

REPUBLIC OF RWANDA



MINISTRY OF INFRASTRUCTURE

FORWARD LOOKING JSR FOR FY 2016/17 REPORT

ENERGY SECTOR

Kigali, June 2016

Q

P

Table of Contents

List of abbreviations	3
I. INTRODUCTION	4
1.1 Energy Sector objectives	4
II. ENERGY SECTOR PRIORITIES FOR FY 2016/17	5
2.1 Linkage between EDPRSII thematic areas and 2016/17 priorities.....	5
2.2 Budget allocated to energy sector for FY 2016/17	8
2.3 Planned analytical studies for 2016/17 FY	8
III. PERFORMANCE PROGRESS ON 2015/16 PRIORITIES	8
3.1 Electricity generation capacity	8
3.2 Access to electricity	9
3.3 Sustainable use of biomass energy solutions.....	9
3.4 Energy efficiency and increase security of supply.....	9
3.5 Policy related analytical studies	9
3.6 Cross-cutting issues	9
3.9 Energy sector challenges and strategies	10
IV. UPDATED SECTOR STRATEGIC PLAN MONITORING AND EVALUATION MATRIX.....	11
V. IMPLEMENTATION OF THE 2013/14 OAG RECOMMENDATIONS	12
VI. SUSTAINABLE DEVELOPMENT GOALS FOR ENERGY SECTOR.....	13
VII. ENERGY DATABASE	14
VIII. UPDATE ON TECHNICAL WORKING GROUPS	14

Q

Ø

List of abbreviations

Abbreviations	
ACP	African Caribbean and Pacific Group of States
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
Eoi	Expression of Interest
EWSA Ltd	Energy Water and Sanitation Authority Limited
GOR	Government of Rwanda
HEP	Hydroelectric Project
HH	Household
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
LV	Low Voltage
MHPP	Micro Hydropower Plant
MININFRA	Ministry of Infrastructure
OAG	Office Auditor General
PMHPP	Pico and Micro Hydropower Plants Project
PPA	Purchase Power Agreements
PS	Private Sector
PV	Photovoltaic
RDB	Rwanda Development Board
RE	Renewable Energy
REG	Rwanda Electricity Group
RURA	Rwanda Utilities Regulatory Agency
SCBI	Strategic Capacity Building Initiative
SEZ	Special Economic Zone
SHS	Solar Home System
SP	Société Pétrolière
SREP	Scaling-up Renewable Energy Programme
SWH	Solar Water Heater
USAID	United States Agency for International Development
WB	World Bank

12

13

FORWARD LOOKING ENERGY SECTOR REPORT 2016/17

I. INTRODUCTION

Access to safe, reliable and cost effective energy is essential to achieve 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 ambitious social economic transformation agenda.

Indeed, 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.

1.1 Energy Sector objectives

The overall goal of Energy Sector is to ensure that all residents and productive uses can access energy products and services that are sufficient, reliable, affordable, and sustainable. The core objectives are as follows:

- Ensuring the availability of sufficient, reliable and affordable energy supplies for all Rwandans;
- Creating an enabling environment for increased private sector participation in energy supply and service provision;
- Encouraging and incentivizing more rational, efficient use of energy in public institutions, and amongst industrial and household end-users;
- Ensuring the sustainability of energy exploration, extraction, supply, and consumption so as to prevent damage to the environment and habitats;
- Promoting safe, efficient, and competitive production, procurement, transportation, and distribution of energy;
- Developing the requisite institutional, organizational, and human capacity to increase accountability, transparency, national ownership and decentralized implementation capacity for sustainable energy service delivery.

EDPRSII Sector objectives

- Increasing electricity generation capacity to 563 MW by 2017/18
- Increasing access to electricity to 48% on grid and 22% off-grid by 2017/18
- Maintaining an economic and competitive tariff
- Sustainable and efficient use of biomass energy solutions
- Maintaining security of supply and stability of petroleum products' prices
- Strengthening institutional, legal and regulatory framework and capacity building

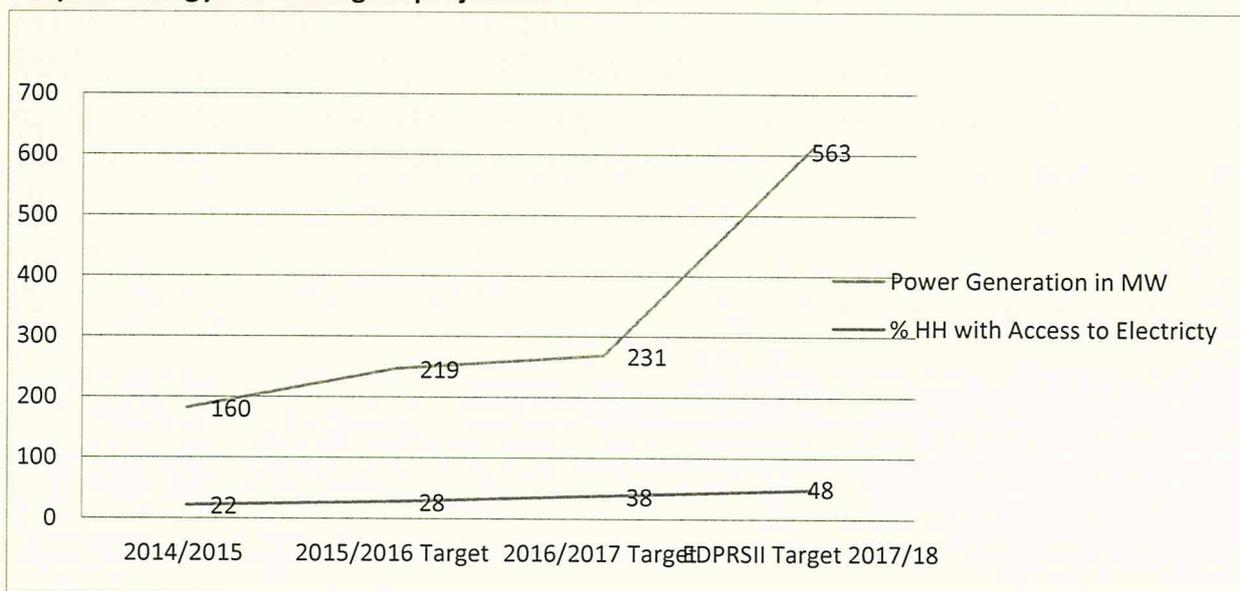
II. ENERGY SECTOR PRIORITIES FOR FY 2016/17

