



Lighting Rwanda

Rwanda Economic Update

Lighting Rwanda

June 2019

TABLE OF CONTENTS

Acronyms	i
Foreword	ii
Executive summary	iii
PART I: RECENT ECONOMIC DEVELOPMENTS	1
1. Momentum in Global Growth Softens	2
2. Rwanda – Taking Stock of Recent Developments	3
3. Rwanda’s Macroeconomic Outlook and Risks.....	13
PART I: ENERGY SECTOR SPECIAL FOCUS: LIGHTING RWANDA.....	15
1. A Decade of Rapid Growth for Rwanda’s Power Sector	16
2. Ambitions and Challenges for the Coming Five Years	21
3. Towards Affordable, Reliable, Sustainable Energy for All.....	24
4. Reform Priorities for the Power Sector.....	29
References	31

LIST OF FIGURES

Figure 1.1: Global and regional economic growth, 2013–21	3
Figure 1.2: Rwanda’s economic Growth, 2013–18.....	3
Figure 1.3: Domestic demand real GDP growth, 2013–18	4
Figure 1.4: Headline inflation, 2015–19	5
Figure 1.5: Food and energy prices, 2015–19	5
Figure 1.6: Credit growth to the private sector, 2012–18	6
Figure 1.7: Money market interest rates, 2015–19	6
Figure 1.8: Digital financial services and payments, 1998–2018	7
Figure 1.9: Gross international reserves, 2013–18	8
Figure 2.1: Growth in installed electricity generation capacity and electricity access in Rwanda 2001-19.....	17
Figure 2.2: Progress in the world’s 20 least-electrified countries over the 2010-16 SDG7 tracking period.....	18
Figure 2.3: Electricity access in EICV4 & EICV5	18
Figure 2.4: Quality of electricity services in Rwanda in regional comparison, as reported by businesses	20
Figure 2.5: Average weekly frequency of electricity outages in Rwanda	20
Figure 2.6: Electricity system losses in Rwanda.....	20
Figure 2.7: Power generation mix and greenhouse gas intensity of power generation in Rwanda (2013-18).....	21
Figure 2.8: Electricity tariff revenue and economic cost of service in regional comparison.....	23
Figure 2.9: Subsidies to the power sector as a percentage of the GDP	24
Figure 2.10: Potential escalation in the subsidies to the power sector as a percentage of the GDP	24
Figure 2.11: Rwanda’s electricity capacity mix in 2020 and future projections under business as usual and least cost sector expansion	26
Figure 2.12: Electricity tariffs in Rwanda, 2005-18.....	27
Figure 2.13: Electricity access targets from 2019 to 2024 in the ESSP.....	28

LIST OF TABLES

Table 1.1:	Rwanda's balance of payments, 2014–18	9
Table 1.2:	Rwanda's central government finances, FY 2016/17–2019/20	10
Table 2.1:	Rwanda's objectives for the power sector under EESP (2017/18-2023/24)	22
Table 2.2:	Estimated investment needs during 2017/18-2023/24 to achieve EESP targets	22

LIST OF BOXES

Box 1.1:	Public debt in Sub-Saharan Africa: Recent developments	2
Box 1.2:	Digital financial services and payments	6
Box 1.3:	Fiscal outlook: Scaling-up the implementation of NTS1 and its fiscal implications.....	11
Box 1.4:	Key constraints affecting Rwanda's private sector	14

ACRONYMS

ATMs	Automated Teller Machine	LCPDP	Least-Cost Power Development Plan
BNR	National Bank of Rwanda	MINECOFIN	Ministry of Finance and Economic Planning
DRC	Democratic Republic of Congo	MININFRA	Ministry of Infrastructure
EAC	East African Community	MTF	Medium term Fiscal Framework
EICV	Integrated Household Living Conditions Survey	MTF	Multi-Tier Framework
EESP	Energy Sector Strategic Plan	MW	Megawatt
EDCL	Energy Development Company Limited	NDC	National Determined Contribution
EUCL	Energy Utility Company Limited	NISR	National Institute of Statistics of Rwanda
EU	European Union	NPLs	Nonperforming Loans
EWSA	Electricity, Water, and Sanitation Authority	NST	National Strategy for Transformation
FY	Fiscal Year	POS	Point of Sale
GDP	Gross Domestic Product	PPAs	Power Purchase Agreements
GHG	Greenhouse Gas	PPP	Public-Private Partnerships
GWh	Gigawatt Hours	REG	Rwanda Energy Group
ICT	Information, Communications and Technology	REU	Rwanda Economic Update
IEG	Independent Evaluations Group	RIPPS	Rwanda Integrated Payment Processing System
IBMS	Integrated Business Management System	RURA	Rwanda Utilities Regulatory Authority
IPPs	independent Power Producers	Rwf	Rwandan Franc
IT	Information Technology	SDG7	Sustainable Development Goal 7
kV	Kilovolt	SSA	Sub-Saharan Africa
kWh	Kilowatt Hour	U.S.	United States
		UN	United Nations

FOREWORD

The Rwanda Economic Update (REU), published twice a year, analyzes recent economic developments and prospects and policy priorities in Rwanda. It is intended for a wide audience of policymakers, business leaders, other market participants, analysts engaged in Rwanda's economy, and civil society. The REU draws on available data reported by the Government of Rwanda and additional information collected as part of the World Bank Group's regular economic monitoring and policy dialogue. The REU team is grateful to the Ministry of Finance and Planning, the National Statistics Institute of Rwanda and the National Bank of Rwanda for their excellent collaboration. Each edition also has a special feature spotlighting a particular topic. This edition focuses on Rwanda's power sector and discusses country's impressive achievements in expanding generation of and access to electricity and outlines the main challenges facing Rwanda in achieving its ambitions in expanding the power sector in a low-cost and fiscally sustainable manner.

The current REU, the fourteenth edition, was jointly prepared by World Bank Group teams Rwanda Macroeconomics, Trade and Investment Global Practice, and Energy & Extractives Global Practice. The report was prepared by a team consisting of Aghassi Mkrtchyan (Senior Economist, TTL), Peace Aimee Niyibizi (Economist, co-TTL), Joern Huenteler (Energy Specialist), Yadviga Viktorivna Semikolenova (Senior Energy Economist), Norah Kipwola (Senior Energy Economist) and Arun Singh (Consultant). It was undertaken under the overall guidance of Abebe Adugna (Practice Manager, Macroeconomic Trade and Investment), Sudeshna Ghosh Banerjee (Practice Manager, Energy & Extractives), Felipe Jaramillo (Country Director for Kenya, Rwanda, Uganda, and Eritrea) and Yasser El-Gammal (Country Manager, Rwanda).

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Views expressed in the REU are those of the authors and do not necessarily reflect the views of the World Bank Group, its Executive Directors, or the countries they represent and the Government of Rwanda.

EXECUTIVE SUMMARY

Recent Economic Developments and Outlook

In 2018, the economy expanded at a brisk pace—Rwanda’s 8.6 percent growth was the highest on the continent. Growth was broad-based. Recovering from the droughts of 2016 and 2017, agriculture expanded by almost 6 percent, above the historical rate of growth of around 5 percent. Industry grew by more than 10 percent, the highest growth since 2012. It was supported by 14 percent growth in construction, where activity resumed after two years of compression, and by 11 percent growth in manufacturing. Among the key sectors, however, the service sector contributed most combining its highest share in the economy with a 9 percent growth. On the demand side, investments were the main driver of growth, expanding by 23.5 percent led by strong public investment. After stagnating in 2016 and 2017, private consumption grew by 6 percent. However, the contribution of net exports to growth turned negative in 2018 because Rwanda’s exports were not able to maintain the momentum generated in 2017.

Inflation remains low. Headline inflation as of March 2019 was 1.2 percent. A supportive macroeconomic environment has allowed the National Bank of Rwanda (BNR) to keep the policy rate at 5.5 percent throughout 2018 and reduce it further to 5 percent in May 2019. The Rwandan franc had depreciated by less than 1 percent in nominal effective terms as of April 2019 (year-on-year) while its depreciation against US dollar was about 4 percent as a result of strengthening of the US dollar against main currencies. Nonperforming loans continued to trend down in response to a new regulation on credit classification and provisioning. Credit growth, however, is still slow: having seen their credit portfolios deteriorate in 2016–17, banks continue to be risk-averse. Although the volume of new loans is larger, the loans are concentrated in several large-scale projects. The banking sector continues

to be well-capitalized—the ratio of capital to risk-weighted assets is well above the minimum required and continued to improve.

The current account deficit (CAD) was relatively unchanged in 2018 compared to 2017, as the widening trade deficit was offset by net incomes. With imports growing faster than exports, the deficit of goods and services balance widened slightly from 10.8 percent of GDP in 2017 to 11.3 percent to be partly offset by the increase in private transfers. At 7.8 percent of GDP in 2018, the CAD remained well below the peak of 15-16 percent of GDP in 2015 and 2016. The CAD was adequately financed by capital and financial flows, and official foreign reserves increased by 13.2 percent during the year. At yearend foreign reserves were estimated at 4.7 months of import cover.

In the second half of 2018, Rwanda’s fiscal performance was characterized by strong revenues and outlays. Tax revenues grew by 12.3 percent, well above the growth of nominal GDP, and non-tax revenues and grants were solid. Fiscal outlays expanded by 16.5 percent, driven by capital spending and transfers. At year-end 2018 public and publicly guaranteed debt had reached 53 percent of GDP, around 5 percentage points higher than in 2017 driven by a higher fiscal deficit during the calendar year and slower growth than expected in nominal GDP in U.S. dollar terms.

Rwanda’s medium-term economic outlook is favorable, with growth expected to be in a range of 7.5 - 8 percent. Public sector-led investments will be central; the government plans higher public investment to achieve its National Strategy of Transformation (NST1) objectives. The fiscal deficit will remain elevated over the medium term to accommodate higher public investment. With inflation low, monetary policy is expected to remain accommodative and support recovery in bank

lending while a flexible exchange rate will help to build external buffers and will facilitate export growth. The CAD will be elevated as a result of expected fiscal expansion but will remain around 10 percent of GDP over the medium term.

Rwanda's economic outlook is vulnerable to both domestic and external risks. Domestically, the main risks are weather-related, such as droughts and floods that may depress agricultural production. Scaling-up of public-sector-led investments is a challenge as well as an opportunity; it could jeopardize debt sustainability if Rwanda's investments-growth nexus does not improve. In addition, with expected increase in fiscal pressures from the expansion of the power sector, maintaining fiscal sustainability will be of utmost importance, as discussed in the special topic of this issue of Rwanda Economic Update. The main external risks are related to a more severe slowdown in global economic growth than is currently projected that would affect prices for the commodities Rwanda exports.

