REPUBLIC OF RWANDA

MINISTRY OF INFRASTRUCTURE

ENERGY PERFORMANCE REPORT /BACKWARD LOOKING JSR FOR FY 2015/16

ENERGY SECTOR

Kigali, November 2016

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List of abbreviations

Abbreviations	
AfDB	African Development Bank
BTC	Belgium Technical Cooperation
DPs	Development Partners
EARP	Electricity Access Rollout Program
EDCL	Energy Development Corporation Limited
EDPRS	Economic Development and Poverty Reduction Strategy
EIA	Environment Impact Assessment
EU	European Union
FY	Fiscal Year
GOR	Government of Rwanda
HEP	Hydroelectric Project
HP	Hydro power
HPP	Hydro Power Plant
ICS	Improved Cook Stoves
JICA	Japan International Cooperation Agency
JSR	Joint Sector Review
LCPDP	Least Cost Power Development Plan
LPG	Liquefied Petroleum Gas
LV	Low Voltage
MINALOC	Ministry of Administration and Local Government
MINECOFIN	Ministry of Finance and Economic Planning
MINEDUC	Ministry of Education
MHPP	Micro Hydropower Plant
MININFRA	Ministry of Infrastructure
MV	Medium Voltage
MW	Megawatt
NDF	Nordic Development Fund
NELSAP	Nile Equatorial Lakes Subsidiary Action Program
PPA	Purchase Power Agreements
PSF	Private Sector Federation
PV	Photovoltaic
RDB	Rwanda Development Board
REG	Rwanda Energy Group
RURA	Rwanda Utilities Regulatory Agency
SCBI	Strategic Capacity Building Initiative
SP	Societé Petrolière
SWH	Solar Water Heater
TL	Transmission line

I. INTRODUCTION

Access to safe, reliable and cost effective energy is essential to achieving the levels of growth defined under the Economic Development and Poverty Reduction Strategy (EDPRS II).

Energy is a critical productive sector that can catalyze broader economic growth and contribute significantly to facilitating the achievement of the country's social economic transformation agenda. In order to realize the desired development impact of 7-year Government Program, EDPRS-II and Vision 2020, the Government of Rwanda adopted and implements sound, comprehensive national energy policies and plans capable of taking into account dynamic factors such as, economic and population growth, natural resource constraints and dispersed settlement patterns. It is expected that by the end of the EDPRS II in 2018, the electricity generation installed capacity shall be 563MW, while the overall access to electricity nationwide shall be at 70%, split into on-grid (48%) and off-grid (22%) connections, with the priority being given to the electrification of economically productive areas.

Objectives of the Backward Looking Joint Sector Review.

The backward looking 2015/16 JSR has the key following main objectives:

- To assess and analyze the progress in achieving sector objectives with focus on 2015/16 energy sector targets and their corresponding policy actions;
- To present and discuss budget execution performance for 2015/16;
- To highlight priority areas for the 2017/18 fiscal year that will inform the planning and budgeting process for institutions in the sector;
- To review progress against implementation of recommendations from the last JSR meetings.

Methodology.

A consultative approach was used during the preparation of the backward looking JSR report with involvement of all key stakeholders through Technical Working Groups (TWGs).

Four[1] TWGs met during the period of 10th to 19th October 2016 to discuss on the review of TWGs terms of reference, sector progress, highlighting the key specific challenges, and as well as the backward looking terms of reference and hence established a calendar for the consultation process. The draft report was shared with the 4 TWGs for inputs/comments for consideration in the draft final report presented to the Sector Working Group (SWG) for validation.

II. PERFORMANCE REPORT ON 2015/16 ENERGY SECTOR PRIORITIES

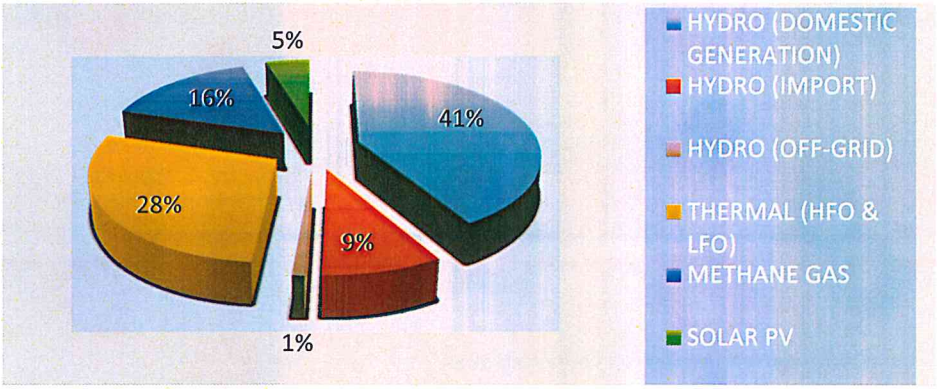
This section highlights the achievements against 2015/16 energy sector priorities in both generation, electricity access, transmission and distribution, biomass and energy efficiency subsectors.

[1] Biomass, Access, Generation, Efficiency TWGs.

2.1 Electricity generation.

During the 2015/16 Fiscal Year (FY) the electricity generation capacity increased by 30MW after the commissioning of KivuWatt Methane Gas Power Plant (26MW) and Giciye II Micro Hydro Power Plant (4MW[2]), which led to the current national total installed capacity of 190MW corresponding to energy generated of 593, 571 GWh/year for the fiscal year 2015-16 . The Renewable Energy available is currently 107.2MW equivalent to 376.072GWh/year which includes additional 8.14GWh from 2015.

The energy mix as detailed below is composed of hydro at 51% (41% for domestic generation, 9% for import and 1% for off-grid), thermal at 28%, methane gas at 16% and solar at 5%.