2.1 Linkage between EDPRSII thematic areas and 2016/17 priorities.

The identification of priorities for 2016/17 built on key criteria i.e. (i) alignment to ESSP, EDPRS II and 7 Year Government Program, (ii) ongoing projects to be completed in 2016/17, (iii) ongoing projects to be completed beyond 2016/17, (iv) provision of infrastructures for IPPs projects and address the issues of network strengthening.

The table graph below show the energy sector targets for 2016/17 and end EDPRS II in terms of electricity installed capacity and access to electricity.

Graph1: Energy sector targets projections



The specific projects to be implemented in 2016/17 were prioritized within 4 outcome areas (generation, access, biomass, petroleum and energy saving) that are linked to 2 EDPRSII main thematic areas i.e. Economic Transformation and Rural Development. The table below summarizes projects which are of high priority while sector policy actions and targets for FY 2016/17 are summarized in annex 2.

Table1: Priority projects for FY 2016/17

EDPRS II thematic area/ Sector indicators	outcome	Sector priority outputs
Economic transformation		
1. Increase electricity generation capacity from the current 188 MW (by		The outcome includes electricity generation projects in Hydro, peat and methane gas to be implemented by EDCL; the planned projects are detailed below:

Q

Q

EDPRS II thematic area/ Sector outcome indicators	Sector priority outputs
<p>June 2016) to 238.529 MW by June 2017 and diversification of energy sources.</p>	<p><u>Projects to be completed by 2016/17 FY (50.529 MW):</u></p> <ul style="list-style-type: none"> ▪ Complete the commissioning of Giciye II with the 2nd generator (2MW); ▪ Complete 3 MHHPs totaling 1.029MW (Kavumu-0.334MW, Kigasa-0.195MW and Gaseke- 0.5MW); ▪ 30MW power thermal to be hired; ▪ Rukarara V, phase I of 2.5 MW; ▪ Complete commissioning of Gishoma peat power plant- 15 MW. <p><u>Projects to be completed beyond 2016/17:</u></p> <ul style="list-style-type: none"> ▪ Development of IPPs MHPPs totaling 176.701MW (list in annex 9), commissioning of Rukarara V, phase 2 (2.5 MW); ▪ 30 MW power import from Kenya; ▪ Symbion Methane Project (50MW) - financial close to be achieved and access road to be completed in 2016/17; ▪ Kivu watt phase II of 75 MW; ▪ Hakan Peat (Phase 1: 80 MW, Phase 2: additional 40 MW) - construction works will be at about 10% - 15%; ▪ Rusumo HPP (80 MW/3) - starting construction works; ▪ Rusizi III (145 MW) – expropriation will be completed.
Rural Development	
<p>2. Increase access to electricity access from 24.3% (580,000 connections by April 2016) to 28.6% (80,000 new HHs connections and 1,451 productive areas) on grid and high voltage (HV) transmission lines (including trans-boundary interconnectors).</p>	<p>This outcome includes the projects to extend the grid and constructions of interconnection transmission lines:</p> <p><u>Projects to be completed by 2016/17 FY</u></p> <ul style="list-style-type: none"> ▪ Construction of new 766 km MV lines and 1302 km of LV lines to connect new 80,000 households and 1,451 designated productive areas to the grid. ▪ Connect to productive use areas: SEZ, milk collection centers, community processing centers, irrigation schemes, touristic attractions, agro-processing factories, etc. ▪ High Voltage (HV) transmission (interconnectors & Domestic lines) lines i.e.: <ul style="list-style-type: none"> i. 110Kv HV Bugarama-Ntendezi and substation; ii. 220/110/30kv 75/93.8MVA Shango substation; iii. 250 MW, 220kv HV TL Shango – Karongi – Rubavu – Goma (180 km) and 220/110/30kv 75/93.8MVA Bwishyura, 220/30kv 25/31.5 MVA Rubavu Substations; iv. Rehabilitation of Rulindo and Gifurwe substations;

EDPRS II thematic area/ Sector outcome indicators	Sector priority outputs
	<p>v. Construction of 110kV TL Rulindo-Gabiro-Musha with Gabiro substation and 30kV Rulindo-Byumba-Ngarama TL.</p> <p><i>Projects to be completed beyond 2016/17 FY</i></p> <p>vi. 220kV Symbion power plant-Rubavu;</p> <p>vii. 110kV TL Gasogi KSEZ with substation;</p> <p>viii. 110kV Mukungwa-Nyabihu and Nyabihu substation;</p> <p>ix. 220kV HV TL Kigoma (Rwanda) – Gitega (Burundi) (62 km);</p> <p>x. 220 kV HV TL Rusumo-Rilima-Shango (116km);</p> <p>xi. 220kV TL Butare-Mamba-Rwabusoro- Rilima with associated substations (Mamba, Rwabusoro and upgrading Rilima substation);</p> <p>xii. 220kV TL Bwishyura- Kigoma-Rwabusoro- with upgrading of Kigoma substation.</p>
3. Increase households with access to electricity through off grid from 1% to 10% by 2016/2017	<ul style="list-style-type: none"> ▪ Providing access to electricity to 236,000 households using Solar PV systems (through partnership with Mobisol, Nots, Ignite, NESELTEC and others). ▪ National awareness campaign for the Eradication of kerosene lanterns (Bye bye Agatadowa).
4. Promote sustainable use of biomass and promote alternative energy solutions	<ul style="list-style-type: none"> ▪ 447 people trained in biogas construction, supervision and quality control in districts; ▪ Technical support for the construction of 85 institutional biogas systems; ▪ Setting up improved cooking stoves production centers and selling centers in 10 districts; ▪ Existing ICS technology surveyed and promoted; ▪ Facilitate biogas dissemination of additional 3,500 at household level.
5. Improve energy efficiency and reduce losses from the current estimate of 23% to 20% by 2017/18.	<ul style="list-style-type: none"> ▪ Promote the usage of LPG in urban areas and of pellets to replace charcoal ▪ Implementation of loss reduction projects: 110 kV line Jabana-Mont Kigali-Gahanga; reactive power compensators; smart metering Infrastructure; ▪ Kigali Distribution Network Strengthening by upgrading distribution lines and transformers; ▪ Grid strengthening: construction of 110kV line Gahanga-Bugesera; Construction of MV lines for the connection of Shango, Rubavu and Rukarara substation; upgrade of Rubavu distribution