Special Focus: Lighting Rwanda

Rwanda's power sector has grown rapidly in the past decade and outpaced many of its peers in Sub-Saharan Africa. More than half of Rwandans have access to electricity in their home, compared to 10 percent in 2009, generation capacity has more than tripled in the same period, and outages have become shorter and much less frequent. These impressive achievements are the result of large investments in the sector but also substantial institutional reforms to improve governance of the publicly-owned electricity company, the Rwanda Energy Group (REG). The private sector has become a strategic partner for Rwanda's power sector. The governance framework in the power sector in Rwanda can become a model for sector governance if the Government continues the path towards making REG financially independent and the new Public Private Partnership (PPP) Law is implemented as planned.

Steady growth in access and improvement in the quality and security of supply are expected to continue over the next decade. Under the National Strategy for Transformation (NST1) for the period 2017/18-2023/24, the Government aims to achieve universal electrification, a more diversified mix of energy sources for power supply, and lower system losses, as well as fewer and shorter outages.

However, the cost of electricity supply is among the highest in the region and remains a constraint for Rwanda's economic and industrial development. Household consumers have problems affording electricity at the present tariffs, a problem that will be aggravated as the rural electrification drive reaches ever poorer parts of the population. Especially larger firms report electricity as a binding constraint.

Caught between the high cost of electricity and limited affordability, the Government has stepped in to fill the gap between sector cost and revenues. This has created fiscal risks. Under a business-as-usual scenario, the fiscal transfers needed to sustain operations in the sector, already above 1 percent of GDP, may rise up significantly above 4 percent of GDP by 2022/23. Recognizing these fiscal risks, the Government has implemented a number of reforms targeting operational efficiency, affordability, and accountability of electricity service, with the overarching objective of making electricity service affordable for the government and consumers and ensure that becomes an engine of economic growth and private-sector development.

The following priority measures will be critical to reap the benefits of and deepen this reform program over the coming decade:

- Pursuing sector expansion in line with least-cost sector planning
- Putting REG into the driving seat of developing new PPP investments identified in the least-cost plan, rather than relying on unsolicited proposals from the private sector

- Accelerating efforts to decarbonize the power sector and adapting to climate change
- Regularly adjusting tariffs for changes in cost and, over time, expanding the groups of electricity consumers that do not need tariff subsidies and are charged the full cost of service
- Providing a state-of-the-art framework for private sector participation in off-grid electrification and targeted incentives to make off-grid solar affordable
- Promoting regional electricity trade through bilateral contracts to tap lower cost supply sources and better integrate variable renewables; and
- Doubling down on the modernization of REG's operations.

PART ONE

RECENT ECONOMIC DEVELOPMENTS



1. Momentum in Global Growth Softens

Global growth is lessening. After a synchronized upturn in 2017 and the first half of 2018, global economic activity has been moderating since mid-2018. As a result, global growth declined from 3.8 percent in 2017 to 3.6 percent in 2018. Trade tensions are taking an increasing toll on business confidence, and in both emerging markets and advanced economies, tightening financial conditions are weighing on global demand. In the Euro Area, consumer and business confidence again eroded somewhat in 2018. China's 2018 growth rate was 6.6 percent, the slowest pace since 1990, as regulation was tightened to rein in financial vulnerabilities and as trade tensions with the United States continued. The U.S. was an exception as its growth stayed strong throughout 2018 and the first quarter of 2019.

Growth throughout Sub-Saharan Africa (SSA) is expected to recover in 2019. It is estimated that in 2018 growth decelerated to 2.3 percent, from 2.7 percent in 2017, mainly because stagnant oil production reduced the exports of SSA's major oil

exporters. In 2019, regional growth is expected to rebound to 2.8 percent as the largest economies, Nigeria, Angola, and South Africa, see the start of a gradual pickup over the medium term. Nevertheless, *Africa's Pulse* for April 2019 considers the external environment for SSA as well as rising debt levels to be challenging (Box 1.1), as global growth continues to abate, and uncertainty related to trade tensions persists.

Growth throughout the East African Community (EAC) is outpacing the SSA-wide average. In 2017, droughts had caused regional growth to decelerate to 4.5 percent; but in 2018, agriculture in most EAC countries rebounded. Growth for the region in 2018 is estimated at 5.9 percent, well above the SSA average (Figure 1.1). Rwanda's growth was the highest not just in the EAC but in SSA as a whole. For 2019, average growth for the regional block is projected to reach 6.1 percent as both agricultural output and aggregate demand recover.

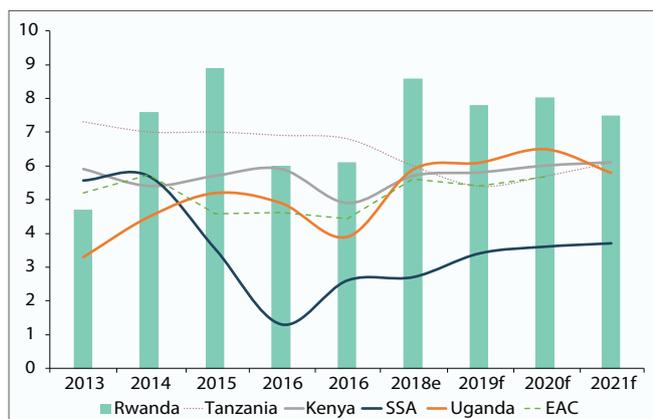
Box 1.1: Public debt in Sub-Saharan Africa: Recent developments

April 2019 edition of The World Bank's Africa's Pulse highlights growing concerns about public debt in SSA. After a substantial fall in the early 2000 owing to debt relief under the Heavily Indebted Poor Country and Multilateral Debt Relief initiatives, median public debt in SSA reached about 53 percent of GDP by 2018, up from 24 percent of GDP in 2012. Sizable fiscal deficits and exchange rate depreciations were the key drivers of debt accumulation, while low global interest rate environment facilitates countries' access to commercial borrowing. A growing number of SSA countries has tapped into international bond markets.

In addition to the increase in debt, notable changes in debt composition have also taken place with the share of non-concessional debt increasing by 10 percentage points in 2010-17. Rising debt levels coupled with the shift of external debt toward more market based instruments – sometimes more extensive and riskier – have increased debt vulnerabilities in SSA. As of end-2018, nearly half of low-income countries with available Debt Sustainability Assessments were either at high risk of debt distress or already in debt distress. The number of such countries doubled since 2013. Increased debt service cost across region due to increased non-concessional borrowing crowds out spending on development needs.

Source: World Bank Group (2019) Coulibaly, Gandhi, & Senbet (2019)

Figure 1.1: Global and regional economic growth, 2013–21
(Percent)



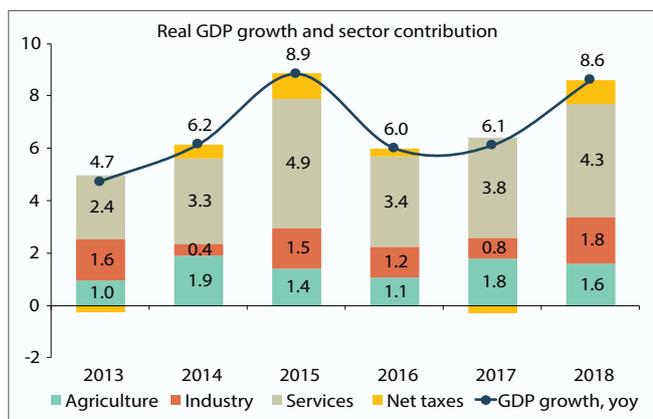
Source: WBG 2019.
Note: SSA: Sub-Saharan Africa; EAC: East Africa Community

2. Rwanda – Taking Stock of Recent Developments

2.1. Domestic Demand Drove GDP Growth in 2018

In 2018, GDP growth reached 8.6 percent, the highest rate since 2015 (Figure 1.2). The growth momentum that began in the second half of 2017 was carried into 2018. Growth exceeded projections in the previous edition of the *Rwanda Economic Update* (REU) by a large margin. The 8.6 percent growth in 2018 was well above the 7.3 percent average for 2008–17. While the 8.6 percent growth surprised on the upside, nominal GDP grew by just 7.7 percent because of a negative GDP deflator. Combined with

Figure 1.2: Rwanda’s economic Growth, 2013–18
(Percent)



Source: National Institute of Statistics of Rwanda (NISR).

depreciation of the exchange rate, in U.S. dollar terms GDP went up by less than 5 percent in 2018, or about 2.5 percent in per capita terms. On the supply side, growth was driven by agriculture, helped by favorable weather conditions; manufacturing; and the recovery in construction. On the spending side, growth was driven by domestic demand, supported by both investments and consumption while net exports contributed negatively to the growth.

Supported by favorable weather, agricultural production in 2018 was above the average of the past decade. Output expanded by 5.9 percent, contributing 1.6 percentage points to GDP growth. Food crops increased by 4.3 percent and export crops by 9.7 percent. In volume terms, tea production went up 12.2 percent, significantly higher than the 7.5 percent in 2017, and coffee by 11.95 percent, up by 0.7 percent.

Industry’s 2018 growth of 10.3 percent was the highest since 2012, supported by construction and manufacturing. Construction, accounting for more than 38 percent of industrial output, expanded by 14.1 percent, recovering from the 3.1 percent contraction in 2017. Growth was driven by resumption of large-scale infrastructure projects, such as Bugesera airport, the new stadium, and roads. The resurgence of construction also contributed positively to several manufacturing subsectors that feed into construction. Overall, manufacturing output grew by 10.7 percent, up from 6.5 percent in 2017. In addition to metals, machinery, and equipment, whose production expanded primarily in response to construction, food and beverages were the main drivers of manufacturing growth. In contrast, mining grew by only 1.9 percent, reflecting weak international prices throughout 2018. The volatility of growth in mining, which had been above 20 percent in 2017, continues.

The growth in Rwanda's power sector was also robust in 2018. Electricity production increased by 9.8 percent in 2018, up from 7.9 percent in 2017. The electricity production has grown 11.0 percent per annum on average in 2010-18. The generation capacity has more than tripled in the same period allowing large gains in access, as discussed in the special topic in the current REU.

Services generally performed quite well in 2018, but with considerable variation by subsector. Accounting for 47.8 percent of GDP, services grew by 8.8 percent, up from 7.9 percent in 2017. Double-digit growth rates were recorded in trade services (15.2 percent), transport (18.3 percent), and ICT (17.9 percent). The hospitality sector (hotels and restaurants) also performed quite well as Rwanda continued to successfully position itself as an emerging destination for international conferences and exhibitions, while the sector continued to attract both private and public investment.

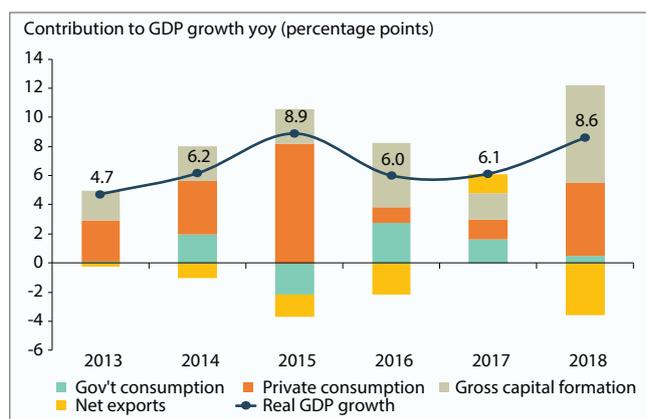
After several years of weakness, growth in private consumption accelerated to 6.5 percent in 2018. Private consumption grew against the background of the recovery in food production following the regional droughts in 2016/2017 and the decline in relative food prices. Public consumption grew by only 3.4 percent, below its 2016 and 2017 growth rates.