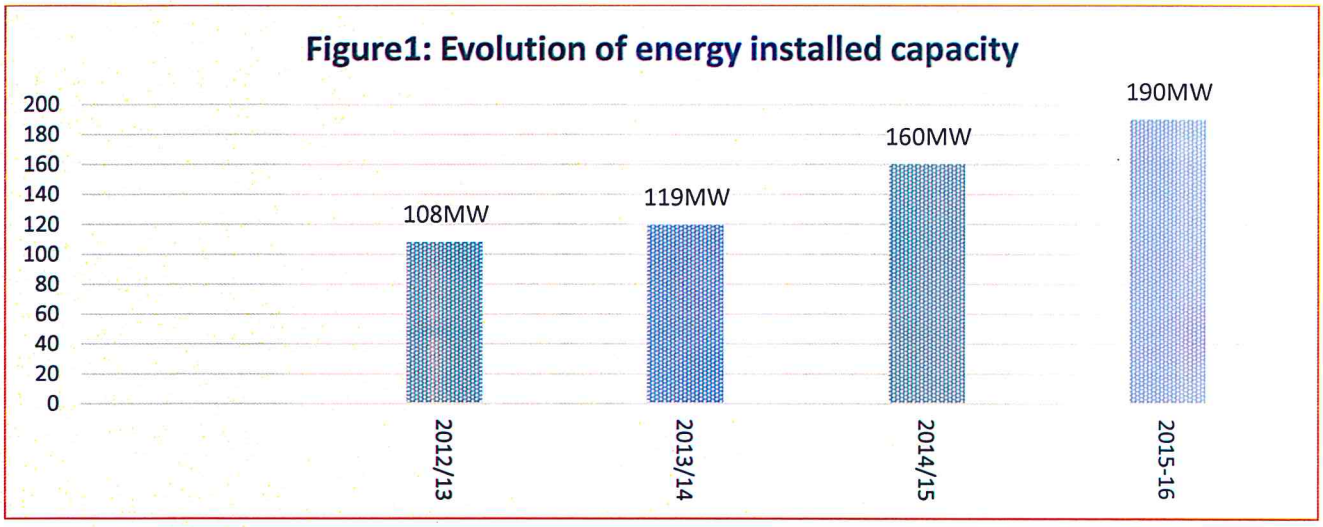


It is expected that in the FY 2016/17, a total of 23MW will added to the national grid, emanating from Gishoma Peat Power Plant (15MW) and KivuWatt additional 8MW; increasing the total installed capacity to 213MW. The 30MW power import is expected by August 2017 subsequent to the completion of regional interconnections.

There are other major projects being undertaken which will substantially increase the installed capacity; these include 50 MW Symbion Methane Gas Power Plant Project, 80 MW Hakan Peat Power Project and regional projects i.e. 80 MW Rusumo Falls and 147MW Rusizi III Hydro Power Projects (note that only a third of this generation capacity is allocated to Rwanda). The Government of Rwanda started also negotiation with Symbion on the PPA and concession of KPI.

The figure below illustrates the evolution of national installed capacity since 2012 until 2016.

[2] During the forward looking report, the second generator of Giciye2 MHPP, generating 2MW was not yet operational.



Source: REG administrative data, 2015/2016

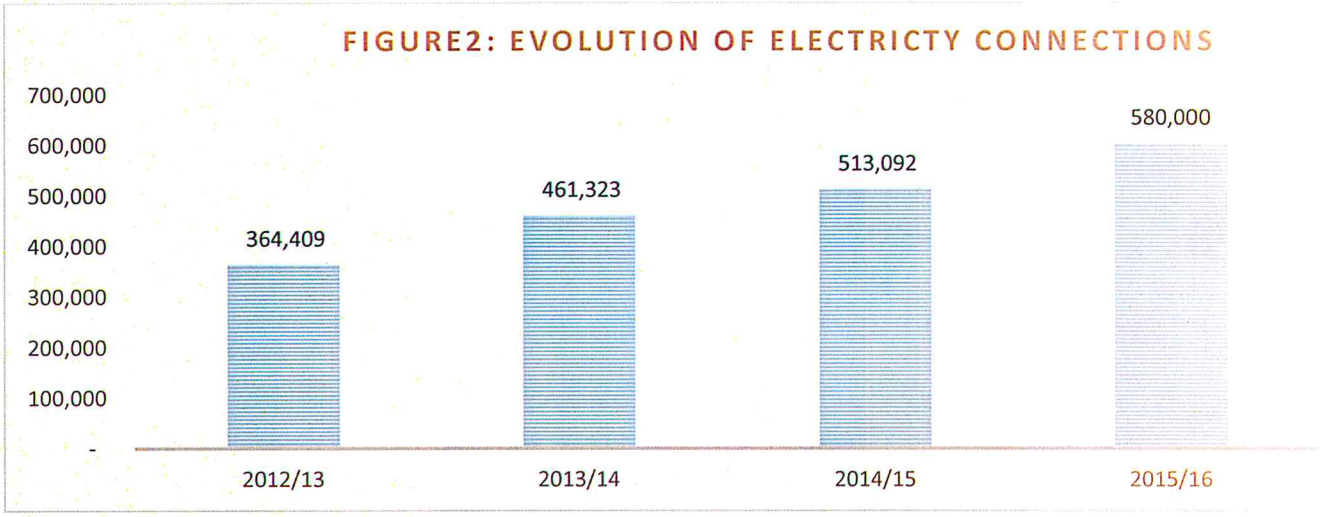
2.2 Access to electricity.

The objective target for 2015/16 was to have increased power production and extension of the national electricity grid in order to increase the number of electricity connections by 60,000. Further, the government priority was to increase electricity access through off-grid solar home systems with a target of 22% off- grid access by 2017/18.

During the fiscal year 2015/16, the total number of connections to the national grid increased from 513,092 to 580,000 (66,908 new connections) corresponding to 24.3% of active subscribers with access to electricity while 37,250 households got access to electricity using off- grid solutions installed in partnership with private sector players e.g. Mobisol, Mesh Power etc. The off-grid connections were standing at 1.5% of households in Rwanda in June 2016 and increased to 2.6% by the end of October 2016.

In a bid to accelerate economic growth, numerous productive use areas were connected to electricity including 25 water pumping stations, 324 markets, 34 milk collection centers, 16 irrigation sites and 171 telecom towers.

In the context of implementing Rural Electrification strategy approved by the Cabinet in April 2016, agreements were signed between Rwanda Energy Group and 16 private companies distributing solar energy solutions i.e. Mobisol, NESELTEC, NOTS, Ignite, etc. . The government is also conducting a national awareness campaign "Amashanyarazi kuri bose" which was launched in September 2016. The figure below portrays the evolution of electricity connection between the fiscal years 2012/13 and 2015/16.



Source: data from REG/EARP, 2015/16 (on-grid)

2.3 Electricity Transmission and Distribution.

To improve quality of power supply and reduce transmission and distribution losses, new transmission lines, substations as well as distribution infrastructures were constructed. Some were completed, while others are ongoing.

Transmission lines and related substations completed or nearing completion include:

- 220 kV Mirama–Shango, 93.5 km transmission line connecting Rwanda and Uganda was completed and the associated substation construction is ongoing at Shango.
- 110 kV Birembo-Shango, 9 km transmission line was completed.
- 110 kV Rukarara-Kilinda, 31 km transmission line and its associated substation were completed.
- 220 kV Shango–Karongi-Rubavu–Goma, 167 km transmission line connecting Rwanda with DRC is under construction and is at 92% completion.
- 110 kV Ntendezi- Bugarama, 17.5 km transmission line and associated substation was completed and commissioned.
- 110 kV Gishoma-Bugarama, 13 km transmission line was completed.
- Rehabilitation of Rulindo and Gifurwe substations: 50% construction, 78% of electrical materials ordered.
- Construction of 110kV TL Rulindo-Gabiro-Musha with Gabiro substation: design completed and procurement of electrical material is ongoing.
- 30kV Rulindo-Byumba-Ngarama TL: design completed, procurement of electrical material is in ongoing;

During the fiscal year 2015/16, distribution network constructed were:

- Medium voltage level, 842.96 km were constructed exceeding the 766 km planned (110.04% of the planned annual target).
- Low voltage level, 1155.53 km were constructed, equivalent to 88.75% of the annual target (1302 km).

