000	2001	2002
National offer	203,862,357	209,350,019	225,511,388

2003	2004	2005	2006
235,251,447	204,027,563	192,532,097	230,356,298

2007	2008	2009	2010
248,623,363	277,449,623	307,789,939	353,228,826

EVOLUTION OF NATIONAL OFFER IN KWH FROM 2000 TO 2010



DISTRIBUTION SYSTEM

- Distribution system is composed of 30kV, 15kV, 11kV and 6.6kV lines
- Low voltage distribution is composed of 0.4kV lines

Year	2006	2007	2008	2009	2010
Overall Electricity losses	22	18	18	20	19

CUSTOMER EVOLUTION

Year	2001	2002	2003	2004	2005
Customers	48,581	57,679	67,008	68,314	70,187

Year	2006	2007	2008	2009	2010
Customers	77,181	86,537	109,502	142,497	186,487

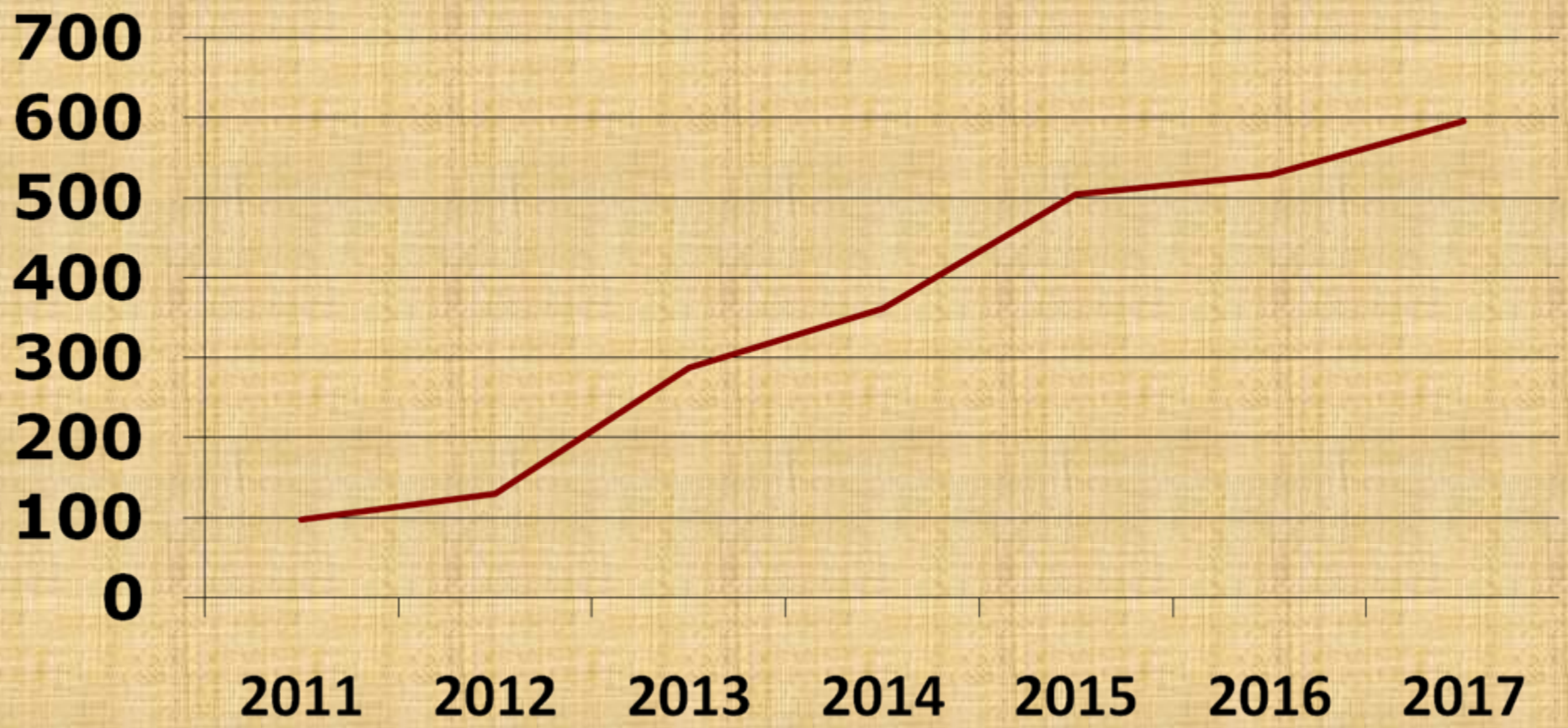
BILLING

- All low voltage (0.4kV) customers use prepayment Energy meters known as Cash Power
- All big customers (Medium voltage) are equipped with electronic meters with a GPRS and indexes are collected by the billing officer at his/her office.
- Electricity grid audit is undertaken for the reduction of the losses