Investment momentum was very strong in 2018. Investment grew by 23.4 percent driven by both government and the private sector. Public investments contributed to gross capital formation through government-funded construction and large-scale purchases of machines, devices, and tools.

Contribution of net exports to GDP growth was negative in 2018 as export momentum ebbed. After growth of about 34 percent in real terms in 2017, exports of goods and services almost stagnated in

2018, growing by only 0.8 percent, highlighting the risk associated with Rwanda' external volatility. In contrast, imports grew by 9.4 percent in real terms, driven by construction and manufacturing demand for intermediary and capital goods.

Figure 1.3: Domestic demand real GDP growth, 2013–18
(Percent)



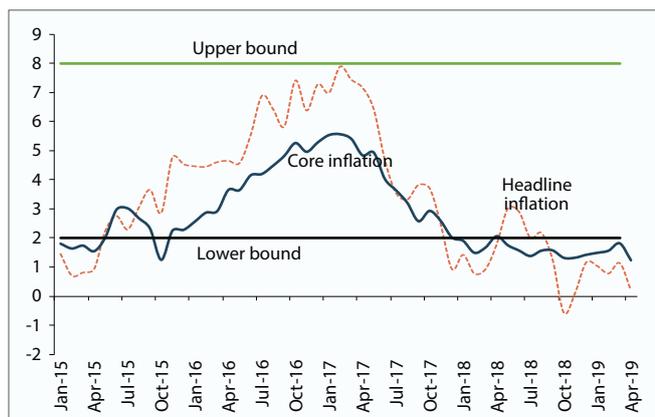
Source: NISR.

2.2. Monetary Policy and the Financial Sector

By the end of 2018 annual inflation had hit a record headline low of 1.2 percent, well below the lower bound of official target of 5 ± 3 percent (Figure 1.4). Low inflation persisted into 2019, recording 1.2 percent as of April 2019. Recovery from the droughts of 2015 and 2016 has led to low food prices across EAC, including Rwanda. Food inflation was negative throughout 2018, down to -3.1 percent in April 2019. In contrast, energy prices were driven up by rising international fuel prices (Figure 1.5). Core inflation, which excludes energy and fresh food items, was 1.4 percent in December 2018 and 1.2 in April 2019.

With inflation very low, the National Bank of Rwanda (BNR) continues to keep its monetary policy accommodative while maintaining adequate external reserves buffers. In its quarterly meeting held on May 3, 2019, the BNR's Monetary Policy Committee reduced the policy rate by 50 basis points to 5 percent after holding at 5.5 percent for 16 consecutive months. Nominal depreciation of

Figure 1.4: Headline inflation, 2015–19
(Percent)



Source: NISR

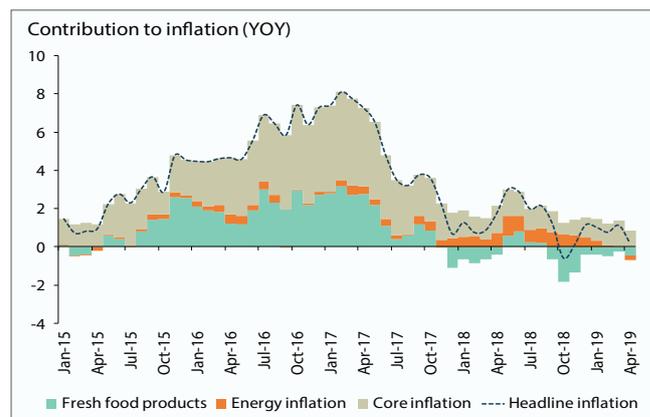
the Rwandan franc in the first quarter of 2019 was moderate with less than 1 percent depreciation in its nominal effective exchange rate. Following the external adjustment in 2016 and 2017, BNR has been increasing its foreign exchange reserves and is holding adequate external buffers.

BNR continues to refine its monetary policy.

In pursuit of price stability, monetary policy has historically used monetary aggregates as an intermediate target. In 2018, BNR announced its intention to move to an interest rate based monetary policy framework, with a medium-term objective of adopting a formal inflation targeting framework. The shallow and volatile interbank market, which may weaken the interest rate pass-through, continues to be the main obstacle for transition to the new framework.

In 2018 money market interest rates converged toward the BNR policy rate. The interbank rate declined on average from 6.1 percent in 2017 to 5.6 percent and the 91-day treasury bill rate from 8.2 to 5.1 percent. Well-anchored inflationary expectations and slow depreciation have contributed to the decline in interest rates, even though the government issued more domestic debt: in 2018, the value of treasury bills issued was 31 percent higher than in 2017.

Figure 1.5: Food and energy prices, 2015–19
(Percent)



Source: NISR.

The repo rate, BNR's main instrument for managing excess liquidity, declined from an annual average of 4.6 percent in 2017 to 4.2 percent.

Slow growth of credit to the private sector remains a low spot as banks continue to be risk-averse.

Bank loan portfolios grew by 10.8 percent in 2018, so that at year-end the credit-GDP ratio was 19.5 percent of GDP, up from 18.9 percent in 2017 (Figure 1.6). The volume of new bank loans did rise by 17.5 percent in 2018, from an average of 5.4 percent in 2016–17, but the main drivers were new loans to the communication and construction sectors (including syndicated loans to MTN and Bugesera Airport), which contributed about 65 percent to the expansion.

The health of bank balance sheets has improved, and the banking sector continues to be stable and resilient.

In December 2018, the share of nonperforming loans (NPLs) in the loan portfolios of commercial banks was 6.4 percent, down from 7.6 percent in 2016 and 2017. The drop in NPLs followed write-offs of bad loans in response to a new regulation issued in January 2018 on credit classification and provisioning. The capital risk-weighted assets ratio was 25.5 percent in December 2018, well above the 15 percent minimum capital adequacy ratio.

Moreover, the banking sector has enough liquidity; the Basel III liquidity coverage ratios of all banking institutions are higher than the minimum required (BNR 2019). Despite minimal credit growth, bank profitability was sound, with a return on equity of

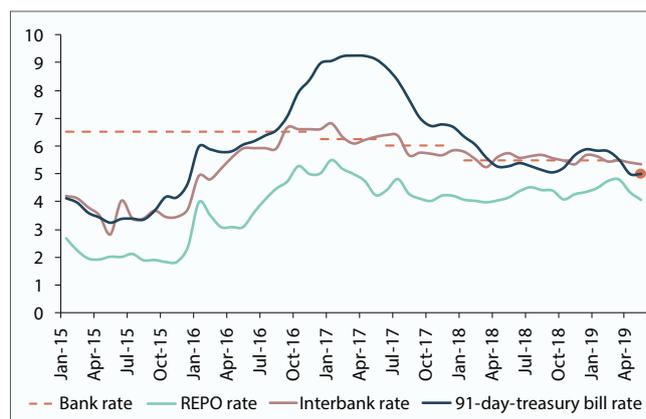
11.2 percent in 2018, up from 6.2 percent in 2017. Recent development in digital financial services continue to contribute to the access to financial services (Box 1.2).

Figure 1.6: Credit growth to the private sector, 2012–18
(Percent)



Source: BNR data.

Figure 1.7: Money market interest rates, 2015–19
(Percent)



Source: BNR Data

Box 1.2: Digital financial services and payments

Digitalization is gaining ground in Rwanda's financial sector, supported by mobile phone penetration. Since 2006, that penetration has been growing very fast. In 2006, 9 years after mobile phone services were introduced in Rwanda, only 6.2 percent of Rwandan households owned a telephone (NISR, 2006), and less than 4 percent of adults had mobile phone service (NISR, 2008). By the end of 2018, there were 9.7 million mobile phone subscribers—82 subscriptions for every 100 people in Rwanda (Figure 1.8A). Between 2010 and 2018, registered mobile money accounts increased 46-fold, from 231,000 to 11.1 million (Figure 1.8B). As a result, the number of mobile money transactions rose steeply, from 829,000 to 300 million, and their value shot up from Rwf8 billion to Rwf1,808 billion (Figure 1.8C). The banking system has also been expanding its mobile banking services, such as remote access to accounts by mobile phone. In 2018, 10 of the 11 banks and one microfinance institution were operating mobile services, and 1,845,584 bank clients conducted 3,206,474 mobile transactions (Figure 1.8D).

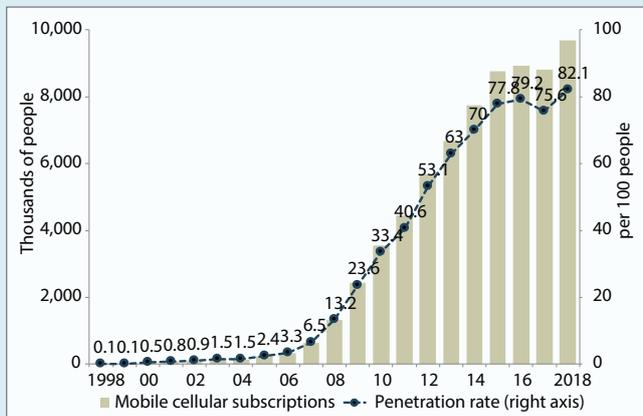
Other instruments for digital payments are also growing. Transactions at automated teller machine (ATMs) and point of sale (POS) terminals, facilitated by the Rwanda Integrated Payment Processing System (RIPPS),¹ have grown consistently since 2010, with over 9.5 million ATM and 1.5 million POS transactions in 2018 alone. At yearend there were 386 ATMs and 2,801 POS terminals. Similarly, Internet banking transactions have also continued to increase, reaching over 767,000 transactions in 2018. The extensive use of mobile money and banking services resulted in fewer physical points for accessing financial institutions. For instance, the BNR's *Monetary Policy and Financial Stability Statement* of February 2019 showed that the number of bank branches had gone down from 522 in 2017 to 517.

¹ RIPPS comprises the Automated Transfer System and the Central Securities Depository.