2.4 Energy efficiency and energy security.

Energy efficiency and security of supply covers ongoing programs to promote sustainable use of energy saving lights (LEDs & CFLs), LPG, biogas, Improved Cook Stoves (ICSs), Solar Water Heaters, power loss reduction projects and fuel storage projects.

LPG, Biogas and ICSs- efforts were made for the promotion of biogas as an alternative source of energy with the following achievements against the annual target of 3500 biogas digesters for the 2015/16 FY:

- The ongoing campaign (Amashanyarazi kuri bose) incorporates awareness of biomass alternatives as the best approach to reduce biomass dependency and hence reducing the share of biomass usage in the energy mix.
- 2,275 new domestic and institutional biogas digesters were constructed in households, schools and prisons and rehabilitation of the non-operational digesters was done;
- In collaboration with WDA (Work force Development Authority) the Biogas Curriculum was developed to train a pool of local experts to support the program;
- 626 Masons in 22 districts were trained in biogas digesters construction;
- Within the same period, technical support was provided for the promotion, marketing and dissemination of 8700 ICSs.

Note: The figures on the number or percentage of HHs using Tier 1 and above cooking methods (LPG, biogas, ICS etc.) will be provided by the ongoing Multi-tier framework survey; the preliminary results are expected in April 2017.

Solar Water Heater - Under the "Solar Rwanda Program", 550 SWHs were installed against the annual target of 1500 and an awareness campaign was conducted to continue mobilizing households and health centers to use solar water heaters.

Power Loss reduction from 22.7% to 15% by 2018-Efforts are being undertaken through different projects to reduce commercial and technical losses including:

- Project to enhance efficiency in operations and commercial loss reduction. The contract was signed on 16th September 2016 with Application Software IFS Pty & Fluentgrid Limited; the total implementation period and training is expected to cover a period of 18 Months;
- Ongoing projects to reduce technical losses: (i) EU- funded Kigali ring network & smart metering project, (ii) JICA funded substations meant to stabilize power supply to KSEZ, Kigali Airport, etc., (iii) Rulindo-Ngarama-Musha Transmission Line Infrastructure project, (iv) Kibuye-Kigoma-Rwabusoro & Mamba-Rwabusoro-Rilima transmission line, (v) rehabilitation of distribution lines.

Fuel storage- The Petroleum storage reserves were increased from 31 Million liters to 72 Million liters during fiscal year 2015/16 resulting from additional storage capacity constructed by private sector (OILCOM and SP Ltd) that commissioned 19 Million and 22 Million liters of storage depots respectively.

Negotiations are ongoing with the private sector to build additional 60 million liters strategic fuel storage reserves to be added to the national strategic reserves.

2.5 Implementation status of EDPRS2 and recovery plan.

Considering the EDPRS2 mid-term targets and with reference to the current implementation status, progress has been made with respect to access to electricity and electricity generation capacity increase, which are respectively 26.9% (24.3% on grid and 2.6% off-grid) and 190MW. However, it appears that the gap is still huge (as shown in the annex.5) to meet both electricity access and generation targets of 70% and 563 respectively by 2018, mainly due to the financing gaps, procurement and project execution delays/contract management.

The current status clearly justifies the need for the sector to strategize more in order to achieve the set targets. Several assessment and analysis that will guide the review exercise especially in demand and supply side management are being undertaken with the support of different partners such as:

- Update of the "Least Cost Power Development Plan" –being done by MININFRA and REG;
- Electricity Development Master Plan (2017-30) – a review being undertaken with support from Israel Electric Corporation (IEC), expected to be delivered in June 2017;
- An Integrated Resource Plan (IRP) for Rwanda's electricity system- Rocky Mountain Institute (RMI).

At the same time, strategies are being implemented to fast-track the main projects that will help in achieving access targets for both on and off-grid.

For off-grid connections:

- Eighteen (18) agreements already signed with solar private companies;
- Incentives to private companies active in Solar Home Systems (SHSs) for the availability of products at affordable prices will contribute to speed up the implementation of Rural Electrification Strategy (RES) and achieving off-grid target. Mobilization of funds continue to supplement SREP funds of about USD 50 million to support the implementation of RES;
- The design of RES program1 is ongoing to support households in Ubudehe category 1 to have access to off-grid solutions.

For on-grid connections:

- To accelerate on-grid connection, all households within 37 meters from LV poles and all villages within 500 m from distribution transformers were identified for connections. Modalities for repayment are under discussions to facilitate low-income households to have access to on-grid electricity.
- Accelerate on-going contracts: Speed up implementation of ongoing Engineering, Procurement and Construction (EPC) and districts contracts and all those planned to start in FY 2016/17 i.e. BADEA, Saudi, WB, BTC, etc.

2.7 Challenges and strategies.

The main challenges faced by energy sector include (i) financing gaps, (ii) electricity tariffs remains subsidized and so do not reflect the investment costs incurred, (iii) limited affordability/accessibility for the use of off-grid solutions and dependence on biomass for cooking for the majority of households, (iv) High energy losses (22.7%) and unreliable power supply. The detailed challenges and lessons learned are developed in the annex 4.

2.6 Cross-cutting issues.

2.6.1 Capacity Building and Technical Assistance – Energy sector is supported by Experts from different partners to improve the capacity of the staff but also for the development of required analysis in the sector:

- *Technical assistance through EU budget support*- Exergia firm was recruited to provide support required for the implementation of the budget support. Currently 2 consultants are on board, one for the completeness of the Functional Review exercise and another for the preparation of the 2nd disbursement request and review of the agreement;
- *BTC through EARP*- experts through the project Institutional Strengthening and Capacity Development of Electricity Utility (CDEU);
- *Africa Governance Initiative (AGI) Expert*- to provide advice and technical support;
- *Israel Electric Corporation (IEC) Experts*- delivering critical trainings to local counterparts and technical support in the development of National Power Master Plan;
- *Rocky Mountain Institute (RMI)* - for the development of an Integrated Resource Plan (IRP) for Rwanda's electricity system;
- *GOPA International, a German Energy Consultancy firm recruited through AfDB support*- to provide capacity building support in form of trainings and technical assistance;
- *Netherlands support*- Consultants for Lake Kivu Monitoring Program (LKMP);
- *International Atomic Energy Agency (IAEA)* – support for the development of Radiation Law and Integrated Nuclear Security Support. They are also providing training on energy demand and supply analysis to REG, MININFRA, RURA, RNRA and MINICOM team.

