



Republic of Rwanda
Scaling-up Renewable Energy Program
(SREP) Investment Plan



SREP Sub-Committee Meeting
Washington, DC
November 11th, 2015

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Director, Energy Division
Ministry of Infrastructure



Country Context

- Population 11.8 m (2013)
- Area 26,338 km²
- Highest population density in Africa creates land pressures
- GDP 643 US\$/capita, 15th poorest in the world, high levels of inequality
- Strong GDP growth 8.3% p.a. between 2008-2012
- Political stability and attractive regulatory environment are positive for private investment
- Improving literacy and numeracy provides basis for a more skilled national workforce

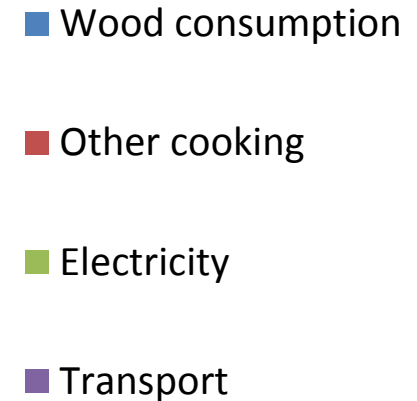
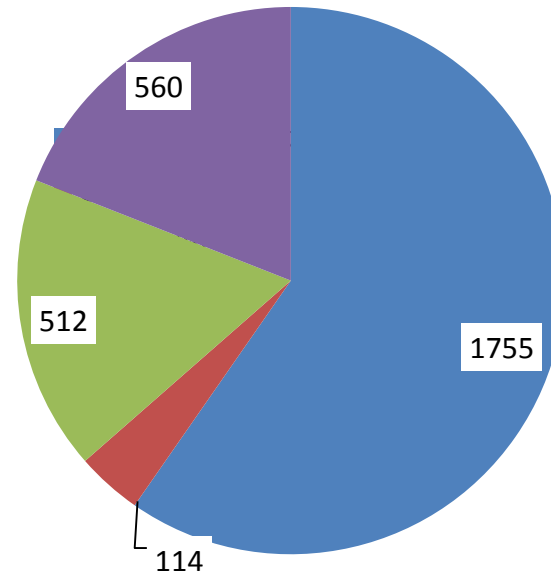
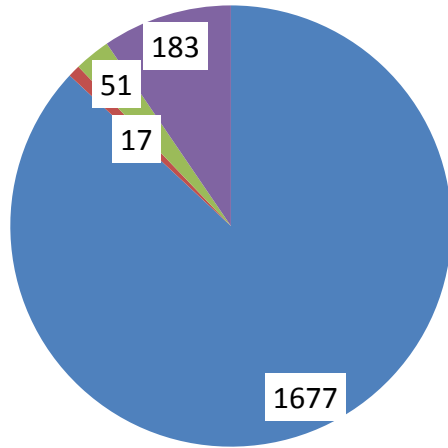