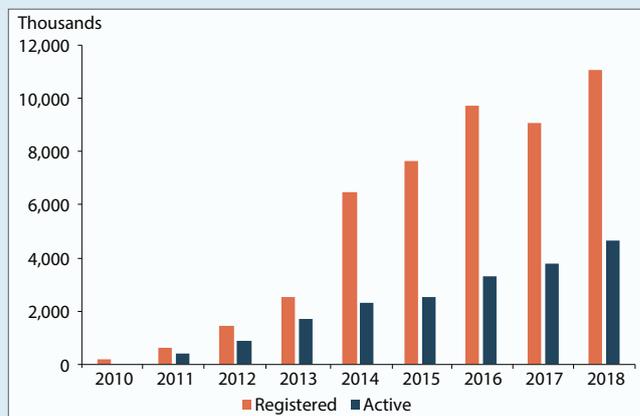
Box 1.2: Digital Financial Services and Payments (cont)

Figure 1.8: Digital financial services and payments, 1998–2018

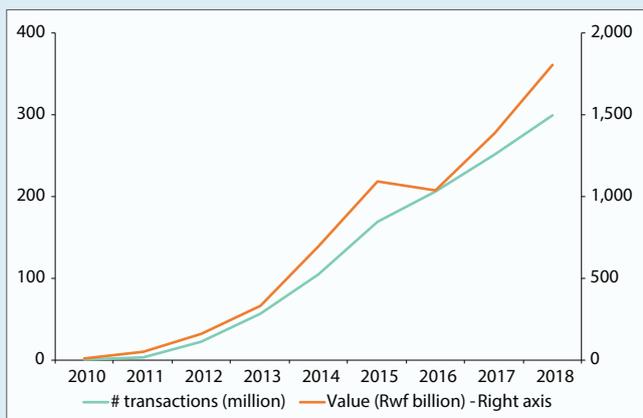
A. Mobile phone penetration



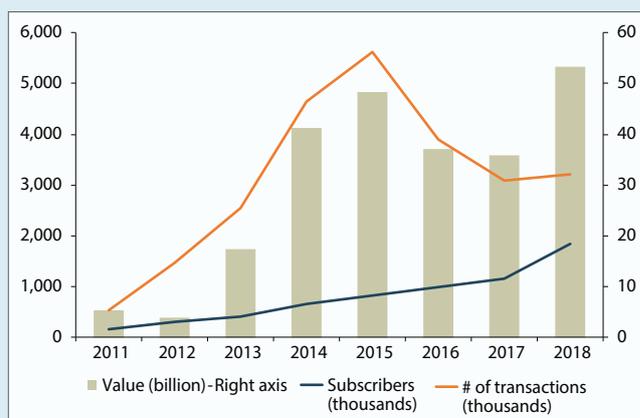
B. Registered and active mobile money users



C. Number and value of mobile money transactions



D. Mobile banking operations



Source: BNR (2019), IMF (2019), NISR (2008, 2012, 2016)

2.3. The External Sector

At 7.8 percent of GDP the current account deficit was almost unchanged compared to 2017. With imports growing faster than exports, the deficit of goods and services balance widened from 10.8 percent of GDP in 2017 to 11.3 percent to be partly offset by the increase in net secondary incomes. Rwanda was able to accumulate reserves as capital and financial flows, supported by flexible exchange rate regime, created a surplus in the balance of payments. Official foreign reserves went up by 13.2 percent to US\$1,319 million, about 4.7 months of import cover (Figure 1.9). Rwanda continues to enjoy relatively low current account deficit, down from

the peak of 15-16 percent of GDP in 2015 and 2016, which was driven by government-led investments largely for the MICE infrastructure.

Growth in goods exports stalled in 2018. In dollar terms, exports grew by 7.2 percent, far below the 44.5 percent growth in 2017 highlighting the risks associated with the volatility of Rwanda’s export performance. Two major sources of volatility have emerged—sporadic nature of exports of nontraditional minerals and fluctuations in international prices of traditional export commodities, especially coffee and tea. Mineral exports, which mainly drove growth of export earnings in 2017 fell by 7.2 percent as a result

of a decline in exports of nontraditional minerals, such as beryllium, unwrought lead, and gemstones, from US\$248 million to US\$208 million. With respect to crop exports, though the volumes of coffee and tea went up, their unit prices in international markets dropped.

Maintaining a strong growth trajectory in service exports has also proved to be challenging. Driven by transport and travel services, exports of services contracted by 1.8 percent, from US\$930 million to US\$913 million. Exports of transport services went down by 11.6 percent, while tourism receipts grew slightly, by 1.6 percent.

Import growth resumed in 2018 after declining in 2017 as investment demand strengthened. The value of gross imports in dollar terms rose by 8.1 percent, after having fallen by 7.7 percent in 2017. Imports of energy products grew fastest, by 22 percent, on higher volume (14.1 percent) and higher international prices, but the biggest contributors to import growth were intermediate and capital goods. Imports of raw materials for manufacturing went up by 10.5 percent and for construction by 18.5 percent. Imports of machines, devices, and tools expanded by 23.1 percent. Food imports fell by 1.3 percent, keeping growth of the largest import item, consumer goods, to just 2.1 percent.

Figure 1.9: Gross international reserves, 2013–18
(US\$ Million)

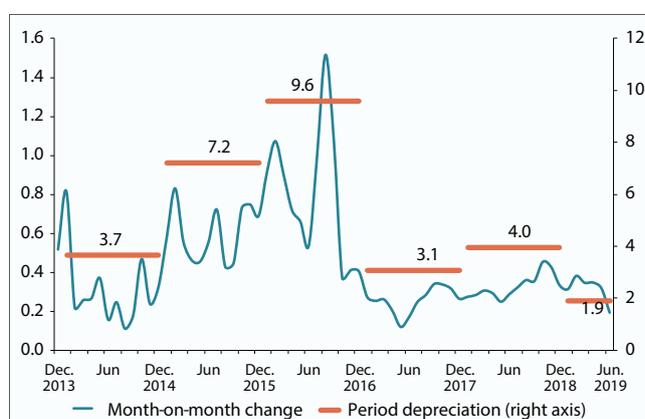


Source: BNR and IMF country reports

Rwanda's balance of payments (BoP) remained in surplus (Table 1.1). Supported by flexible exchange rate regime the current account deficit continues to be adequately financed by capital and financial flows. Capital account, which recovered from a 3-year decline, rose to 2.6 percent of GDP, while net foreign direct investment reached 3 percent of GDP. Net government external and government-guaranteed borrowing amounted to 5.1 percent of GDP, up from 3.8 percent of GDP in 2017 driven by budget borrowing and project financing as well as RwandAir's long-term debt. Rwanda's official foreign reserves continued to increase third year in a row reaching US\$1.3 billion or about 4.7 months of imports cover (Figure 1.9).

Exchange rate depreciation continues to be modest. BNR continues to adhere to the floating exchange rate regime while prioritizing accumulation of foreign exchange reserves for strengthening Rwanda's external buffers. In 2018, the franc depreciated less than 2 percent in nominal effective terms, and less than 1 percent as of April 2019. Because of strengthening of US dollar against other main currencies, franc's depreciation against US dollar was more pronounced, about 4.0 and 4.2 percent respectively (Figure 1.10). Franc's real effective exchange rate depreciated by 2.3 percent in 2018.

Figure 1.10: Rwanda franc against the US dollar, 2013–18
(Percent)



Source: BNR

Table 1.1: Rwanda's balance of payments, 2014–18
(Percent of GDP)

	2013	2014	2015	2016	2017	2018
Current account balance	-7.3	-11.8	-15.3	-16.0	-7.7	-7.8
Goods and services	-15.3	-16.7	-18.9	-18.6	-10.8	-11.3
Exports of goods and services	16.9	16.4	17.8	18.2	21.7	21.5
o/w Minerals	5.5	4.8	3.0	2.9	5.3	4.9
o/w Coffee and tea	1.5	1.4	1.6	1.4	1.6	1.7
o/w Travel	3.9	3.8	4.1	4.3	4.0	3.9
Imports of goods and services	32.2	33.1	36.7	36.7	32.5	32.7
o/w Capital goods	7.8	8.0	7.9	8.4	6.8	7.2
o/w Intermediary goods	8.3	9.0	8.3	6.7	6.5	7.1
o/w Energy products	5.1	4.6	3.4	2.7	2.8	3.2
o/w Transport	5.1	5.1	4.9	4.7	4.4	4.7
Primary income (net)	-1.7	-2.4	-2.9	-3.6	-3.4	-3.4
Secondary income (net)	9.7	7.2	6.5	6.2	6.5	6.9
o/w Remittances receipts	2.1	2.2	1.9	2.0	2.3	2.7
o/w Government budgetary grants	7.6	5.3	4.7	4.3	4.5	4.0
Capital account balance	3.1	4.2	3.6	2.2	2.1	2.6
Financial account balance	8.8	8.1	9.4	11.9	6.4	7.4
Direct investment (net)	3.4	3.9	2.7	2.6	2.8	3.0
Portfolio investment (net)	0.0	0.0	0.1	0.1	-0.8	-0.2
Loans and other investments (net)	5.4	4.2	6.6	9.2	4.4	4.6
o/w Public debt disbursement	7.1	4.3	5.3	8.1	4.4	5.8
o/w Other long-term debt disbursement	2.2	1.2	1.1	2.2	1.0	1.7
Net errors and omissions	-1.6	-1.6	2.0	1.8	0.2	-0.8
Overall balance	3.0	-1.1	-0.3	-0.1	1.0	1.4

Notes: Minerals include the exports of cassiterite, coltan, wolfram as well as nontraditional minerals, such as beryllium, unwrought lead, and gemstones
Source: BNR and NISR

2.4. Fiscal Policy Developments

The fiscal deficit was reduced in the first half of FY2018/19 (H2 of the calendar year 2018) (Table 1.2).² The fiscal deficit was 3.1 percent in the first half of FY (second half of 2018), lower than in the same periods of 2016 and 2017. Government revenue and spending both increased as a share of GDP. Revenues increased for all the main categories—taxes, nontax revenues, and grants. Increases in total government

spending were a result of higher transfers to local governments and other public entities and higher capital spending. Meanwhile, excluding the grant, the fiscal deficit widened by 0.4 percentage points to 8.7 percent of GDP in the first half of FY2018/19.

Revenue collection in first half of the FY2018/19 was strong. Compared to the same period in 2017, total revenues, excluding grants, grew 16.7

² Rwanda's fiscal year runs from July 1 to June 30. This REU-14 reports on the July-December 2018 period.

percent; and tax revenues grew 12.3 percent, well above the growth of nominal GDP of 7.7 percent, to reach 15.6 percent of GDP, up from 14.9 percent a year earlier. Increased tax revenue was mainly driven by direct taxes, primarily corporate profit tax, which went up 23.8 percent. Income tax grew at 13.8 percent, reaching 3.7 percent of GDP. Taxes on goods and services were 9.9 percent higher and on international trade 10.8 percent higher, reflecting strong domestic demand and increased imports. This performance was backed up by ongoing policy and administration reforms including rolling out the Electronic Billing Machines to selected non-VAT registered tax payers; revision of the property

tax law; enactment of the law amending excise duties on beer, wines and liquors, and mobile data; and implementation of the new transfer pricing guidelines. This follows earlier initiatives such as amendments in the VAT law, the law on investment promotion and facilitation, the income tax law, and new mineral tax and gaming laws.

Non-tax revenues and grants were stronger than expected because of unique factors. Growing at 40.9 percent, nontax revenue was the highest-growing category; it exceeded the target by about 20 percent because reimbursements from the UN for peace-keeping operations were higher than expected.