Q



EDPRS II thematic area/ Sector outcome indicators	Sector priority outputs
	<p>network from 6.6 to 30kV);</p> <ul style="list-style-type: none"> ▪ Installation of 450 solar water heaters through SOLA Rwanda program; ▪ Increase awareness campaign for LPG use mainly in Kigali city and secondary cities; <p><u>Note:</u> A baseline study is required to measure the current status of LPG penetration.</p>
5. Increase the current fuel storage facilities of 72 million liters by starting construction of new fuel storage facility.	Studies and start construction of fuel storage capacity of 38 million liters

2.2 Budget allocated to energy sector for FY 2016/17

Energy sector has one development budget program “Fuel and Energy “and 4 subprograms as detailed in the annex1. Electricity transmission and distribution subprogram takes 86.5% of the total budget while generation, alternative energy sources and energy efficiency and security supply subprograms represent respectively 3.6%, 2.7% and 7.3% of the total budget.

2.3 Planned analytical studies for 2016/17 FY

During 2016/17 FY, there are a number of studies to be conducted aiming at providing baseline situation, guidance for future investments in the sector, etc. The studies to be conducted with source of funds or technical support are detailed in annex 4.

- ✓ Review of biomass strategy;
- ✓ Development of Energy Efficiency strategy;
- ✓ Development of Energy Efficiency Law;
- ✓ Integrated Resource plan (demand forecast scenarios, 15 year Utility plan);
- ✓ Risk mitigation facility and working capital.

III. PERFORMANCE PROGRESS ON 2015/16 PRIORITIES

This section highlights the current achievements on 2015/16 energy priorities and Annex 6 summarized the progress against 2015/16 key sector policy actions and targets.

3.1 Electricity generation capacity

Electricity installed capacity increased from 160 MW by June 2015 to 188 MW by June 2016 with the commissioning of KivuWatt (26MW) and partial commissioning of Giciye II with 1 generator (2 MW).

3.2 Access to electricity

The total number of connections to the national grid has increased from 513,092 electricity connections at end of June 2015 to 580,000 corresponding to 24.3% of HHs by April 2016 and 13,488 SHS were installed by Mobisol. Over the same period, the national electricity grid had been extended to 4,401Km of MV lines and 2517 km of LV lines with the construction respectively of 676.3 kms and 886.23 kms MV and LV lines.

3.3 Sustainable use of biomass energy solutions.

The ongoing programs to promote the sustainable use of biomass fuels, whilst supporting transition to best alternatives to mitigate social and health impacts of traditional use of biomass resources include the National Biogas program (domestic and institutional) and Improved Cook Stoves (ICSs).

Since 1st July 2015, 2,275 new domestic biogas digesters were constructed against 2015/16 annual target of 3,500, feasibility study for 15 institutional biogas was completed and 832 masons were trained countrywide on biogas construction during the same period. Within the same period, a total of 8700 Canarumwe stoves disseminated in 15 districts.

The ongoing off-grid and biomass survey will provide the status on the use of biogas and ICSs; the report is expected by end of June 2016.

3.4 Energy efficiency and increase security of supply.

The Petroleum storage reserves were recently increased from 31 Million liters to 72 Million liters. This increment was due to additional storage capacity from by OILCOM and SP Ltd which commission a 19 Million liters and 22 Million depots respectively.

Over the same period the number of SWHs increased from 1665 SWHs to 2215 SWHs by the installation of 550 SWHs through solarRwanda program.

Regarding the achievement of losses reduction target to be reduced from the current estimate of 23% to 20% by 2017/18, a number of projects to improve the grid network were initiated with support of Development Partners i.e. EU and World Bank.

3.5 Policy related analytical studies

A number of studies were initiated during FY 2015/16 to support the implementation of Energy Policy and Sector Strategic Plan are currently; they are currently at different stages of completion as detailed annex 5.

3.6 Cross-cutting issues

3.6.1 Capacity building



Technical assistance- The active technical assistances in energy sector include: (i) 1 AGI expert, (ii) 3 experts through Institutional Strengthening and Capacity Development of Electricity Utility (SCDEU) project supported by BTC as well as 2 experts financed on the Belgian study fund, (iii) 1 project manager of Rwanda Electricity Sector Strengthening Project, through World Bank support, (iv) 2 experts of Lake Kivu Monitoring Project with Netherlands support. Through the Budget Support, European Union offers technical assistance for both REG and MININFRA and 3 experts are under recruitment through NCBS to support in energy planning, electricity and power systems

Capacity Building- the Ministry of Infrastructure commissioned a functional review study to provide short and long term capacity needs for energy sector with an implementation plan. This will guide all capacity building interventions for the sector.

3.6.2 Environment and Gender

Strategies were initiated though efforts still required to reduce pressure on biomass and indoor pollution which mostly affect women and children who are always exposed to emissions from burning wood. The replacement of biomass energy with other alternative sources such as LPG, biogas, dissemination of improved cook stoves, and employment of efficient carbonization techniques and ICSs across the country, are some of programs being implemented to reduce the pressure exerted on the natural environment.