With the Functional Review exercise, it is expected that various partners will align their support for the implementation of the capacity building action plan that will be approved by the Steering Committee composed of Development Partners and MININFRA.

2.6.2 Environment and Gender- Environment is one of the cross-cutting issues that is predominantly addressed in the implementation of energy programs/ projects. The replacement of biomass energy with other alternatives such as LPG, biogas and peat briquettes, LPG tax removal, subsidies and

technical support for biogas and private sector involvement in making peat briquettes are some of measures in place to reduce the pressure on use of row biomass.

Environment Impact Assessment (EIA) is also a precondition to all power projects development and the protection of rivers near Micro Hydro projects is done in a coordinated way with all concerned institutions.

Gender is another key cross-cutting issue that is being addressed by energy sector at policy, strategy and operational levels. For example, under the Rural Electrification Program, Increasing energy access to majority households especially in rural areas in itself promotes women's empowerment by; i) enabling more small business start-ups and increasing productivity of existing one's including those owned by women, ii) security and safety to the rural households especially to women who are prone to rape and other delinquent behaviors, among others. The use of improved cooking techniques reduces the burden of firewood collection and the time of cooking, making women save time for other productive activities, contributing then to improvement of the quality of life and education to women and men.
Under the current contracts gender mainstreaming has also been followed through employing considerable number of women into construction of power transmission and generation projects.

2 BUDGET EXECUTION FISCAL YEAR 2015/16.

The overall energy budget execution rate is 92 % for the Fiscal Year 2015/16. The execution rate is respectively 112% for the recurrent and 87% for development budget. The recurrent budget execution rate exceeded 100% due to the increase in expenditures for the heavy fuel oil. The budget allocated to fuel subsidies increased from 15,616,803,652 FRW to 17,616,734,631 FRW during the budget revision.

The budget execution per program and subprograms as defined by MINECOFIN (Program: Fuel and Energy, subprogram1: Electricity Generation, subprogram2: Electricity Transmission and subprogram3: Alternatives Energy Sources Promotion) is detailed in annex 2.1 for the domestic budget. The execution rate of 77% for Electricity Generation subprogram was due to the budget planned for the construction of the Lake Kivu Monitoring laboratory which was not utilized because the prerequisite study was not yet finalized.

For the fiscal year 2014/15 the overall energy budget execution rate was 89.89% with 125.09% for the recurrent and 82.87% for development budget.

The annex 2.2 shows the execution rate and general performance of other off-budgetary projects externally financed. The latter includes loans and grants signed between the Government of Rwanda represented by MINECOFIN and Development Partners i.e. Kingdom of Belgium, World Bank, OFID, EU, Netherland, AfDB, KFW, NDF to support the implementation of electricity generation and transmission projects.

The execution rate for 2015/16 is above 70% for all loan and grant agreements with the exception of:

- KFW&EU grant for the construction of Kigoma-Ngozi/Burundi) electric line for which the budget allocated for 2015/16 FY was not utilized due to the procurement process which took long. The Supervising is preparing tender documents expected to be ready and published before the end of November 2016. The recruitment of the contractor is expected to be concluded by February 2017.

- AfDB loan for the construction of Rusumo-Kigali Airport-Shango transmission line for which the budget was not utilized too. This was caused by the delay in recruitment process of the consultant mainly due to the feedback to the Non Objection request that took long time;

- NDF grant (to be closed by 31st December 2017) which performed at 30.08% for the 2015/16 FY; however the overall execution of the grant is at 77.78%.

Considering the overall performance, the lowest cumulative project spending rate registered is 4% for the project "Improving Access to Reliable On - Grid Electricity Services for Households and Priority Public Institutions - Belgian Contribution EARP".
The average execution rate for the off-budgetary projects externally financed is 65.43% during the Fiscal Year 2015/16.

3 PRIORITY AREAS FOR THE 2017/18 FISCAL YEAR.

The priorities for 2017/18 that shall be the reference point for energy sector in planning and budgeting are in line with EDPRSII annual targets and the ESSP. The key priority areas will cover the following:

1. Efforts will be focused on grid strengthening projects- Construction of domestic transmission lines and interconnections.
2. Increasing power generation- MININFRA/REG will ensure fulfilment of its obligations under committed energy production projects/IPP by facilitating Developers in site acquisition and basic infrastructure development such as roads, water and power evacuation lines for new sites.
3. Regional hydro power projects such as Rusumo and Rusizi III where Government of Rwanda participation as one of the country beneficiaries will be important; the budget for land acquisition for Rusizi III is one of the priorities for 2017/18.
4. Continue to promote initiatives aimed at increasing access to electricity- Connecting of new household customers and designated productive areas, specifically identified industrial zones for financial sustainability in order to achieve EDPRSII targets.
5. Also, efforts will be increased for the promotion of alternative cooking technologies to reduce the use of biomass.
6. Fast-track implementation of Rural Electrification Strategy for the achievement of off-grid targets.

4 OFFICE OF THE AUDITOR GENERAL'S REPORT IMPLEMENTATION STATUS AND UPDATE ON THE PREVIOUS JSR RECOMMENDATIONS

5.1 Office of the Auditor General's report Implementation status.

The recent audit covered the year ended 30th June 2014 and was the last audit of EWSA following the promulgation of Law no. 97/2013 of 30/01/2014 under which EWSA was restructured to form two new entities of Rwanda Energy Group Limited (REG Ltd) and Water & Sanitation Corporation Ltd (WASAC Ltd) in line with the Government of Rwanda's reforms in the energy and water sectors. The report is available on: www.oag.gov.rw.

The key issues highlighted in the report include: (i) lack of proper accountability for EWSA operations, (ii) high cost of production threatening sustainability of services, (iii) delayed completion of projects, (iv) hydro power plants operating below installed capacity, (v) lack of accountability for high volume of electricity produced and (vi) high number of idle assets.

Following the reform, the management of REG deployed efforts in addressing the above issues to ensure efficient and sustainable operations in the energy sector. The current implementation status of the recommendations is summarized as follows:

- Concerns over financial statements are implemented at 91%: out of 65 recommendations 59 were fully implemented while 6 are partially implemented;

- Concerns over compliance implemented at 76%: out 76 recommendations, 58 were fully implemented and 15 partially implemented.

- Regarding the issue of idle assets, REG started the public auctioning of these assets whose value is estimated at five hundred million Rwandan Francs. The process is on-going until all assets will have been sold out.