Table 1.2: Rwanda's central government finances, FY 2016/17–2019/20
(Percent of GDP)

	FY2016/17	FY2017/18	FY2018/19 revised budget	FY2017/18 (July-Dec. 2017)	FY2018/19 (July-Dec. 2018)	FY2019/20 budget
Revenue and grants	22.7	23.1	23.1	22.4	24.8	22.5
Total revenue	18.0	18.5	18.3	17.7	19.2	18.3
Tax revenue	15.5	15.9	15.6	14.9	15.6	16.0
Non-tax revenue	2.5	2.6	2.7	2.7	3.6	2.3
Grants	4.6	4.5	4.8	4.7	5.6	4.2
Expenditure	27.3	27.2	27.0	26.9	29.1	28.5
Current expenditure	15.0	14.9	14.8	15.2	16.0	14.3
Wages and salaries	4.2	4.1	4.1	4.1	4.0	4.3
Purchases of goods and services	2.7	2.7	2.8	3.0	2.8	2.4
Interest payments	1.0	1.2	1.1	1.1	1.2	1.3
Transfers	4.9	4.6	4.8	4.3	5.3	4.2
Exceptional social expenditure	2.2	2.3	1.9	2.7	2.7	2.1
Capital expenditure	10.7	10.3	10.1	9.3	10.8	11.7
Domestic	5.9	5.9	5.7	5.4	6.0	7.1
Foreign	4.8	4.4	4.3	3.9	4.8	4.7
Net lending	1.6	2.0	2.1	2.4	2.3	2.4
Change in arrears (net reduction-)	-0.3	-0.3	-0.3	0.9	1.2	-0.3
Budget balance						
Primary deficit	-3.6	-3.0	-3.5	-3.4	-3.2	-4.7
Fiscal deficit (cash basis)	-4.9	-4.5	-4.9	-3.6	-3.1	-6.3
Financing	4.9	4.5	4.9	3.6	3.1	6.3
Foreign (net)	4.5	4.0	4.2	5.3	5.9	4.6
Domestic (Net, -: deposit build-up)	0.3	0.4	0.7	-1.7	-2.8	1.7

Source: MINECOFIN data (Budget Execution tables)

Note: Table 1.2 is reported in Government Finance Statistics Manual (GFSM) 1986 format

There was 27.2 percent growth in grants, which reached 5.6 percent of GDP, following increases in grant to health and education sector.

The increase in budget outlays was mainly driven by capital spending and transfers. In nominal terms, budget outlays grew by 16.5 percent in H2 of 2018 compared to 2017. Transfers and subsidies grew by 32.8 percent, reaching 5.3 percent of GDP. The surge in transfers to local governments reflects Rwanda’s continuing efforts in decentralization. Capital spending rose by 25.1 percent, reaching 10.8 percent of GDP, compared to 9.3 percent a year earlier. With an increase of 15.5 percent, energy was one of the main recipients of public investment. The energy investments were directed to increasing access to electricity, expanding transmission as well as generation. Among the results was that in H2 about 35,000 more households were connected to

the grid, as discussed further in the special topic on energy sector in Rwanda.

The 2018/19 budget was revised in March 2019. Building on the progress in H2, both revenue and spending were revised upward (MINECOFIN, 2019). The nominal spending target went up by 5.8 percent, with a 2.5 percent increase in the recurrent budget and an 11.1 percent increase in the development budget. Spending is expected to be financed by higher domestic revenues and grants, but more external borrowing will have to be made. As a result, the fiscal deficit is now projected to reach 5.4 percent of GDP. Furthermore, the 2018/22 budget framework paper was presented to the parliament in April 2019 envisages further increase in fiscal deficit to support a scale-up in investments in line with the targets of NST (Box 1.3).

Box 1.3: Fiscal outlook: Scaling-up the implementation of NTS1 and its fiscal implications

The draft budget framework paper (BFP) for 2019/20 – 2021/22, which includes a draft FY2019/20 Budget, is currently under discussion in the Parliament and is expected to be approved by the end of June 2019. The key focus of the budget is on capital spending, which will increase to 11.7 percent of GDP, up from 10.1 percent of GDP projected for FY2018/19. Increased capital spending will be mostly financed by larger fiscal deficit, which will increase to 6.3 percent of GDP, as revenues will not increase substantially as a percent in GDP – projected increase in tax to GDP ratio will be offset by declining external grants as a percent of GDP.

Fiscal deficit will remain elevated over the medium-term reflecting Government’s determination to fully implement the investment program identified in NTS1. The key infrastructure projects that will be funded by the budget include: (i) Nyabarongo II Hydro Power Plant of 43.5MW, (ii) Hakan Peat to Power Plant (80 MW) and Rwanda-DRC interconnection substations (220 kV); (iii) two 220kV single circuits (Rusumo-Bugesera-Shango and Mamba-Rwabusoro-Rilima); (iv) connecting more than 200 Schools and 40 Health Facilities with electricity, etc.

The BFP projects that over the medium-term public investments will continue to be increasingly financed by borrowing as external grants continue to decline. This will be a continuation of earlier trends observed since 2013/2014 (Figure 1.11). This highlights the criticality of strategic prioritization of public investments to strengthen Rwanda’s investment-growth nexus and safeguard Rwanda’s debt sustainability.

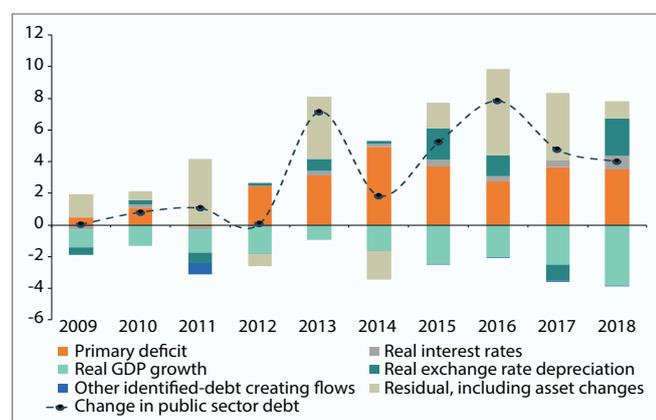
Figure 1.11: External budgetary grants and borrowing
(Percent in GDP)



Source: BFP

Rwanda's public debt continued to rise in 2018, reaching 53.1 percent of GDP. Since 2013 external public and publicly guaranteed debt, including commercial loans and Eurobonds, has contributed more than 80 percent to Rwanda's cumulative debt. As of December 2018, commercial borrowing represented 12 percent of the nominal external debt. Most of Rwanda's public external debt is in fixed terms and is not exposed to interest rate fluctuations. In addition to public external debt, Rwanda has also provided guarantees for State Owned Enterprises in strategic sectors, which currently stand at about 5 percent of GDP. Most of these guarantees are in foreign exchange. In terms of drivers of debt, high primary deficits—mainly the result of public investment—have fueled debt, in addition to real exchange rate depreciation and government guarantees (Figure 1.12). Interest payments have also been going up as debt accumulates; they are currently at 1.2 percent of GDP. Although domestic debt is a small fraction of the total stock of public debt, it accounts for the majority—54 percent—of the interest burden because its interest rates are higher.

Figure 1.12: Decomposition of public debt accumulation, 2009–18 (Percent in GDP)



Source: MINECOFIN and DSA data

Note: Government guarantees are reflected in "residual, including asset changes."

2.5. Recent Reform Initiatives

Rwanda continues to implement reforms for sustained growth. Joint Government/World Bank Group report on Future Drivers of Growth identified several priority areas for maximizing Rwanda's

growth potential. Government's recent reform efforts were focused on some of these areas, including education, de-risking agriculture and strengthening market institutions.

- Education.** Rwanda's low human capital is one the main constraints for long-term growth. Rwanda scored 0.37 in human capital index (HCI), which is one the lowest in the region. As indicated in the special topic of REU-13, one of the main priorities in the sector is to strengthen the professionalism of teachers, instructional leaders and their managers. In January 2019, the government announced policy reforms to improve teachers' remuneration and pathways for career progression. A 10 percent salary increase for primary and secondary teachers in government and government-aided schools came into effect in March 2019, as part of revision of the FY2018/19 budget. The new policies also introduce incentives for teaching as a career. To attract qualified new teachers, the policies give education courses higher priority for university scholarships and provide subsidies for students at Teacher Training Colleges (TTC).
- Agriculture insurance.** The government launched the National Agriculture Insurance Scheme (NAIS) in April 2019. Launched as a pilot in 10 districts, NAIS aims at mitigating risks and losses incurred by farmers due to unpredictable natural disasters, pests and diseases that affect their livestock and crops. The scheme is subsidized up to 40 percent by the Government of Rwanda and is expected to enable the farmers to access financial services more easily. NAIS is being implemented through a multi-agency framework composed of three local insurance companies under the overall guidance and control of the government.

- **Market institutions.** Parliament passed a law in April 2019 to regulate organization, functioning, licensing and remuneration for insolvency practitioners. This initiative is expected to address resolution of insolvency which is a weak area in business environment of Rwanda. It takes 2.5 years to resolve insolvency.

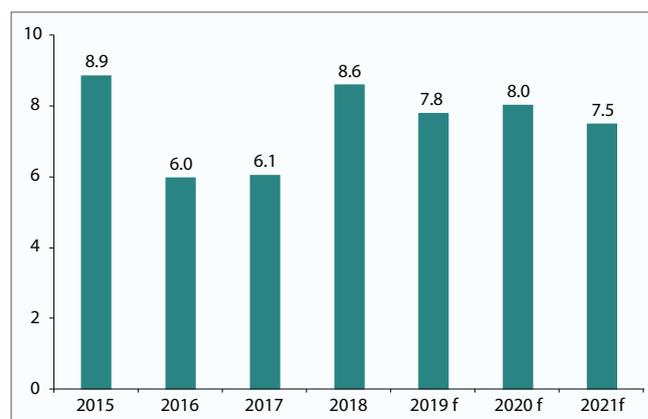
In addition to these reforms, Rwanda continued to advance in the area of digital financial services and payments. The revised Rwanda National Payment System was approved by the cabinet in November 2018, building on the progress in digital financial services for a faster transition toward “cashless Rwanda” (see Box 1.2).

3. Rwanda’s Macroeconomic Outlook and Risks

3.1. Outlook

Rwanda’s economic outlook is strong, with economic growth forecast in a range of 7.5 to 8 percent annually over the medium term (Figure 1.13). Projections are revised upward slightly compared to the previous edition of the REU because of Government’s recent decision to scale-up public investments in 2019-22. On the supply side, agriculture is expected to sustain strong growth momentum due to favorable weather at least in the short run. In the medium term, investments in developing progressive terraces, irrigation, and rehabilitation of marshlands and interventions for land consolidation and the distribution and application of fertilizers will help to maintain healthy growth of 5–6 percent. These agricultural interventions are also expected to reduce the sector’s exposure to weather shocks. Agriculture is also expected to support expansion of the nascent but promising agri-business sector. Construction of the new airport, several dams, roads, and sports infrastructure will continue to boost industrial activities. Growth in services is expected to average 8 percent over the medium term.