The development of local and renewable sources is also contributing to reduce the amount of carbon dioxide emitted into the atmosphere and thus contributes to the global protection of the environment. The Environment Impact Assessment (EIA) as a precondition to all power projects and the protection of rivers near Micro Hydro projects is among measures taken for the protection of environment.

Gender is another cross-cutting issue always considered during the implementation phase of energy projects. All projects under implementation are encouraged to consider women in the recruitment of workers. A considerable number of women have then accessed jobs and are generating incomes contributing to the welfare of the entire family. It is also, important to notice that the ministry of infrastructure is planning to develop “Infrastructure gender mainstreaming strategy” that will serve as guidance on how to measure gender dimension in all infrastructure sectors including energy.

3.9 Energy sector challenges and strategies

The following paragraphs highlight some of the key challenges that hinder the implementation of the priority actions and sector performance.



- (i) **Supply shortfalls and high supply costs:** Due to insufficient generation capacity, the use of rental thermal generation has led to high electricity costs. Rwanda has the highest generation tariff in the EAC of about \$0.21/kWh. To address those challenges, a Least Cost Power Development Plan (LCPDP) and an Integrated Resource plan are being developed to ensure the sustainable development of the electricity sector.
- (ii) **Low electricity rate in rural area:** Despite impressive gains, access rates remain low at about 25% nationwide from which 24% on grid and 1% off-grid. Significant investment is required in transmission and distribution in order to maintain the high connection rates. About \$1.2 billion is required to increase the national access rate to about 48% by 2018. The implementation of Rural Electrification Strategy recently approved will supplement the EARP program mainly in remote areas while EARP focuses on productive uses.
- (iii) **Insufficient capacity of Private Sector Investments:** Private sector investments remain low in energy sector due to limited financial capability and return on investment which is not immediate. The Scaling Up Renewable Energy Program (SREP) approved in November 2015 will support sustainable financial long term market for private sector with USD 50 million in off –grid electricity services.

IV. UPDATED SECTOR STRATEGIC PLAN MONITORING AND EVALUATION MATRIX

The Energy Sector Strategic Plan (ESSP) approved by the Cabinet on 20 March 2015 is an implementation plan to achieve national targets in energy sector as reflected in EDPRS2 i.e. increasing power generation capacity to 563MW by 2018 and boost electricity access to 70% of population with 48% on grid and 22% off-grid.

However as ESSP is a dynamic document and considering the recent approval of Rural Electrification Strategy, the overall access target of 70% by 2017/18 will be achieved through on-grid and off-grid following below proportions:

- Initial on-grid target of 48% is reduced to 31-35% and
- Off-grid target initially of 22% will increase in the range of 35%

Considering the current implementation progress as summarized in the table below, it appears that joint efforts Government-DPs-PS and Civil Society are required to meet the gaps registered.

a 

Table2: Energy sector monitoring matrix

Sector Indicator	2014/15	2015/16 Target	Current Status	2016/17 Targets	EDPRS II Target 2017/18	Gap 2017/18 targets to EDPRS2 targets
Installed capacity for power generation	160	219	188	238.495	563	324.51
% of households with access to electricity (on grid).	22%	25.50%	24.3% (April 2016)	28.60%	31-35% ¹	19.4%
% of household with access to electricity off grid.	-	1	1% (14,000HHs)	10% (250,000HHs)	35% ²	25%

V. IMPLEMENTATION OF THE 2013/14 OAG RECOMMENDATIONS

The recent audit report covered the year ended 30 June 2014 and was the last audit of former EWSA following 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 reforms in the energy and water sector.

The key issues raised in the recent report includes: (i) lack of proper accountability for EWSA operations, (ii) high cost to cover cost of producing water and electricity, (iii) delayed completion of projects, and power plants operating below installed capacity during dry season.

Following the reform, the management of REG deployed efforts in addressing the above issues to ensure efficient and sustainable operations in the energy. Some of the efforts include the transfer and recruitment of staff in line with the new structure, establishment of effective management information system, sector institutional planning, etc.

Note: All OAG reports are available on: www.oag.gov.rw.

¹ Revised from 48% to 31-35% in line with Rural electrification Strategy

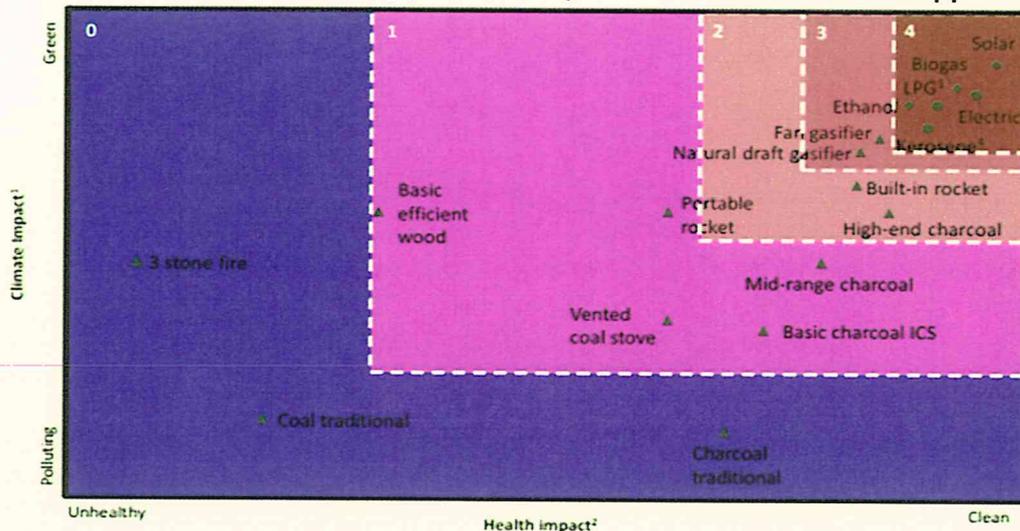
² Revised from 22% to 35% in line with Rural Electrification Strategy