YEAR	2009	2010	Increase
BILLING	38,282,956,140	44,286,253,018	6,003,296,878

POWER DEMAND FORECAST IN MW BY 2017

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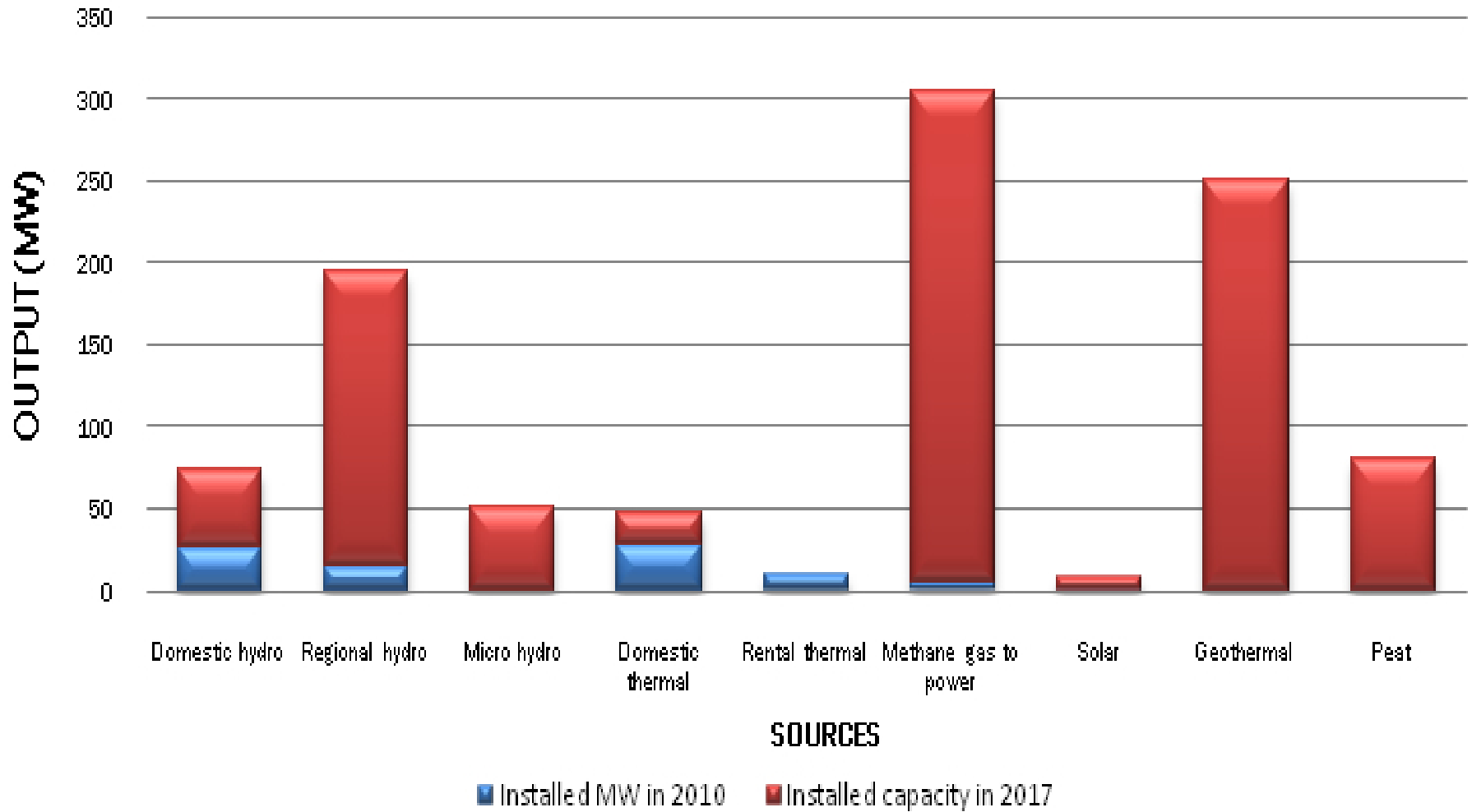
Overall targets by 2017