Figure 1.13: GDP growth, 2015–21f, is projected to remain solid over the medium-term (Percent)



Source: World Bank estimates
Note: ‘f’ denotes forecast

The BNR is expected to maintain an accommodative monetary policy. With inflation low and a favorable external environment, monetary policy is expected to remain accommodative and support recovery in bank lending. A flexible exchange rate will be conducive for export growth. The upcoming IMF Policy Coordination Instrument (PCI) arrangement will also support to the implementation of the BNR’s new forward-looking monetary policy operational framework, including through development of financial markets and broader access within the economy to financial resources.

The fiscal outlook envisages a higher fiscal deficit over the medium term to accommodate projected scaling-up in public investments. Revenue mobilization is expected to improve because of administrative measures to boost VAT and rationalize exemptions. This will be offset by higher public investment in energy, water and sanitation, education, health, roads and agriculture sectors and recurrent outlays to support the ongoing restructuring of education and health sectors. Despite the higher investment, the CAD should not exceed 10-11 percent of GDP.

3.2. Risks to the Outlook

Rwanda's economic outlook is vulnerable to both domestic and external risks. Domestically, the main risks are weather-related, such as droughts and floods that may depress agricultural production. Scaling-up of public-sector-led investments is a challenge as well as an opportunity; it could jeopardize debt sustainability if Rwanda's investments-growth nexus does not improve. In addition, with expected increase in fiscal pressures from the expansion of

the power sector, maintaining fiscal sustainability will be of utmost importance, as discussed in the special topic of this issue of Rwanda Economic Update. Weak private sector remains a major risk to Rwanda's growth outlook (see Box 1.4). The main external risks are related to a more severe slowdown in global economic growth than is currently projected that would affect prices for the commodities Rwanda exports.

Box 1.4: Key constraints affecting Rwanda's private sector

Private sector-led growth has been a key priority since the early 2000s. Vision 2020 stressed that "the emergence of a viable private sector that can take over as the principal growth engine of the economy is absolutely key". Rwanda has made great strides in improving the business environment climbing to the 29th place in global ranking in 2019 Doing Business report, the only low-income economy ranked in the top 50. Rwanda has seen some increase in FDI. However, Rwanda's private sector remains nascent. Joint Rwanda Government-World Bank Group (WBG) report on Future Drivers of Growth and WBG's 2019 Country Private Sector Diagnostic identified the key constraints that Rwanda needs to address to stay on the high growth trajectory.

Rwanda's private sector faces an **inadequately skilled labor force**, especially in non-primary sectors and large businesses. Rwanda needs to aggressively pursue a wide array of interventions that support human development throughout the life cycle. In terms of **high cost of finance**, the nominal lending rate is high with an interest spread of around 10 percent. After reaching 20 percent of GDP in 2014 bank lending has not grown as a percent of GDP. Low domestic savings and high operational costs in the financial sector are the main factors constraining efficient supply of finance. With respect to **logistics**, Rwanda remains one of the most expensive places for a container to reach. Inadequate storage facilities severely constraints the agribusiness. **Access to and high costs of broadband connectivity** remains a challenge for Rwanda. A quasi-monopoly combined with erratic electricity supply place the service beyond the reach of most private users. The uptake of internet is well below the regional average. **Limited access to land** further affects the private sector. Foreign investors cite access to serviced land as a major constraint. The Special Economic Zone (SEZ) program was intended to address this constraint, but land in SEZs remains costly. Access to agricultural land is a serious constraint for investors looking to undertake large-scale farming and land consolidation for private investors is challenging. **The cost of electricity** is among the 10 highest in SSA (around \$0.25 per kilowatt hour in 2018). The government introduced a large subsidy bringing down the tariff to around \$0.10, comparable to the tariffs in EAC, with fiscal implications (see the focus of the current REU). One-third (31.5 percent) of firms report that access to reliable electricity is a challenge to their operations (NISR, 2017). Power outages continue to cripple production and capacity utilization, as well as increases firms' costs due to low production or generator use.

Source: World Bank. 2017, 2019

PART TWO

ENERGY SECTOR SPECIAL FOCUS: LIGHTING RWANDA³



³ The analysis underpinning this Special Focus was made possible by funding from the Energy Sector Management Assistance Programme (ESMAP) Subsidy Reform Window.

Summary

Rwanda's power sector has grown rapidly in the past decade and outpaced many of its peers in Sub-Saharan Africa. More than half of Rwandans have access to electricity in their home, compared to 10 percent in 2009, generation capacity has more than tripled in the same period, and outages have become shorter and much less frequent.

These impressive achievements are the result of around a billion USD in public investments over the past decade and wide-reaching institutional reforms. These reforms have improved governance of the publicly-owned electricity company, the Rwanda Energy Group (REG) and made the private sector a strategic partner for Rwanda's power sector. The governance framework in the power sector in Rwanda can become a model for sector governance if the Government continues the path towards making REG financially independent and the new Public Private Partnership (PPP) Law is implemented as planned.

Substantial further reforms will be needed to achieve universal access to affordable, reliable and clean electricity—a prerequisite for Rwanda to achieve its vision of becoming an upper middle-income country by 2035. Steady growth in access and improvement in the quality and security of supply are expected to continue over the next decade. However, the cost of electricity supply is among the highest in the region and remains a constraint for Rwanda's economic and industrial development. Caught between the high cost of electricity and limited affordability, the Government has stepped in to fill the gap between sector cost and revenues. Recognizing the resulting fiscal pressures, the Government has since 2017 implemented a reform program targeting operational efficiency, affordability, and accountability of electricity service, with the overarching objective of making electricity service affordable for the government and

consumers and ensure that becomes an engine of economic growth and private-sector development. The following priority measures will be critical to reap the benefits of and deepen this reform program over the coming decade:

- Pursuing sector expansion in line with least-cost sector planning
- Putting REG into the driving seat of developing new PPP investments identified in the least-cost plan, rather than relying on unsolicited proposals from the private sector
- Accelerating efforts to decarbonize the power sector and adapting to climate change
- Regularly adjusting tariffs for changes in cost and, over time, expanding the groups of electricity consumers that do not need tariff subsidies and are charged the full cost of service
- Providing a state-of-the-art framework for private sector participation in off-grid electrification and targeted incentives to make off-grid solar affordable
- Promoting regional electricity trade through bilateral contracts to tap lower cost supply sources and better integrate variable renewables; and
- Doubling down on the modernization of REG's operations.

1. A Decade of Rapid Growth for Rwanda's Power Sector

Rwanda's power sector has grown rapidly in the past decade and outpaced many of its peers in Sub-Saharan Africa. Generation capacity more than tripled from 88 MW in 2010 to 221 MW in early 2019, with hydro at 47 percent, oil (heavy fuel oil and diesel) 26 percent, peat 7 percent, solar 5 percent, lake methane 14 percent and imports 1 percent (see Figure 2.1, left). Electricity sales rose from 286 GWh in 2010 to 654 GWh in 2018. The number of consumer connections increased over five-fold since 2010, from 175,000 to over 900,000 in 2018. The share of grid-

connected households rose from 11 percent in 2010 to 37 percent as of April 2019. Off-grid connections reached 14 percent of the population by April 2019, taking total electricity access from 11 percent in 2010 to 51 percent in February 2019 (see Figure 2.1, right).

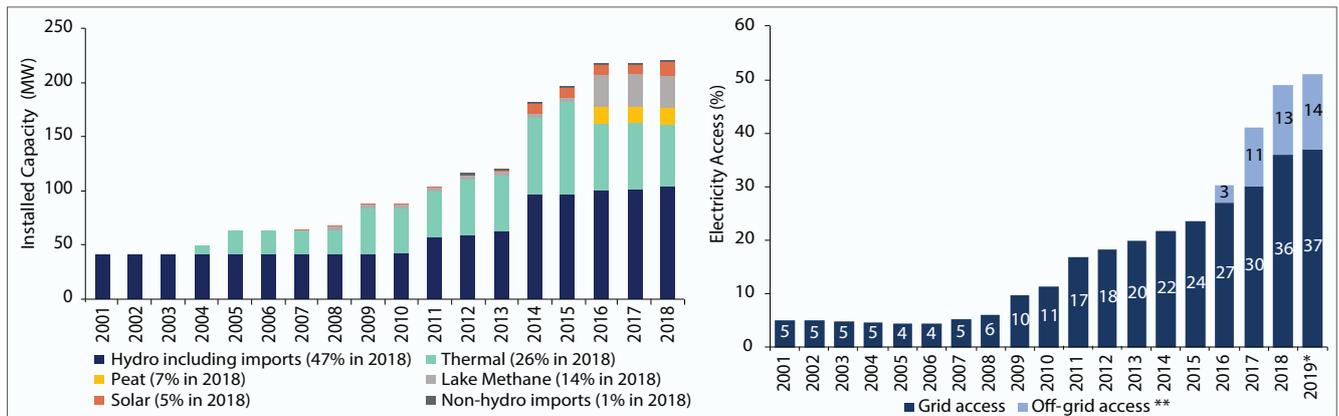
The five-fold increase in electricity access within ten years is almost unprecedented when compared with electricity access expansion in similar countries. Already during 2010-16, prior to the latest acceleration, Rwanda stood out among the world’s 20 least-electrified countries as the one making the fastest progress (see Figure 2.2). The steep progress since 2016 means that Rwanda’s electricity access roll-out over the last decade now counts as one of the fastest electrification programs in history.

Rwanda’s success in expanding access is a result of a robust design and implementation of the grid access program, and is being highlighted as best practice globally by the World Bank’s Independent Evaluations Group (IEG) (The World Bank & IEG, 2014). Rwanda’s institutional approach to electrification follows a ‘Sector-Wide Approach’ (‘SWAp’), which was set up in 2008 to execute the government’s electrification program using an inclusive strategy, including government stakeholders, donors, private sector, and nongovernmental organizations (NGOs). All funding

was pooled in a single program (the ‘Electricity Access Roll-out Program’, or EARP). Multiple donors, including the AfDB, BADEA, BTC, EU, the Netherlands, Japan, OPEC Fund, Saudi Fund, and the World Bank have contributed to the program. The program is being implemented by a fully staffed EARP housed in the Energy Development Company Limited (EDCL), with targeted technical assistance from development partners. From the beginning in 2009, investments have been guided by geospatial analyses to prioritize new grid connections depending on demographic and cost factors, including proximity to the existing grid, interhousehold distances, social infrastructure, access to road networks, and the ability of consumers in each planning cell to afford electricity. The EARP is being closely monitored by the Presidency, through the annual leadership retreats. In addition, the MINECOFIN conducts annual joint sector reviews in collaboration with development partners, during which the sector performance is monitored and reported to the sector-working group (which includes the private sector and all development partners active in the sector).