VI. SUSTAINABLE DEVELOPMENT GOALS FOR ENERGY SECTOR

The SDG goal for energy sector is to "Ensure access to affordable, reliable, sustainable and modern energy for all". Indicators were identified in 3 areas as detailed in annex 7:

- *Access to electricity:* achieve 100% electricity access by 2030 in both urban and rural areas through a mix of on-grid and off-grid solutions; electricity access is defined as being tier 2 (annex 10 provide details on tiers) or above. A Multi-tier framework survey to be conducted with World Bank support will provide the baseline status in terms of tiers.
- *Share of renewable energy in electricity generation mix:* currently the renewable energy represents 56% of the total installed capacity. Recently 2MW of RE (2MW from Giciyell) were added corresponding to 15,66GWh by May 2016. The country needs to maintain flexibility regarding the mix of generation sources that it will develop in the future. The share of renewables is expected to be above the global SE4All target share of 44% by 2030.
- *Access to clean and sustainable cooking technologies:* the target is to eliminate the use of unimproved cooking, recognizing that poorest households may still use Tier 1 and have 90% of households using T2 to T4 by 2030. The current status is expected from the Baseline Multi-Tier Survey Framework to be completed by April 2017. The graph below shows the different tiers in line with cooking technologies.

Graph2: Cooking technologies-ICS tiers (in line with WB Multi-tier approach)



Handwritten green annotations: a small 'a' and a large arrow pointing upwards.

VII. ENERGY DATABASE

Good data is required for energy policy formulation and integrated energy planning. MININFRA with the support of Belgium Embassy has initiated the process of establishing an energy sector information system or depository that can serve as a central mechanism for integrated energy data collection, management and dissemination. This system will be used as a key input to energy sector planning and models that take into account all available energy resources and primary consumption patterns to match investments with future demand. It will help to gather energy information from different sources and should be easily accessible to all stakeholders.

After the scoping phase of needs and functionality of the system, the next step is expected to be implemented through European Financing support.

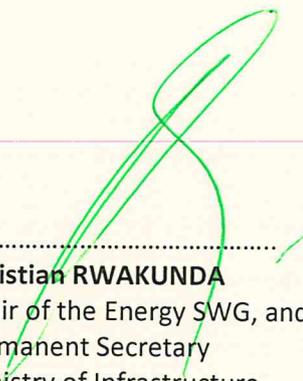
VIII. UPDATE ON TECHNICAL WORKING GROUPS

The generic terms of reference for Technical Working Groups (TWGs) were finalized with support of the consultant recruited by the Belgium Embassy and were presented to all Chairs and Co-Chairs TWGs. The database of core members with Chair and Co-Chairs of each TWG was also finalized and shared.

Biomass TWG which is the most dynamic met several times to discuss and validate some studies related to biomass i.e. (i) charcoal value chain complementary study, (ii) strategic paper on LPG, biogas and ICS penetration strategy, (iii) finalization of ToRs for the review of biomass strategy.

Access TWG met during the elaboration of Rural Electrification Strategy for inputs before its finalization. The private sector was also consulted several times through Energy Development Partners (EPD) for inputs on Rural Electrification Strategy and for discussions on the establishment of Energy Development.

Approved and Signed on,/ June, 2016



.....
Christian RWAKUNDA
Chair of the Energy SWG, and
Permanent Secretary
Ministry of Infrastructure



.....
Erwin De Wandel
Co-Chair of the Energy SWG, and
Minister Counselor Development Cooperation
Embassy of Belgium in Kigali (Rwanda)

Annex 1: Linking Sector Outcomes Budget programme and sub-programmes

Sector Outcome 1: Increased electricity generation capacity		
No.	Sub-programme	2016/17 Budget allocated
1	Electricity Generation	2963014573,00
Sector Outcome 2: Increased access to electricity for households and enterprises		
2	Electricity transmission and distribution	71670342163,00
Sector Outcome 3: Sustainable use of biomass and other resources promoted		
3	Alternative energy sources promotion	2229988750,00
Sector Outcome 2: Increased energy efficiency and security supply		
4	Energy efficiency and supply security	6026993600,00
TOTAL		82890339086,00

9

8

Annex.2) Targets and Policy Actions for the Sector Indicators Matrix (For the selected 10 sector indicators)

EDPRS2/sector outcome	Sector outcome indicators (not exceeding 10 including EDPRS2 Core indicators)	Baseline (2014/15)	Current status	2016/17 Targets	2016/17 Policy Actions/ priority outputs (maximum of 2 per each indicator)	
ECONOMIC TRANSFORMATION						
1	Increased electricity generation capacity (including imports)	Electricity generated (MW)	160 MW (June 2015)	188MW	238.529 MW (new 50.529MW)	1. Complete commissioning of Giciye II MHPP (2MW), construction and commissioning of Gaseke MHPP (500kW), Kigasa MHPP (195 kW), Kavumu (334kW) and RukararaV (2.5MW). Complete commissioning of Gishoma Peat Power Plant (15MW) 2. 30MW power thermal to be hired. 3. Integrated Resource plan and National Power master Plan.
2	Increased access to electricity for households and enterprises	Households with access to grid electricity	513,092 connections on-grid (22%) by end June 2015	580,000HHs (24.3%) by April 2016.	80,000 HHs connections on-grid and 1,451; (from 24.3% to 28.6% on-grid)	Complete construction of 330.6 Kms HV new transmission lines and Substations. Construction of MV and LV lines to increase access to electricity by 80,000 households and 1,451 productive areas
		Households with access to off-grid electricity	0,50%	1%	From 1% to 10% off-grid	Implementation plan of Rural Electrification Strategy Installation of 236,000 SHSs through Mobisol, Nots, Ignite, NESELTEC, others.
3	Increase the strategic reserve by 60 million liters	Fuel storage capacity (million liters)	31 million liters (June 2015)	72 million liters	No additional capacity during 2016/17 (under construction)	Start construction of fuel storage capacity of 38 million liters
4	Increased use of Solar Water Heaters (SWHs)	Number of SWHs installed	1665 SWHs	2215 SWHs	new 450 SWHs installed	Awareness creation of solarRwanda program
RURAL DEVELOPMENT						
5	Increased use of domestic biogas digesters	Domestic biogas digesters constructed	7,941 domestic biogas digesters	10,216 domestic biogas	New 3500 domestic biogas digesters s	Training of technicians on domestic biogas technologies
6	Increased Number of institutional biogas digesters	Institutional biogas digesters constructed	81 institutional biogas digesters	81 (no additional biogas digester)	new 15 institutional biogas digesters constructed	Training of technicians on institutional biogas technologies
7	Increased use of efficient cooking methods	Number of Improved Cooking Stoves (ICS) disseminated	1,678,872 ICS disseminated, 30 production units completed	1,687,572 ICSs	10 production selling centers initiated	Development of selling points for improved cook stoves