Energy Sector: Overview and Challenges

2009 consumption = 1,930 ktoe

2020 projection = 2,940 ktoe

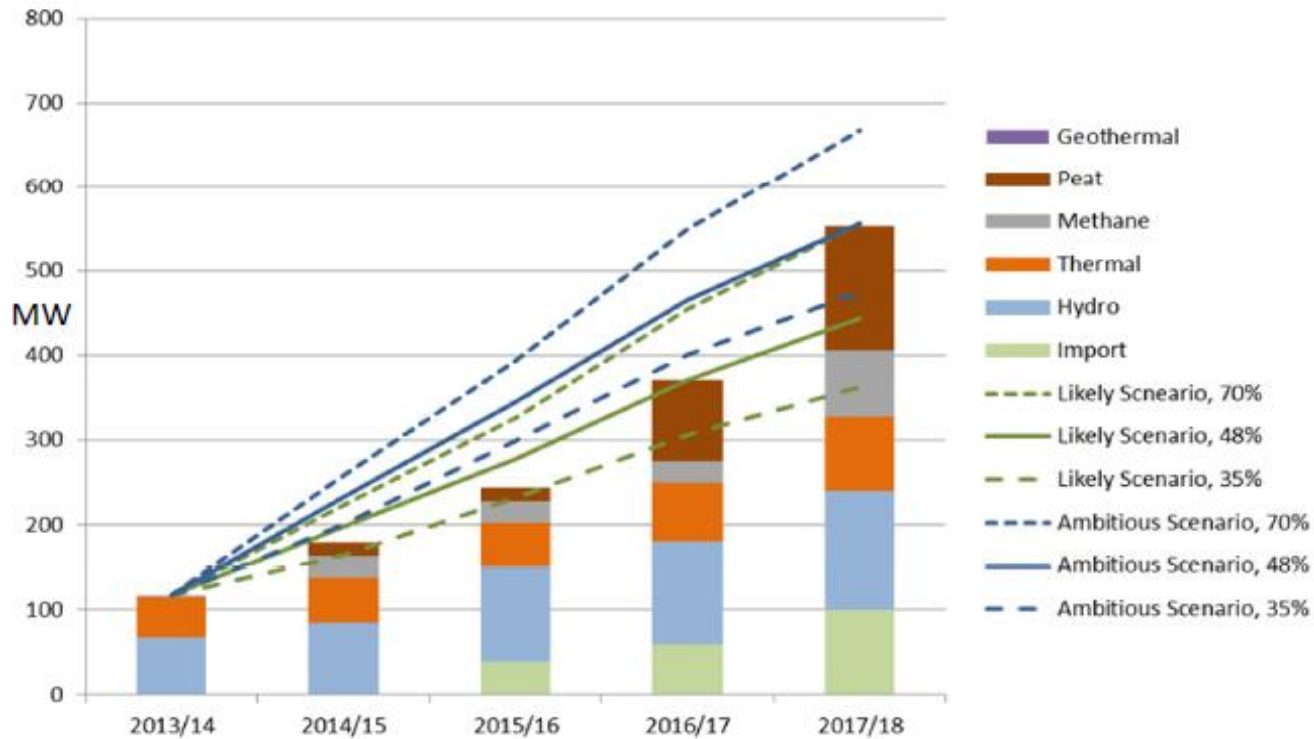


Rwanda's Energy Sector Strategic Plan (ESSP) – Targets by 2018:

- Increase the generation power from 160 MW to 563 MW
- Increase access to electricity from 24% to 70%
- Reduce carbon intensity of the grid by 10%
- Set up energy fund to facilitate private sector investments



Electricity Sector: Overview and Challenges



- Generation mix dominated by hydropower (59%), thermal (34%), solar (6%), and methane (1%) (2015)
- Most promising renewable energy options include hydropower, solar PV, and geothermal in long-term.
- Increase access to 70% (on-grid 48%, off-grid 22%)



SREP Rwanda: Off-grid and Private Sector

Objective: Develop financially sustainable long-term markets for private sector provision of off-grid electricity services

- Off-grid focus aligned with energy sector priorities
- Enabling environment to catalyse potential for private sector-led market for scaling-up off-grid electrification
- Companies and business models emerging which are capable of significant scale-up on a sustainable manner
- Market transformation needed to overcome barriers:
 - Access to capital constrained due to market risks uncertainty
 - Market at early stages of development, low consumer awareness
 - Equipment quality inadequate and standards not enforced
 - Institutional, legal, and regulatory constraints



Rwanda IP Preparation

MDB
scoping
mission

MDB joint
mission:
stakeholder
consultation
& project
prioritisation

MDB technical
mission:
stakeholder
consultation
(Energy Sector
Group)

Independent
technical
review

Stakeholder consultation



Dec



Mar

Apr

May

June

July

Aug

Sept

Oct

Nov

Submission to
SREP Sub-
Committee

SREP Sub-
Committee
Meeting





Rwanda IP Consultation Process

Consultation at heart of process:

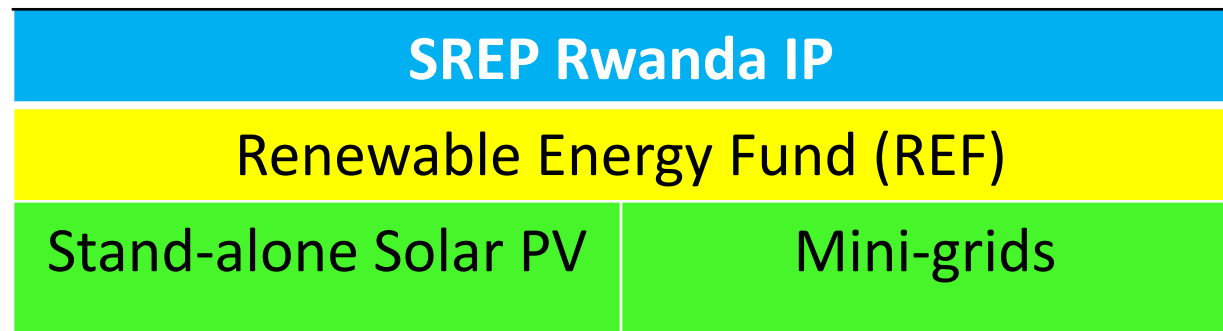
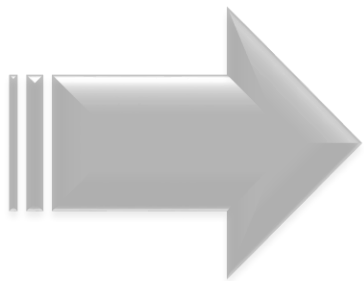
- Sector working group (SWG)
- Technical working groups
- Development partners
- Energy companies / developers
- Banks, investors, financiers
- Civil society

- Acumen.org
- AfDB
- Afritech Energy
- Amahoro Energy
- ARED
- Azuri
- Barefoot Power
- Belgian Embassy
- Belgian Development Agency
- Berkeley Energy (African Renewable Energy Fund)
- Colorado State University – Smart Village Microgrid Team
- Dfid
- FMO
- FONERWA
- GIZ
- Goldsol
- Great Lakes Energy
- IFC
- Inkomoko
- KfW
- Mesh Power
- Micro-hydro Power Roundtable Group (15 companies)
- MINICOFIN
- MININFRA
- Mobisol
- Ngali
- Power Africa (Rwanda)
- Project Developer Rukarara
- RDB
- REG
- REMA
- Renewable Energy Association
- Rocky Mountain Institute
- RURA
- Rwanda Development Bank (BRD)
- Serve & Smile
- SNV
- Societe des Grand Lacs
- Vivid Economics
- World Bank