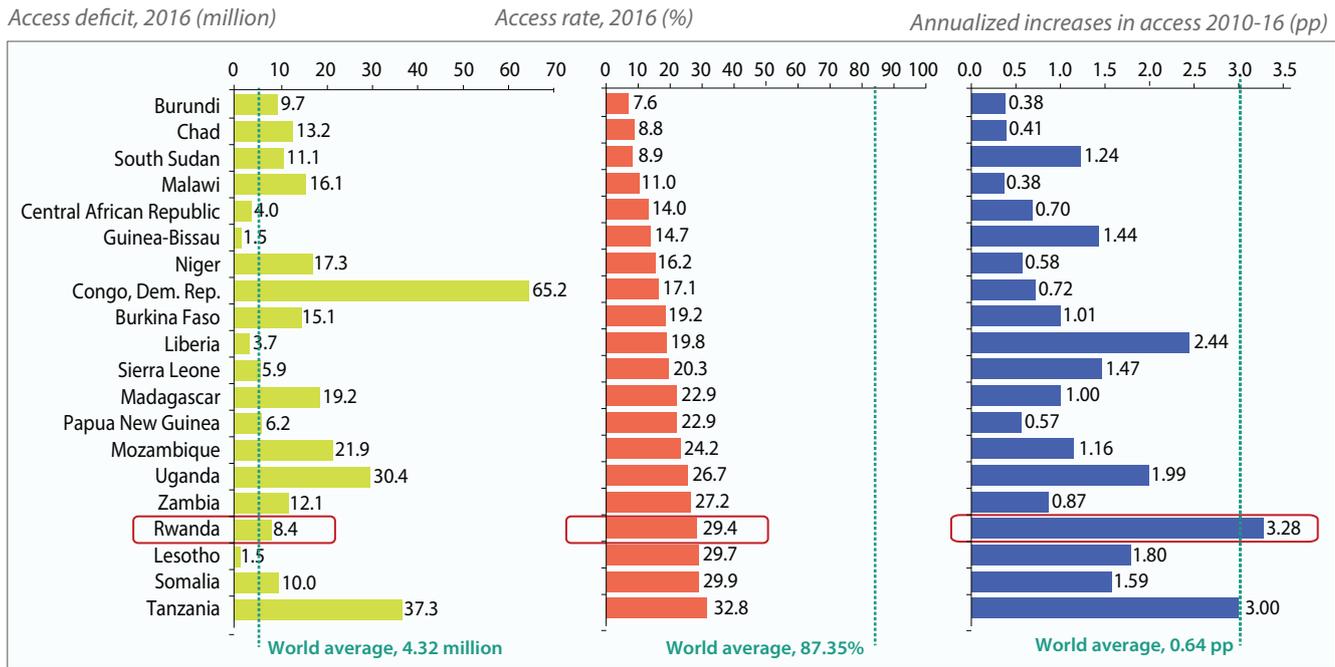
Rapid increase in electricity access is having a measurable impact on household welfare, and access to the grid is finally reaching the poorest and most vulnerable members of society. A recent impact evaluation of the World Bank’s grid extension

Figure 2.1: Growth in installed electricity generation capacity and electricity access in Rwanda 2001-19



Notes: * as of February 2019. ** Data prior to 2017 is not fully comparable to more recent data. Source: World Bank.

Figure 2.2: Progress in the world's 20 least-electrified countries over the 2010-16 SDG7 tracking period



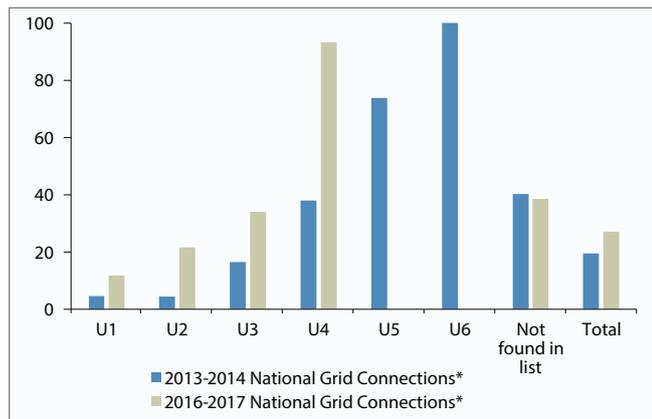
Source: World Bank (2018).

investments in Rwanda⁴ found increased income and consumption spending, improved quality and value of houses, and accelerated asset creation. Electrification was also found to decrease household monthly energy expenditure (excluding electricity) and biomass collection costs and time and increase time spent on education by children and time used

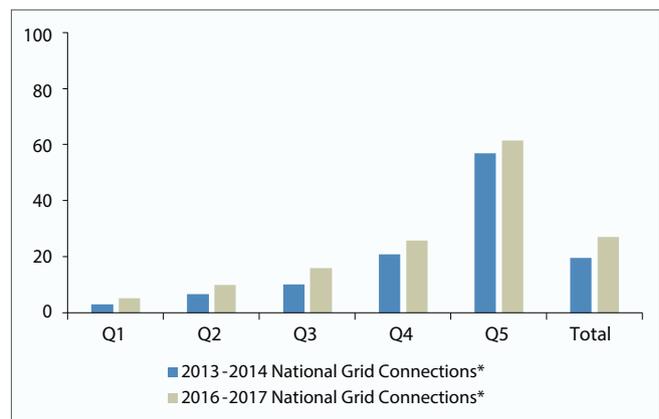
for tutoring children. Further, although access to electricity remains largely concentrated in the two top quintiles, with less than 10 percent of the bottom 40 percent of the population using electricity as the main lighting source, grid access is finally reaching the lowest quintiles and Ubudehe categories (Figure 2.3).

Figure 2.3: Electricity access in EICV4 & EICV5 (Percent)

By Ubudehe category



By income quintiles



Note: *Houses that use electricity as their main source of lighting
Source: EICV4 & EICV5

⁴ 'Impact Evaluation of the Rwanda Electricity Access Rollout Program (EARP) and Sectorwide Approach (SWAp) Development Project', conducted by REG with the support of the World Bank, is a part of the World Bank's corporate commitments in IDA17. The baseline survey was completed in 2014 and the follow-up survey was conducted in 2016. The report provides unprecedented information on the use of energy and its impact on socioeconomic welfare. Subsidy Reform Window.

Rwanda has implemented a suite of restructuring measures that have transformed the electricity utility into a commercially operated, well-governed state-owned enterprise. Structural sector reforms accompanying Rwanda's last five-year plan, the Second Economic Development and Poverty Reduction Strategy strengthened sector institutions and clarified roles and responsibilities of different public entities in implementing the Government program. Most importantly, the separation of the electric utility from the water utility in 2014 and the formation of the Rwanda Energy Group (REG) and its two subsidiaries, EUCL and EDCL⁵, allows for better governance and clear financial accountability between revenue-generation service functions and nonrevenue-generating infrastructure development. While the Government retains ownership of the utility holding company, its affiliated companies are governed under company law as opposed to public service law, which entails stricter requirements in terms of transparency and management accountability. Tailoring business procedures, operational policies, and information technology solutions to the new functions and entities is still work-in-progress, however, and important steps still need to be taken to create fully functional, state-of-the-art electricity companies.

The private sector has emerged as a strategic partner for investment in new energy generation capacity and the access agenda. Through recent measures taken in the sector, Rwanda has established an attractive investment climate in power generation. In the latest round of reforms that started in 2014, the Government restructured the key energy sector institutions, with the aim to

strengthen accountability, streamline operations, and create a credible off-taker for electricity supplied by the private sector. As a testimony to the success of these reforms, Rwanda, a poor, landlocked country without significant energy resources, has managed to attract direct investment of over 15 independent power producers, and the capacity expansion over the past decade has been financed to large extent by the private sector. As of 2018, 52 percent of capacity is under private ownership, one of the highest shares in Sub-Saharan Africa. In off-grid electrification, too, the private sector has taken the lead with a dozen or so private companies active in distributing off-grid solar products throughout the country under various business models.

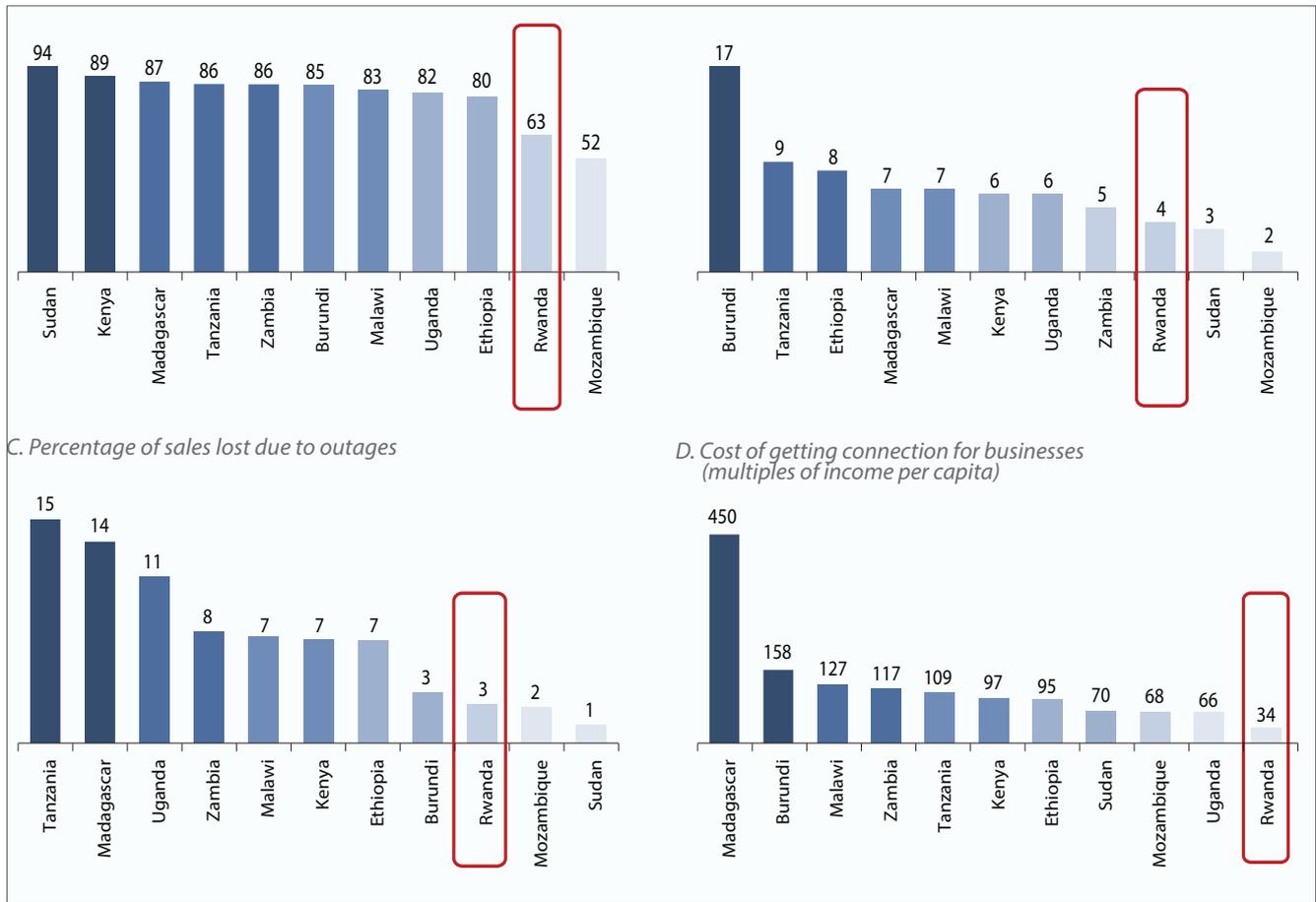
Rwanda's power sector is now among the top performers in the region in the quality of electricity services provided to businesses. Among several indicators associated with the quality of electricity services provided to businesses collected under the World Bank's Enterprise Survey of 2011-13, such as the frequency, extent, and impact of outages, and the cost of getting electricity services, Rwanda was among the top performers in east Africa (Figure 2.4). The performance is expected to improve further after recent measures, such as through the provision of electricity connections free of charge for industrial consumers (which is expected to spur baseload demand), and through the implementation of the utility's operational improvement plan. System losses have also resumed their declining trajectory, after a period of increase as a result of the rapid expansion of low and medium-voltage lines—which are associated with higher losses—under the electrification program, and in 2018 dipped below