Q J

Annex 3) Targets and Policy Actions for the EDPRS 2 Core Indicators Matrix

No.	EDPRS Outcome	Indicators	UNIT	Baseline (2014/15) VALUE	Current status	2016/17 Targets	2016/17 Policy Actions	Responsibility for Reporting
ECONOMIC TRANSFORMATION								
1	Increased electricity generation capacity (including imports)	Electricity generated (MW)	MW	160 MW (June 2015)	188MW	238,529 MW (new 50,529MW)	1. Complete commissioning of Giciye II MHPP (2MW), construction and commissioning of Gaseke MHPP (500kW), Kigasa MHPP (195 kW), Kavumu (334kW) and Rukarara V (2.5MW). 2. 30MW power thermal to be hired. 3. Integrated Resource plan and National Power Master Plan.	Energy Sector/REG-MININFRA
2	Increased access to electricity for households and enterprises	Households with access to grid electricity	Number, percent	513,092 connections on-grid (22%) by end June 2015	580,000HHs (24,3%) by April 2016.	80,000 HHs connections on-grid and 1,451; (from 24,3% to 28,6% on-grid)	Complete construction of 330.6 Kms HV new transmission lines and Substations. Construction of MV and LV	Energy Sector/REG-MININFRA
		Households with access to off-grid electricity	percent	0,50%	1%	From 1% to 10% off-grid	Implementation plan of Rural Electrification Strategy Installation of 236,000 SHSS through Mobisol, Nots, Ignite, NESELTEC, others.	

8

8

Annex.4: Sector Priority Analytical Studies for 2016/17

EDPRS2/sector outcome	Planned Analytical Work & Duration	2016/17 Budget	Funding Source (GoR, if otherwise, specify, also state the status i.e. Secured/ Still under mobilization)
ECONOMIC TRANSFORMATION	Energy Efficiency strategy	110 million Rwf	GoR
	Energy Efficiency Law	N/A	GoR
	National Power Master Plan	N/A	GoR (NCBS)
	Integrated Resource Planning	N/A	RMI & GoR
	Multi-Tier Framework for Measuring Energy Access: baseline survey	300,000USD	WB
RURAL DEVELOPMENT	Risk Mitigation Facility and Working capital	300,000USD	WB & GoR
	Biomass Strategy Review	300,000 Euros	BTC

8

Annex.5: Progress against 2015/16 Sector Analytical Studies

EDPRS2/sector outcome	2015/16 Planned Analytical Work	Brief progress, challenges and actions to be taken if any
ECONOMIC TRANSFORMATION	Nyabarongoli Multipurpose Project Feasibility Study	The draft final feasibility study that includes electricity, water and irrigation components was presented to MININFRA/REG, WASAC and MINAGRI for comments in April 2016.
	Countrywide Peat Assessment study	Final report approved in April 2016 and is available.
	Multi-Tier Framework for Measuring Energy Access: baseline survey	Evaluation of technical proposal of the shortlisted companies from EoI completed.
RURAL DEVELOPMENT	Rural Electrification Strategy	RES approved by the Cabinet on 27 April 2016.
	Renewable Energy Law	Draft final report was submitted by the Consultant in March 2016. It is under review by Law Reform Commission.
	Charcoal Value Chain study	Revised draft report presented to TWG on 12 th May 2016.
	Biomass Strategy Review	Request for Proposals advertised, proposals to be submitted before 11 th July 2016.
	Off-grid baseline survey	Data analysis completed, consolidated draft report expected by end of June 2016.
CROSS-CUTTING	Functional Review	Revised final report presented to the Steering Committee on 4 th May 2016 for final evaluation.
		An implementation plan with clear timeframe and prioritized action plan of capacity development will be developed by a long term Institutional Capacity Development Expert that will be recruited through the support of the EU.

e Ø

Annex.6) Progress against 2015/16 Policy actions (for the selected 10 sector indicators)