Rwanda IP Prioritisation Process

- Prioritization criteria aligned with SREP criteria and national priorities
- SREP to support two key areas of Energy Sector Strategic Plan (ESSP)
 - Help meet 22% off-grid electricity access through stand-alone solar PV and mini-grids
 - Provide initial capitalization of an energy fund as the mechanism for financing the investments





Rwanda IP - Renewable Energy Fund (REF)

- ***Stimulate growth*** of privately-led market for off-grid electricity provision
- ***Coordinating mechanism*** to consolidate Government and donor support to Rwanda's off-grid strategy
- ***Flexibility***, responding to market demand and consumer choice, no top-down allocation to technology options
- ***Leverage***, capitalized with capital and grant contributions from SREP, development banks, donors, and government
- Windows for barrier removal include investment support and technical assistance
- Financial products will include loans, guarantees aimed to gear-up private sources of capital, and grants and results-based finance



REF Windows for Barrier Removal

Investment support to overcome constraints on access to capital

- Pre-investment support (e.g., seed capital)
- Investment support (e.g., loans, grants)

Technical assistance to improve enabling environment conditions to unlock and systematically scale-up private investments in off-grid electrification

- Market development (e.g., consumer awareness, market intelligence, technician training programs, project pipeline development)
- Promoting business use of electricity (e.g., rural economic activities)
- Increasing technical capacity (e.g., establishing and enforcing equipment standards, etc.)
- Institutional & regulatory support (regulations for mini-grids, institutional support for managing REF, development of monitoring and evaluation framework for off-grid sector, etc.)



***Potential* REF Sub-program: Mini-grids**

- Build markets and private sector capabilities to develop financially sustainable and scalable mini-grid systems
- Demonstrate commercial and technical viability of mini-grid business models
- Potential for micro-hydro and solar PV
- Off-grid productive uses
- Designed to support private sector, with incentives not only to invest, but also to ensure sustainability
- Support companies developing mini-grids through:
 - Loans/guarantees to address access to finance barriers
 - Grants to improve affordability



***Potential* REF Sub-program: Stand-Alone Solar PV**

- Build markets and private sector capabilities to develop stand-alone solar PV systems
- Designed to harmonise and coordinate support to achieve substantial scale-up, with a focus on improved quality products
- Minimise market distortion; main focus on loans, grant component only to be used where deemed necessary
- Supporting businesses supplying solar PV:
 - Loans to support working capital requirements for companies offering pay-as-you-go systems
 - Guarantees / subordinated debt to address repayment risks
 - Credit lines for community / micro financing institutions on-lending for consumer finance
 - Loans and / or risk guarantees to companies supplying energy to social infrastructure



REF Implementation Arrangements

- REF will be hosted within an existing financial institutions and/or mechanisms (e.g., Development Bank of Rwanda, FONERWA) in order to streamline set-up process and contribute to local capacity-building
- Selection criteria for hosting institution, together with capacity assessment of alternatives, will be developed during project preparation
- Examine lessons learned from similar funds in neighbour countries (e.g., Uganda, Tanzania)
- World Bank will be the primary implementing partner for REF, with collaboration from other development partners



Rwanda IP - Expected Outcomes

- Based on illustrative scenario, noting that actual impact will depend on market demand for stand-alone solar PV and mini-grids systems, the **expected impact of the REF** includes:
 - 20 MW renewable energy capacity installed
 - 1.49 million people with access to electricity
 - 425 businesses and community services with access to electricity
 - Co-benefits include enhanced energy security, improved gender equality and women's socioeconomic status, improved quality of life in rural areas.



SREP Rwanda IP Financing Plan (US\$m)

Financing Plan is indicative. Actual allocation for Mini-grids and Stand-alone Solar PV Systems sub-programs will depend on market demand.

Project / sector	Project component	Total	Private Sector	Other dev. partners	REF budget, of which:		
					MDBs (WB, AfDB)	GoR	SREP
Mini-grids	Feasibility & TA	1		1			
	Investment	64.3	34.3	3.9	14.0		12.1
	Sub-total	65.3	34.3	4.9	14.0	0.0	12.1
Stand-alone solar PV systems	Market building	2		2			
	Investments	108.4	40.0	12.0	16.0	5.3	35.1
	Sub-total	110.4	40.0	14.0	16.0	5.3	35.1
TA / Enabling Environment	TA / Enabling env't	7.2		4.7			2.5
	IP prep. grant	0.3					0.3
	Sub-total	7.5	0	4.7	0	0	2.8
TOTAL US\$m		183.2	74.3	23.6	30.0	5.3	50.0

REPUBLIC OF RWANDA



MINISTRY OF INFRASTRUCTURE

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