The overall implementation status for finance and compliance is at 83.5%.
Note: The Office of Auditor General is currently conducting the audit of REG for 2014/15.

5.2 Update on the previous JSR recommendations

The implementation status of the recommendations from the previous Forward Looking Joint Sector Review (FLJSR) are summarized in annex 6.

5 INSTITUTIONAL, LEGAL AND REGULATORY FRAMEWORK AND ANALYTICAL STUDIES INCLUDING EUROPEAN UNION BUDGET SUPPORT (EU BS).

During the FY 2015/16 various sector documents i.e. laws, policies, strategies and studies were elaborated and approved while others are still under development:

- ***Rural Electrification Strategy*** approved by Cabinet on 27th April 2016;
- ***Rwanda Energy Investment plan*** approved in November 2015 by Scaling up Renewable Energy Plan (SREP) Subcommittee;

- ***Renewable Energy Law*** was reviewed based on comments from Law Reform Commission. It will be submitted to Prime Minister 'Office for review before submission to the Cabinet for approval.
- ***Charcoal Value Chain Complementary Study:*** the draft final report was presented to Biomass TWG on 21st April 2016. The study will serve as basis for the development of biomass strategy.
- ***Biomass energy strategy-*** contract negotiation with the successful company (CAMCO) concluded, the assignment is expected to start before the end of November 2016 and will take 6 months from the effective date of the contract.
- ***Off-grid and biomass baseline study*** – draft final report to be presented to stakeholders for inputs.
- ***Awareness of Rwanda Energy Policy approved in March 2015,*** conducted through different media outlets.
- ***Geothermal surface studies:***
    - *Kinigi:* detailed studies completed in April 2016, additional studies such as seismic and local geological mapping were recommended by UNEP experts. Proposals are being prepared by REG for funds mobilisation to conduct additional studies.
    - *Gisenyi*: report on detailed study underway, expected by end December 2016; this will inform decision on thermal gradient drilling.
    - *Bugarama:* drilling of 6 wells of 150m temperature gradient wells completed in May 2016; however there is a need for drilling more wells to confirm prospects.
- ***Nyabarongo II Feasibility Study:*** Hydro & water supply technical study draft reports with Environmental & Social Impacts Assessment under finalization while the draft final study reports of the Financial & economic Cost Benefit Analysis, for irrigation and hydro components were presented and validated on 27th September 2016.
- ***Countrywide Peat Assessment for Power Generation Potential*** - final report approved in April 2016.
- ***Financial Sustainability Plan for Rwanda's power sector*** –key findings from the study were presented to the Economic Cluster on 26th October 2015.
- ***Sustainable Energy for All Action Agenda (SE4All)*** - finalized and presented to the Economic Cluster in February 2016. It was officially launched during iPAD Rwanda Energy Infrastructure Forum (iPAD) on 1st November 2016.
- ***Electricity Access Rollout Program (EARP) impact evaluation survey:*** a Consultancy firm "JV Green Growth Solutions Ltd and Kabanos Business Services Ltd" was hired through EARP to conduct a follow up survey and assess the impact of the program. Field work started on 11th October 2016 and is expected to be completed by the middle of November, 2016.
- ***Multi-tier framework baseline survey:*** through World Bank support, a consultancy firm was hired to conduct the multi-tier baseline survey. Training of enumerators and pre-testing phase are already completed.
- ***Functional Review:*** initial report approved partially by the Steering Committee composed of Development Partners and MININFRA. Completeness of the Functional Review is ongoing by the Consultant recruited through EU Budget Support.

- ***Integrated Nuclear Security Support Plan (INSSP)*** which will serve as a framework for coordinating and implementing nuclear security activities in Rwanda - Stakeholders are providing their inputs to the draft document with the support of International Atomic Energy Agency (IAEA).
- ***Radiation protection law*** that will regulate the use of radioactive sources to ensure protection of people and the environment from the adverse effects - draft law is under finalization before submission to Prime Minister' Office for further approval process.
- ***Tariff Review*** - Electricity tariffs were revised upward effective 1st September 2015 after a long consultative process. RURA in close collaboration with REG has undertaken a study on new tariff that will include proposals for Life Line (social tariff) to be ready by the December 2016. The new tariff is expected to be effective on 1st January 2017.
- ***Studies on Interconnections***- System simulation at 400kV Interconnection level was completed and the report available, the one at 220kV level is currently being undertaken by NELSAP and the final report will be out by end of this year. However, more synchronization studies will be required before actual trading can take place.

Update on European Union Budget Support (EU BS).

The European Union allocated Euros 177million for Energy Sector Budget Support whose financing agreement was signed in May 2016 and will be disbursed over a period of five (5) fiscal years (2016-2021). For these funds to be disbursed there are conditions and indicators that the sector needs to have met annually.

As of now, the first disbursement was made and the request for the 2nd disbursement is under preparation with the support of a Consultant/Exergia recruited through EU technical assistance support. The current status on EU BS indicators is indicated in annex 3 together with the summary of national energy targets.

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Annex. 1.1 EDPRS 2 Core Indicators Matrix

No.	EDPRS OUTCOME	INDICATORS	UNIT	BASELINE VALUE (2014/15)	2015/16 Targets /EDPRS 2 Mid-term targets	Actual Performance	Indicator Score	Policy Actions	Brief Narrative Progress against Policy Actions	Responsibility for Reporting	Catch up Plans for areas lagging behind
ECONOMIC TRANSFORMATION											
1	Increased electricity generation capacity	1. Electricity generated	Mega Watts	160 (June 2015)	235	190	40% Lagging behind	1. Complete construction and commissioning of ongoing generation projects i.e. KIVUWATT (25 MW), Gishoma Peat (15 MW), import 30MW from Kenya Through Uganda and micro hydros (e.g. Giciye II – 4MW).	Installed capacity:190 MW (additional 30 MW) • KivuWatt: 26MW commissioned in December 2015 • Giciye MHPP- 4MW commissioned by end May 2016.	MININFRA/REG	•Gishoma Peat -15 MW: full commissionning is ongoing, expected to be completed by the end November 2016. •Import 30MW: expected in August 2017 after regional interconnections are completed.
RURAL DEVELOPMENT											
8	Increased access to basic infrastructure for households and enterprises	11. Households with access to electricity	Percent	513,092 connections on-grid (22%) by end June 2015	573,092 connections (new 60,000 connections in 2015/16).	580,000 (66,908 new connections)	101.2% On track	Complete construction of new 331km HV lines, 505 km MV lines and 600km of LV lines and connect new 60,000 households.	•164 km of HV lines •842.96 km of MV lines •1155.53 km of LV lines	MININFRA/REG	The line will be energized after construction of Mirama and Shango Substations.
				0.5%	8%	1.5% by June 2016 and 2.6% by October 2016	15.5% Lagging behind	Installation of 11,000 solar home systems through MOBISOL-REG cooperation project.	37,250 households have been connected to off grid in partnership with private sector players.	MININFRA/REG	Implementation of Rural Electrification Strategy and its implementation plan will speed up the achievement of off-grid access targets. Awareness compaign for