EDPRS2/sector outcome	Sector outcome indicators (not exceeding 10 including EDPRS2 Core indicators)	Baseline (2014/15)	2015/16 Policy Actions	Brief Description of Progress against implementation of 2015/16 Policy actions
ECONOMIC TRANSFORMATION				
Increased electricity generation capacity	Electricity generated	160 MW	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:188 MW (additional 28 MW) <ul style="list-style-type: none"> • KivuWatt: 26MW commissioned in December 2015 • Giciye MHPP- 2MWpartially commissioned with 1 generator by end May 2016. • Import 30MW: waiting for regional interconnections to be completed •Gishoma Peat -15 MW: commissioning to be completed by July 2016
Increased Household access to Electricity	% households with access to on-grid electricity	22%	Complete construction of new 331km HV lines, 505 km MV lines and 600km of LV lines and connect new 60,000 households.	24.3% HHs have access to electricity (April 2016) <ul style="list-style-type: none"> •676.3 km MV and 886.23 km LV constructed. •68,563 connections completed
	% households with access to off-grid electricity	1%	1000 solar kits installed by Ignite and 8000 systems will be installed by Mobisol by June 2016	14,488 Solar Energy Home Systems installed (13,448 by Mobisol and 1000 by Ignite).
Increased fuel storage capacity to 150 million litres by 2017	Fuel Storage volume facilities constructed	Storage capacity of 30 million litres	Increasing the security of Supply through construction of Fuel storage Facilities	Oilcom and SP fuel facilities completed
Increased use of Solar Water Heaters (SWHs).	Number of SWHs installed.	1665 SWHs	3,304 SWHs installed	2215 SWHs installed
RURAL DEVELOPMENT				
Increased use of domestic biogas digesters	Domestic biogas digesters constructed	• 7,941 domestic	Construction of 3,500 domestic biogas digesters	• 2275 new biogas domestic biogas digesters
Increased Number of institutional biogas digesters	Institutional biogas digesters constructed	81 institutionalbiogas digesters disseminated	15 New Institutional biogas	Feasibility study of 15 institutional biogas completed from July 2015 to May 2016
Increased use of efficient cooking methods	Number of Improved Cooking Stoves (ICS) disseminated	<ul style="list-style-type: none"> • 1,678,872 households with Improved cook-stoves • 30 production units completed 	91,242 ICSs to be disseminated	•8700 Canarumwe stoves in 15 districts from July 2015 to May 2016.



SDGs indicators to be monitored at the Sector level			
SDG Targets		Proposed Indicators	2030 target
Sector: Energy		Baseline (latest)	
Goal #7: Ensure access to affordable, reliable, sustainable and modern energy for all			
1	By 2030, achieve 100% access to electricity	% of HHs with access to electricity	100%
2	By 2030, doubling the share of renewable energy in electricity generation mix	% of renewable energy	44%
3	By 2030, doubling the global rate of improvement of energy efficiency	% of HHs using Tier2-4 cook stoves as clean and sustainable cooking technologies	To be confirmed after Multi-tier framework survey 90%

4

7

Annex 8: Summary national energy targets

TWG Sub-sector	EDPRS2 Strategic Outcome	ESSP High-level target objective	SE4ALL	EU Sector Budget Support Indicator	Current status (May 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)	EE – EE/DSM unit established in REG with staffing & business plan	EDPRS outcome & ESSP : 188MW
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)	5. RE – Additional 14.5gWh (over 2015 baseline) of RE power in the energy mix (including imports)	EE Unit is place under REG and its action plan is incorporated REG plan. RE: 2MW of RE (GiciyeII) were added corresponding to 15,66GWh (with the assumption of 90% of power availability).
		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)	1. 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. 6. Ensure adequate [petroleum] storage infrastructure (equivalent to 3 months' supply), and implementation of regional projects.	5. Progress to higher quality and quantity of electricity over time, with >50% of the population having tier 3-5 access by 2030. (EA)	2. At least 6% of population has off-grid electricity access (Electricity as main source of domestic light)	Off-grid:1% The Multi-tier survey will provide the current status of electricity in terms of tiers. Current storage facility is 50 million liters
Biomass	Rural Development Outcome 4.3: Rural households using efficient cooking methods	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) 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)	3. At least 5% increase in HHs using Tier 1 and above cooking methods (over 2009 baseline)	Ongoing off-grid survey will provide estimated data of cooking methods used by HHs.

o



(Biomass)	<p>BIOMASS – not at level of Strategic Outcome.</p> <p>3.75 biomass trade lacks clear regulation which can sometimes stifle trade.</p> <p>3.77 Biogas and alternative sustainable biomass sources will be promoted.</p>	<p>BIOMASS – not at level of HLTO (various more specific quant targets)</p> <p>8. (non HLTO) The EP calls for developing a harmonized, regionally-integrated policy and market for sustainable liquid bio-fuels.</p> <p>9. Government is to focus on increased wood production.</p>	<p>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</p> <p>10. Reduction in losses from charcoal by improving charcoal production and promoting alternatives such as biomass pellets and biogas</p> <p>11. Increasing production by improving forestry management.</p>	<p>6. 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</p> <p>7. Forestry inventory carried out with update on productivity by district and vegetation type (draft report available)</p>	<p>Off-grid and biomass baseline survey is ongoing report expected by end of June 2016.</p> <p>Biomass supply/demand baseline under finalization by MINIRENA in close collaboration with MININFRA</p> <p>Forestry inventory ongoing by MINIRENA-draft report available.</p> <p>Charcoal value chain complementary study under finalization</p> <p>Biomass strategy review under procurement process</p>
-----------	---	---	---	--	---

[1] Indicators are for 2015/16 (Tranche 3)

[2] Electricity efficiency is not specifically mentioned as an EDPRS2 Outcome.