By 2017, Rwanda intends to have 50% electricity access connectivity and electricity production of 1000 MW

Generation Mix 2010-2017

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Energy Sources 2010 to 2017



Targets and investment opportunities directory

links:

http://mininfra.gov.rw/index.php?option=com_content&task=view&id=117&Itemid=145

<http://www.rdb.rw/about-rwanda/economy.html>

<http://www.ewsa.rw/projectsreco.html>

Electricity Master Plan 2009-2025 and

Electricity strategic plan for the energy sector:
2011 – 2017

Internal and regional investment environment

- Political will, electricity and energy infrastructure considered GoR priorities
- Clear roadmap strategic papers/documents
 - ✓ Vision 2020
 - ✓ EDPRS
- Belong to Two strong regional economic bodies i.e. EAC and CEPGL
- Embarked on
 - ✓ regional interconnection of electric grids and
 - ✓ exploitation of shared resources (Hydro and Gas)

The energy policy objectives are to support national development through:

- ensuring the availability of reliable and affordable energy supplies for all Rwandans;
- encouraging the rational and efficient use of energy;
- establishing environmentally sound and sustainable systems of energy production, procurement, transportation, distribution and end-use

Energy efficiency approach

- CFLs promotion programme
- Solar Water Heaters (SWH)
- Promotion of use of Liquefied Petroleum Gas (LPGs)
- Promotion of Energy Audits in Industries

EDPRS CFLs promotion programme (2008-2012): implications

- Number of lamps: 800 000 lamps
- 1 lamp CFL of 20 watts is equivalent to 1 incandescent lamp of 100watts, there is Saving of 80 W
- Per day: $80w \times 4h/d = 320 \text{ Wh/day}$
- Per year: $320wh/d \times 365 \text{ d} = 115 \text{ kWh/y}$
- Foreign exchange savings for 1 CFL: $115 \text{ kWh} \times 132 \text{ frw} = \text{Rwf } 15,180$
- For 800, 000 CFLs savings = $\text{Rwf } 12 \text{ Bn}$ or $22 \text{ 000 000 } \$/\text{year}$
- Savings over the EDPRS period: **US \$ 88mil**

EDPRS Solar Water Heating programme (2008-2012): implications

- Targeted 5000 hhs should be using SWH
- On average 5000 SHW are equivalent to 10 000 m² of Solar
- collectors= 1000 ToE/y
- Energy saving: 11,000 MWh/y
- Indirect foreign currency savings: 11000 MWh/y x 132000 Frw/Mwh = Rwf
- 1,45 Bill/yr
- Savings over the EDPRS period: Rwf 5.8 Bill = US \$ 10.56 mill

EDPRS LPG promotion programme (2008-2012) : implications

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- Programme: LPG: 5 000 tons /y :(about 20,000 households)
- 5 000 tons = 250 000 bottles of 20 kgs
- Consumption: 1 bottle/hh/month x12= 12 bottles/hh/y
- Number of hhs targeted by 2012 = 30,000 hh
- 30,000 hh x 12 bottles x 4 years = 1,440,000 bottles = 28,800 tons
- LPG consumed within the EDPRS period = 28,800 tons
- This would replace 190,080 tonnes of charcoal or 1,900,800 tonnes of wood

Promotion of Energy Audits in Industries

Most industries in Rwanda do not give the necessary weight to the use and management of energy. Annual energy audits of the industries will allow us to know the energy consumption of the industry and be able to recommend areas of saving by examining the whole industrial production chain. The programme also aimed at Sensitization campaigns on the efficient use of Energy in industries

Achievements

- Distribution of CFLs has tremendously been achieved
- Reduction of network losses from 35% in 2002 to 19% in 2010 commercial being only between 5-7%
- Solar water heater adopted last month (April 2011)-creation of Revenue PU
- Deal to connect 300 secondary schools with PV panels-Pilot project

Challenges

- National Energy Policy and National Energy Strategy is still adraft not gazetted or approved yet
- Companies don't understand the importance of energy efficiency
- Still depend of HFO and LFO as source of electricity (almost 50% of the total production)
- The country's main focus to day is to satisfy demand and increase connection rates, but supply is still low due to lack of diversification of energy sources.