Annex. 1.2 Sector Indicators Matrix (For the selected 10 sector indicators)

NB: The 10 Sector selected indicators (including the EDPRS 2 Core indicators) should be consistent with those reported in the 2014/15 Backward Looking JSRs

No.	EDPRS/SECTOR OUTCOME	INDICATOR	UNIT	BASELINE (2014/15) VALUE	2015/16 Targets	Actual Performance	Indicator Score	Policy Actions	Brief Narrative Progress against Policy Actions	Catch up Plans for areas lagging behind
ECONOMIC TRANSFORMATION										
1	Increased electricity generation capacity	1. Electricity generated	Mega Watts	160	235 (new 75)	190 (additional 30)	40% Lagging behind	Complete construction and commissioning of ongoing generation projects i.e. KIVUWATT (25 MW), Gishoma Peat (15 MW), import 30MW from Kenya Through Uganda and micro hydros (e.g. Giciye II – 4MW).	Installed capacity:190 MW (additional 30 MW) • KivuWatt: 26MW commissioned in December 2015 • Giciye MHPP-4MW commissioned by end May 2016.	•Gishoma Peat -15 MW: full commissionning is ongoing, expected to be completed by the end of November 2016. •Import 30MW: expected in August 2017 after regional interconnections are completed.
2	Increased strategic reserve by 60 million liters	Fuel storage capacity	Million liters	31	49.6 (new 19 million litres in 2015/16)	72 (additional 41)	215.78% Over achievement	Oilcom storage operational and Construction of SP fuel facility at 60% completion rate by June 2015	Oilcom and SP fuel storages completed and operational.	n/a
3	Increased use of Solar Water Heaters (SWHs)	Number of SWHs installed	SWH install	1665	3165 (new 1500)	2215 (additional 550)	36.7% Lagging behind	Dissemination and installation of new 1500 SWHs in households, hospitals and health centres.	550 SWHs were installed in households and public institutions	Increased awareness compaign for Solar Water Heater Program.

RURAL DEVELOPMENT										
1	Increased access to electricity basic infrastructure for households and enterprises	11. Households with access to on-grid electricity	Percent	513,092 connections on-grid (22%) by end June 2015	573,092 connections (new 60,000 connections in 2015/16).	580,000 (additional 66,908)	101.2% On track	Complete construction of new 331km HV lines, 505 km MV lines and 600km of LV lines and connect new 60,000 households.	•164 km of HV lines •842.96 km of MV lines •1155.53 km of LV lines	
		1.2.Households with access to off-grid electricity	Number of S	0.50%	8%	1.5% by June 2016 and 2.6% by October 2016	13.5% Lagging behind	Installation of 11,000 solar home systems through MOBISOL-REG cooperation project.	37,250 households have been connected to off grid in partnership with private sector players.	Implementation of Rural Electrification Strategy and its implementation plan will speed up the achievement of off-grid access targets. Awareness compaign for "amashanyarazi kuri bose"is ongoing countrywide
2	Increased use of domestic biogas digesters	Domestic biogas digesters constructed	Number of domestic biogas digesters	7,941	11,441 (new 3,500)	10,216 (additional 2,275)	65% On watch	Subsidies and technical support for the construction of 3500 new biogas digestors.	Subsidies and technical support provided for construction of new 2275 domestic biogas.	The ongoing awareness compaign covers all energy alternatives solutions.
3	Increased Number of institutional biogas digesters	Institutional biogas digesters constructed	Number of institutional biogas	81	96 (new 15 institutional biogas digesters)	81 (no additional biogas)	0%	Provide technical support for the construction of 15new biogas digestors.	Technical support provided for the rehabilitation of non operational biogas digesters.	Budget for institutional biogas to be planned for in schools.

4	Increased use of efficient cooking methods	Number of Improved Cooking Stoves (ICS) disseminated	Number of ICSs	1,678,872 ICS disseminated, 30 production units completed	1,854,412 ICS disseminated and 45 production units (new 175,540 ICS and constructio n of 15 production	1,687,572 ICSs	50% On watch	Dissemination of Improved Cook Stoves through the construction of ICSs production units and training of potters	Technical support was provided for the promotion, marketing and dissemination of 8700 improved cook stoves	Awareness compaign continue for the use of ICSs.

Annex.2.1 Execution Performance against Domesticaly Financed Budget

Table.1 2015/16 Budget Execution by Programme and Sub Programme				
Programme and SubProgramme	Budget - (Includes re-allocation)	Commitment	Balances	Execution rate
Recurrent Budget	**16,160,800,984**	**18,037,790,862**	**-1,876,989,878**	**112%**
Programme 1: Administrative and Support Services	**16,160,800,984**	**18,037,790,862**	**-1,876,989,878**	**112%**
Development Budget				
Programme1: Fuel and Energy	**59,923,211,542**	**52,015,452,507**	**7,907,759,035**	**87%**
Sub Programme 1: Electricity Generation	22,254,530,458	17,168,954,413	5,085,576,045	77%
Sub Programme 2: Electricity Transmisison and Distribution	37,507,976,552	34,701,004,274	2,806,972,278	93%
Sub Programme 3: Alternative Energy Sources promotion	160,704,532	145,493,820	15,210,712	91%
TOTAL BUDGET	**76,084,012,526**	**70,053,243,369**	**6,030,769,157**	**92%**

Annex.2.2 Execution performance of other off-budgetary Projects externally financed"

NB. This is meant to capture execution on Externally finaced projects that were not on budget in the 2015/16 Finance law

MAIN AGENCY	PROJECT NAME	DONOR	FIN. TYPE	PROJECT TOTAL COST (IN FRW)	2015/16 BUDGET	START DATE	END DATE	ACTUAL BUDGET BY END JUNE 2016	CUMULATIVE DISBURSMENT END JUNE 2016	ANNUAL EXECUTION RATE IN FY 2015/2016	CUMULATIVE PROJECT SPENDING RATE	TIME EXECUTION RATE	ASSESSMENT ON PROJECT PERFORMANCE (*)
EDCL	Improving Access to Reliable On - Grid Electricity Services for Households and Priority Public Institutions - Belgian Contribution EARP	Kingdom of Belgium	Grant	13,809,991,990	RWF 297,000,000.00	Feb-14	May-18	297,000,000	298,501,364	101%	4%	53%	The Current annual Budget is executed 100%.
EDCL	Improving Access to Reliable On - Grid Electricity Services for Households and Priority Public Institutions - Belgian Contribution EARP- Component 2	Kingdom of Belgium	Grant	9,784,229,640	RWF 58,263,101.00	Dec-15	Dec-19	43,870,379	43,870,379	100%	0.45%	13%	The Project Agreement is signed the 17th December 2015. The project is in the beginning time of execution.