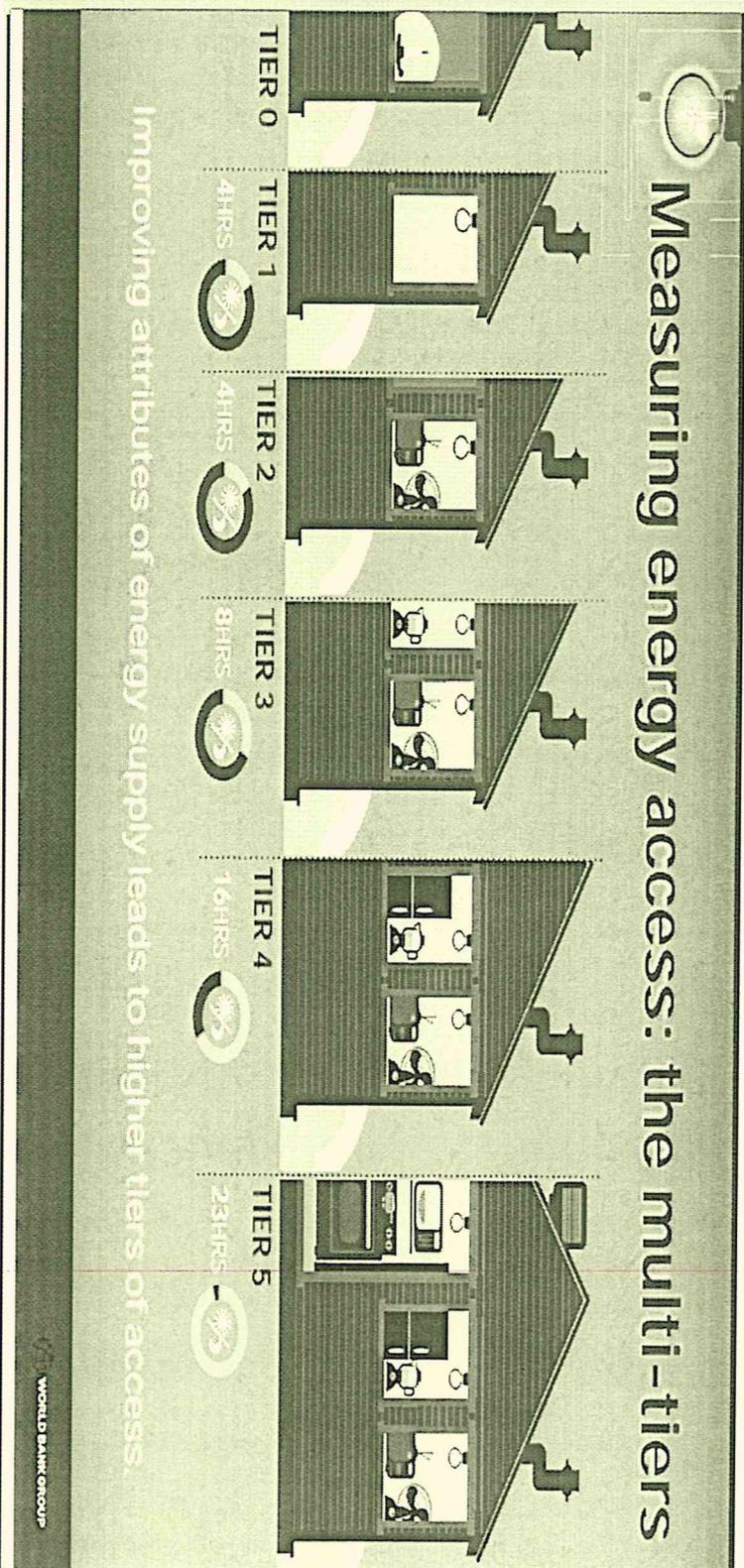
[3] Addresses both supply (fuel) and demand (efficient use)

Annex 9: List of MHPPs under or to be implemented by Independent Power Producers (IPPs)

No	Site / Plant	Capacity (MW)	Developer	Status	Activities to be completed in 2016/17	Planned completion date
1	Base I	2,9	Ngali Energy	PPA signed in May 2014. Funds under mobilization.	Fund Mobilization	Not yet specified
2	Base II	2,9	Ngali Energy	PPA signed in May 2014. Funds under mobilization.	Fund Mobilization	Not yet specified
3	Ngororero	2,7	Ngali Energy	PPA signed in May 2014. Funds under mobilization.	Fund Mobilization	Not specified
4	Ntaruka A	2,07	Ngali Energy	Project under implementation. Access road under construction	Project implementation continue	Expected to be completed in Q1 of 2018
5	Rwondo	2,3	Ngali Energy	PPA signed in May 2014. Project under implementation.	Fund Mobilization	Not specified
6	Nyirantaruko	1,2	LVY.LTD & Kochendorfer	PPA negotiations concluded.	Fund mobilization	2 years following effective date
7	Nyirahindwe I & II	0,909 & 0,359	DC HYDROPOWER LTD & MECAMED	PPA negotiations concluded.	Fund mobilization	2.5 year following effective date
8	Muhembe	0,323	LED Solutions & Green Energy Rwanda Ltd	PPA negotiations concluded.	Fund mobilization	2 years following effective date
9	Rukarara VI	6,7	PRIME ENERGY	PPA signed	Achieve financial close	COD expected January 2021
10	Ntaruka	11,25	GoR	under operation	Rehabilitation ongoing	Rehabilitation to be completed next year
11	Nyabarongo II Project	128	Feedback Infra Private Limited	evaluation of the revised Interim Report 3 and draft final feasibility report	Complete final feasibility study	Complete Feasibility study Q4 2016
12	RWAZA-MUKO	2,6	DC HYDROPOWER LTD	concession agreement granted and PPA amended	Start project implementation	Nov-19
13	Nyundo	4	Amahoro Energy	concession agreement granted and PPA amended	Start project implementation	Nov-19
14	Koko	4,5	SOCIETE DES GRANDS LACS	Tariff negotiations in process	Conclude Tariff negotiations	PPA Not yet signed
15	Kore	2,4	RUCO ENERGY Ltd	tariff negotiations in process	Conclude Tariff negotiations	PPA Not yet signed
16	Kavumu	0,3	SPV MWANGE KAVUMU HPP LTD	Addendum No: 3 signed on 20 Jan, 2016 Project under implementation stage.	Conclude financial closure	COD expected April 2017
17	Rubagabaga	0,28	RUBAGABA HYDRO POWER PLANT LTD	PPA under signature process	PPA signature by both parties	PPA Not yet signed
18	Kigasa	0,195	LED Solutions & Green Energy Rwanda Ltd	Under implementation stage	Developer has request 12 month extension period as he delayed to get Concession Agreement.	COD expected in March 2017
19	Mpenge II	0,36	MESCO	PPA negotiations pending.	Conclude PPA negotiations.	PPA Not yet signed
20	Gaseke	0,5	Novel Energy Ltd	75% works progress	Complete Electromechanical installations	Commissioning expected in July 2016
21	Mpenge I	0,2	GLC Factory	PPA signed in feb 2016	Conclude financial close	COD expected in Jan-18
22	Mpenge III	0,75	GLC Factory	PPA signed in feb 2016	Conclude financial close	COD expected in Jan-18

G

P



Handwritten green marks: a checkmark and a scribble.