Cont'n

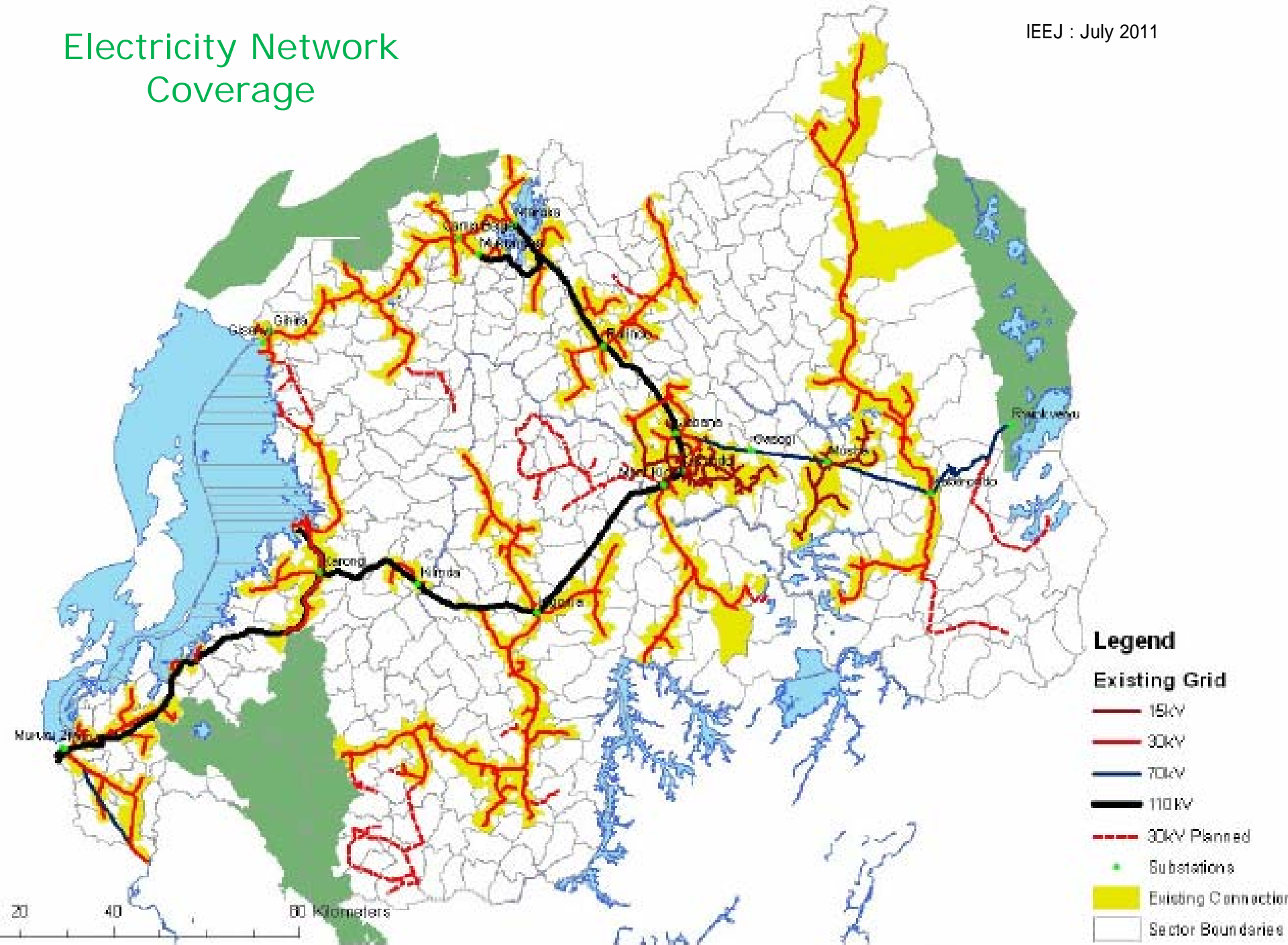
- Financial mobilization and Resource allocations
- High tariff of electricity due to production cost. Rwanda is among countries that has highest tariff rate (cents 20 \$/kwh)
- Determination of tariffs for IPPs(Independent Power Producers)
- Lack of adequate technical and financial capacity for private sector in energy sector

Recommendations

- Setting up a clear energy efficiency and conservation policy-2008-2012 need to be amended and adopted
- Carry out Regular energy audits and give incentives to the companies with good energy saving and conservation mechanisms
- Speed up the generation of other resources like geothermal, methane gas, biogas ,solar, peat, to reduce the cost of electricity; - i.e. Methane Gas (300MW),Geothermal(310MW), Hydro(230MW), Peat (200MW)

Electricity Network Coverage

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Thank you