EDCL	Electricity Access Scale Up and Sector Wide Approach Development Project (EASSDP)	WORD BA	LOAN(XDR)	$ 84,100,000.00	RWF 23,139,915,831	Jun-10	Jun-17	25032.38M	RWF 70,710,686	108.18%	84.08%	85.71%	
EDCL		OFID	LOAN(U	$ 22,000,000.00					RWF 16,638,427		75.63%	85.71%	
EDCL	Rwanda Electricity Sector Access Programme Investment Prospectors	NETHERLA	Grant	€ 38,900,000.00	RWF 2,005,537,468.00	2009	Jun-16	20913.76M	38,591,668.00		99.21%	100%	
EDCL	Multinational-Interconnection of Electrical Grids of Nile Equatorial Lakes Countries (Construction of 220kV electric line Mirama (Uganda)-Shango (Rwanda))	AfDB & GoR	Grant	USD 17,623,247.04 RWF 4,997,562,113.17		Dec-13	Dec-15	USD 16,742,085 RWF 4,824,880,580	15,289,627,821		100%	100%	

EDCL	Multinational-Interconnection of Electrical Grids of Nile Equatorial Lakes Countries(Construction of 220kV electric Kibuye-Gisenyi-Goma-Shango-Birembo and associated substations)	KFWand GoN/AfDB & GoR	Grant	48,688,387,922	RWF	5,876,500,000.00	Mar-09	Dec-17	1663.20M	37,502,602,462	77.03%		96.30%	
EDCL	Construction of Kigoma-Ngozi/Burundi)electric line	KFW&EU	GRANT	15,960,000,000	RWF	665,000,000.00			0	0	0.00%		0.00%	
EDCL	(Construction of Rusumo-Kigali Airport-Shango) Donor:AfDB	AfDB	Loan	20,677,980,000	RWF	17,193,348.00	Feb-14	Aug-19	0	0	0.00%		0.00%	

EARP	Scaling up Energy Access Project (SEAP)	AfDB	Loan &	$41,451,659.15	RWF 6,250,418,400.00	7-May-14	Aug-18	4470.27M	$5,904,058.61	71.52%	13.57%	50%	
EARP		AfDB	Grant	€ 3,289,487.46	RWF 61,598,569.00	Sep-10	Dec-15	64,367,544	€ 3,289,487.46	94.68%	99.99%	100%	
EARP	Sustainable Energy Developme nt Project (SEDP)	NDF	Grant	€ 4,000,000.00	RWF 1,046,371,899	Apr-11	Dec-17	314,716,510	€ 1,859,903.76	30.08%	46.45%	77.78%	

Annex 3: Summary national energy targets with EU Sector Budget Support Indicators

TWG Sub-sector	EDPRS2 Strategic Outcome	ESSP High-level target objective	SE4ALL	EU Sector Budget Support (BS) Indicator	Actual Performance (October 2016)
Electricity Generation	Economic Transformation Outcome 1.1: Increased electricity generation capacity to 563 MW leveraging large-scale private investment[2]	1. Electric power system installed capacity (domestic generation + imports) to reach 563 MW by 2018.	1. Exceed the global SE4All target (26%) of renewable energy as a percentage of the primary energy supply (RE)		EDPRS outcome & ESSP : 190MW
Energy Efficiency		2. Reduce the carbon intensity of the grid by 10% by 2018 (from a 2013 baseline).	2. Exceed the global SE4All target (44%) of renewable electricity generation as a percentage of total electricity generation (RE)	RE – Additional 14.5gWh (over 2015 baseline) of RE power in the energy mix (including imports)	Renewable Energy produced is currently 107.2MW equivalent at 939.072GWh/year including additional 35.04 GWh/year from 2015.
				EE – EE/DSM unit established in REG with staffing & business plan	EE Unit is place under REG and has an action plan
		3. Save up to 10% of 2013 power output by implementing priority energy efficiency programs including demand-side management and grid-loss reduction measures.	3. Extend current rates of electrical efficiency improvement to 2030 (EE)		Grid loss reduction strategy is under implementation through different projects to improve the grid network
Energy Access	Economic Transformation Outcome 1.2: Accelerated access to electricity, water, roads and land to priority sectors of the economy and/or large investors	4. Reach 70% (48% grid and 22% off-grid) electricity access based on differentiated grid and off-grid strategies and targets.	4. To achieve 100% electricity access by 2030 in both urban and rural areas through a mix of on-grid and off-grid solutions (EA)	At least 25.5% of population connected to the grid as number of active subscribers	On grid: 24.3%
		5. Make power increasingly affordable and phase out indiscriminate subsidies to the electricity tariff by 2017/2018.	5. Progress to higher quality and quantity of electricity over time, with >50% of the population having tier 3-5 access by 2030. (EA)	At least 6% of population has off-grid electricity access (Electricity as main source of domestic light)	Off-grid:2.6% Off-grid baseline survey The Multi-tier survey will provide the current status of electricity in terms of tiers.

		6. Ensure adequate [petroleum] storage infrastructure (equivalent to 3 months' supply), and implementation of regional projects.			Current storage facility is 72 million liters
Biomass	Rural Development Outcome 4.3: Rural households using efficient cooking methods 3.77 Biogas and alternative sustainable biomass sources will be promoted.	7. Ensure 80% of all households employ clean cooking energy technologies	6. [Demand / consumption side] Access to clean and sustainable cooking: To close the gap (currently about 20%) between production and consumption of biomass to make it a sustainable source of energy (EE, EA).	At least 5% increase in HHs using Tier 1 and above cooking methods (over 2009 baseline)	Ongoing Multi-tier survey will provide estimated data of cooking methods used by HHs.
			7. Supply a growing and urbanizing population with clean secure supplies of biomass for cooking, requiring 100% access to much more efficient cookstoves than currently used[3]. (RE, EE, EA)		
			8. At least double the efficiency of biomass energy use (EE)		

(Biomass)	BIOMASS – not at level of Strategic Outcome.	BIOMASS – not at level of HLTO (various more specific quant targets)	9. [Supply / Production side] Access to clean and sustainable cooking: To close the gap (currently about 20%) between production and consumption of biomass to make it a sustainable source of energy	Biomass energy national consumption baseline established, including use of cooking methodologies, forest coverage, use of electricity for HH lighting, demand/supply balance on biomass, gender facets of biomass energy use	Off-grid and biomass baseline survey conducted by University of Rwanda; draft report will be presented to stakeholders. The biomass energy baseline will be also part of the biomass strategy expected to start before end November 2016. Biomass demand/supply completed by MINIRENA& MININFRA and was presented to MINECOFIN.
	3.75 biomass trade lacks clear regulation which can sometimes stifle trade.	8. (non HLTO) The EP calls for developing a harmonized, regionally-integrated policy and market for sustainable liquid bio-fuels. 9. Government is to focus on increased wood production.	10. Reduction in losses from charcoal by improving charcoal production and promoting alternatives such as biomass pellets and biogas 11. Increasing production by improving forestry management.	Forestry inventory carried out with update on productivity by district and vegetation type (draft report available)	Forestry inventory ongoing by MINIRENA-draft report available. Charcoal value chain complementary study finalized. Biomass Strategy Review is at final stage of contract negotiation with the successful firm; exercise to start in the 1st week of November 2016.

		9. (Non HLTO) The Establishment of a Rwandan Energy Development Fund (REDF)-as solution for private sector engagement	Developing a dedicated energy fund In order to create a more favourable environment for private investors in the sector	Electrification and Renewable Energy Fund Investment Plan is approved by MININFRA and MINECOFIN.	Scaling up Renewable Energy Project (SREP) Investment Plan for Rwanda approved by SREP Subcommittee in November 2015. Assessment of REF host institutions completed: BRD proposed as the suitable host institution. Concept of the establishment of the fund is under consultation with MINECOFIN.
				Other EU BS Indicators	
				Functional review carried out and action plan for the implementation of the recommendations of the functional review developed and validated by SWG by 2016.	Functional review initial report approved partially by the Steering Committee composed of MININFRA and Development Partners. Completeness of the Functional Review currently being done by Consultant recruited through European Union Budget Support
				M&E unit in MININFRA operational and make public Joint Sector Reviews reports on the performances of the sector.	Energy performance report prepared on annual basis: forward looking JSR report presented in June 2016 and backward looking to be presented by November 2016.

				Adoption of renewable energy law by SWG after Stakeholders consultation (linked to the second variable tranche of 6 M EUR)	Draft law presented to SWG on 16th December 2015 and draft final law submitted by the consultant. Law submitted to Law Reform Commission for legal opinion before further submission to the Cabinet for approval.

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				Other EU BS Indicators	
				Functional review carried out and action plan for the implementation of the recommendations of the functional review developed and validated by SWG by 2016.	Functional review initial report approved partially by the Steering Committee composed of MININFRA and Development Partners. Completeness of the Functional Review currently being done by Consultant recruited through European Union Budget Support
				M&E unit in MININFRA operational and make public Joint Sector Reviews reports on the performances of the sector.	Energy performance report prepared on annual basis: forward looking JSR report presented in June 2016 and backward looking to be presented by November 2016.

				Adoption of renewable energy law by SWG after Stakeholders consultation (linked to the second variable tranche of 6 M EUR)	Draft law presented to SWG on 16th December 2015 and draft final law submitted by the consultant. Law submitted to Law Reform Commission for legal opinion before further submission to the Cabinet for approval.

Annex 4: Challenges and lesson learnt

Challenges	Lessons learnt/strategies
Electricity tariffs: the electricity tariff is still subsidized and so do not reflect the investment costs incurred in generation, transmission and distribution.	Electricity tariffs were revised upward effective 1st September 2015 after a long consultative process. RURA in close collaboration with REG has undertaken a study on new tariff that will include proposals for Life Line (social tariff) to be ready by the December 2016. The new tariff is expected to be effective on 1st January 2017.
Financing gaps for the implementation of priorities and achievement of targets.	Continued mobilization of Private players into partnership with GoR in energy investments.
Limited affordability/accessibility of use of off-grid solutions.	Awareness campaign and sensitization conducted countrywide for use of off-grid solutions in remote areas, Promotion of use of biomass alternatives such as LPG, biogas and peat briquettes. LPG tax removal, Subsidies and technical support for biogas and private sector involvement in making peat briquettes are some of measures in place.
High energy losses (22.7%) & unreliable power supply	Different projects are under implementation i.e.: - Kigali ring network & smart metering project - JICA funded substations meant to stabilize power supply to KSEZ, Kigali Airport, etc. - Ring network (Rulindo-Ngarama-Musha) - Kibuye-Kigoma-Rwabusoro & Mamba-Rwabusoro-Rilima transmission line - Rehabilitation of distribution lines

Annex 5: EDPRS 2 Energy sector monitoring matrix

EDPRS Outcome	Indicators	Baseline (2012/13)	EDPRS Mid Term targets (2015/16)	Actual Performance	EDPRS II Targets 2017/18	Gap to achieve EDPRS II Targets	Comment
Economic Transformation							
Increased electricity installed capacity to 563 MW	MW of electricity installed capacity	110	280	190	563	373	Very far to the target
Rural Development							
Increased access to electricity by 70% (48% on grid and 22% off-grid)	% of households connected to grid electricity	17.60%	36.6% (164,928 new connections)	24.30%	48% (1,108,882 new connections)	23.7%	Half way to reach the target
	% of households with access to electricity through off-grid	1%	13.1% (101,648 new off- grid solutions)	2.6%	22% (111,812 new off- grid solutions)	19.40%	Very far to the target

Note: EDPRS Mid Term targets (2015/16) correspond to EDPRS 2 annual breakdown targets for the fiscal year 2015/16

Annex.6: Implementation status of the recommendations from the previous JSR.

No	JSR Recommendation	Implementation status
1	FLJSR report: E-SWAP team to incorporate the comments from stakeholders in the FLJSR report and have it ready for signing before 30th June 2016.	Comments from stakeholders were incorporated into the final forward looking report signed by the Chair and Co-Chair of the SWG. The signed report was officially submitted to MINECOFIN on 1st July 2016.
2	DPs involvement in the planning process: consultation with MINECOFIN to know at which step DPs and other stakeholders will be involved	DPs and other stakeholders were involved in the preparation process of the Backward Looking JSR report through TWGs. They will be also involved in the early planning process of 2017/18 FY for identification of priorities.
3	E-SWAP to share the document to stakeholders prior to the meeting for them to have time to read through it and be able to	The draft0 BLJSR report was shared with all TWGs for comments. The draft final report incorporating comments from TWGs was shared with SWG members 1 week before the meeting.
4	Rural Electrification Strategy (RES): implementation plan of RES especially for Programme one (1) to be well designed.	Design of RES programme1 targeting Ubudehe 1 and 2 is ongoing with the support of World bank Consultants.
5	Careful implementation of off-grid electrification and grid expansion to avoid future business interference or duplication of efforts.	Mapping of on-grid zones extension was done by EDCL/EARP to avoid duplication of efforts; the map is available.