⁵ The restructuring of energy sector institutions aimed at achieving regulatory independence, financial sustainability, and increased private sector engagement. The former Electricity, Water, and Sanitation Authority (EWSA) was split, with Rwanda Energy Group (REG) taking over the electricity utility functions. Two subsidiaries were formed under the holding company REG: (a) Energy Utility Company Limited (EUCL), an electric utility mandated to operate the country's publicly owned generation, transmission, and distribution assets; provide customer service; and develop the distribution network in the already electrified areas and (b) Energy Development Company Limited (EDCL), an asset development company mandated to develop new generation plants and expand the distribution grid to provide electricity access to new areas. While the Government retains ownership of the corporatized entities, the Government's role is significantly reduced as the utilities are governed under company law as opposed to public service law. This split of utility operations (EUCL) from energy resource development (EDCL) allows for clear financial accountability between energy development (nonrevenue) and utility operations (revenue-generating electricity business). The policy-setting mandate lies with MININFRA. The Rwanda Utilities Regulatory Authority (RURA) regulates the sector and approves electricity tariffs.

Figure 2.4: Quality of electricity services in Rwanda in regional comparison, as reported by businesses

A. Percentage of firms experiencing outages

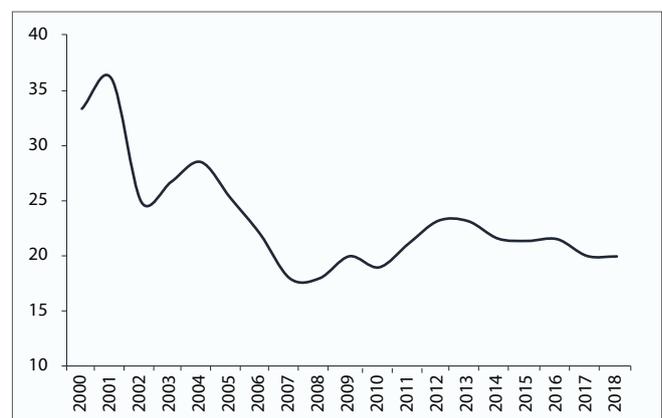
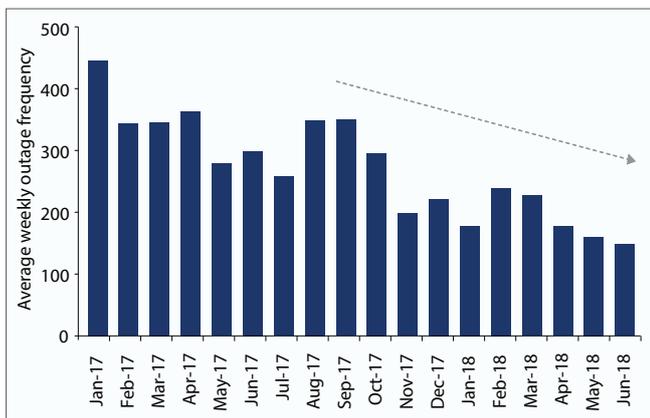
B. Number of outages per month



Source: World Bank Enterprise Surveys (2011-13)

Figure 2.5: Average weekly frequency of electricity outages in Rwanda

Figure 2.6: Electricity system losses in Rwanda (Percent)



Source: REG (2019)

Source: MININFRA, REG, RURA, the World Bank

20 percent for the first time since 2010. The decline in system losses can be attributed to the measures undertaken by the utility to strengthen the grid and to reduce electricity theft.

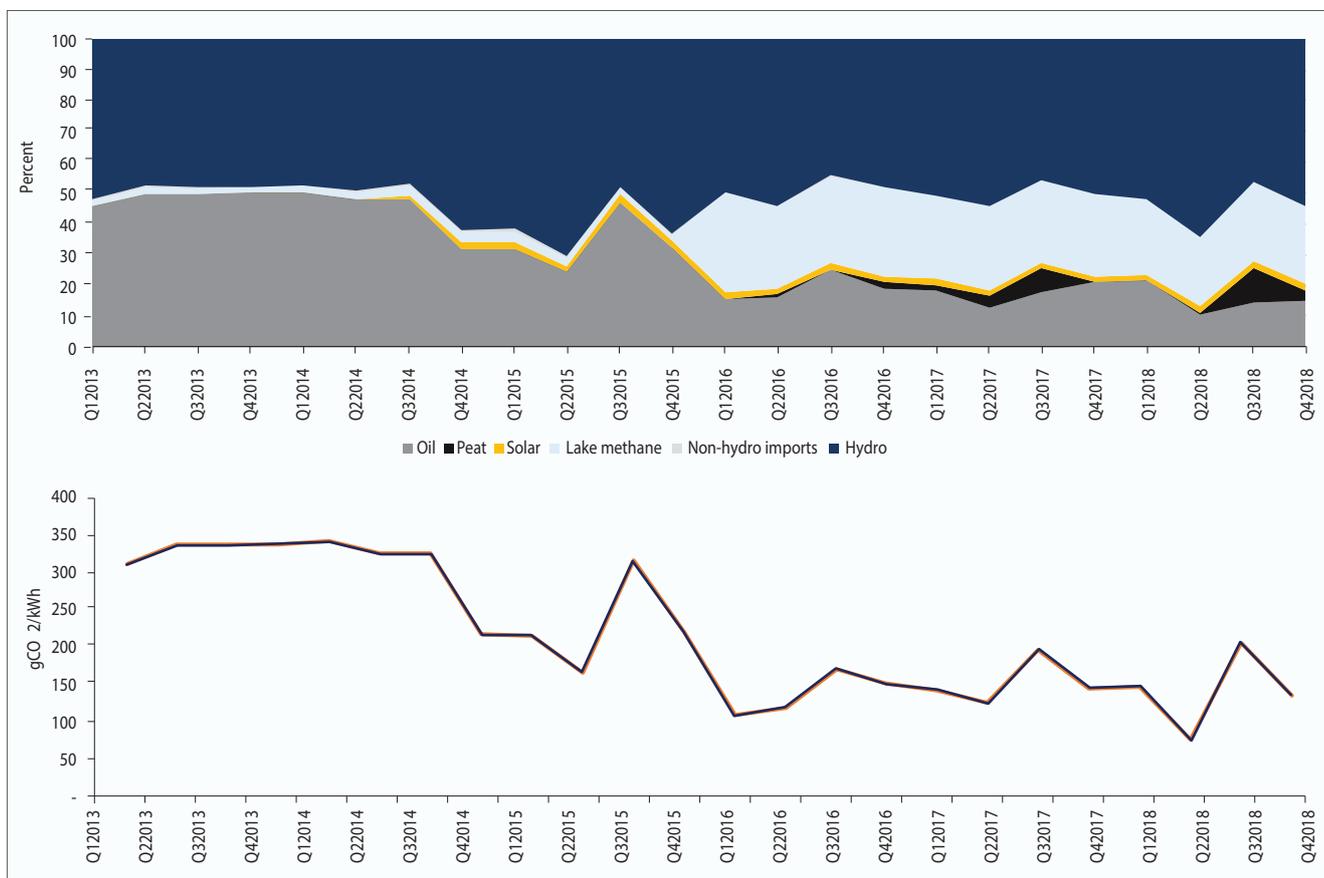
As Rwanda’s power mix has decisively shifted away from oil, owing to investments in hydro power and lake methane-based power, the greenhouse gas (GHG) emissions intensity of the power sector has dropped by more than half. The share of oil fueled power in Rwanda’s power generation mix has declined from about 45 percent in 2013 to less than 20 percent in 2018 as it has been replaced by cleaner lake methane based power⁶ and to a smaller extent by solar power and peat fueled power (Figure 2.7). As a result, the GHG intensity of power generation,

which is largely driven by the share of oil in the fuel mix in Rwanda, has declined from about 308 gCO₂ per kWh in the first quarter (Q1) of 2013 to 134 gCO₂ per kWh in the final quarter (Q4) of 2018. As most of the future least-cost power generation is expected to be from clean sources of power, the GHG intensity is expected to improve further.

2. Ambitions and Challenges for the Coming Five Years

Rwanda has set an ambitious sector agenda for the power sector under the National Strategy for Transformation (NST1) for the period 2017/18-2023/24. Implementation of the NST1 in the energy sector is guided by the Energy Sector Strategic Plan (EESP; 2017/18-2023/24). The objectives of the ESSP

Figure 2.7: Power generation mix and greenhouse gas intensity of power generation in Rwanda (2013-18)



Source: RURA, World Bank estimates

⁶ Lake methane, which is the naturally occurring methane in Lake Kivu, is considered as a zero-carbon source of energy because, if not burned the methane would gradually emit into the atmosphere.

include enough supply to meet growing demand with an adequate reserve margin (see Table 2.1). A total of over 500 MW of projects are at various stages of development, including 120 MW of peat power plants; 125 MW of lake methane power plants; and 30 MW of diesel-fired generation capacity. Regional hydro projects being developed include the 80 MW Rusumo project, currently under construction, and the 147 MW Rusizi III project, currently at an early project development stage. In parallel, the Government is investing in new transmission lines and network upgrades to strengthen the grid. The ESSP sets the target of reaching a universal basic level of access to electricity (Tier 1)⁷ by 2024 (52 percent on-grid, 48 percent off-grid). Total investment needs to meet these targets are estimated at US\$2,813 million (see Table 2.2).

However, the Government will have to overcome a number of challenges as it pursues the objectives under the ESSP. These relate to the cost of electricity supply, affordability of electricity to consumers, and affordability to the government as well as related fiscal risks.

First, the cost of electricity supply is excessively high. Rwanda lacks domestic, low-cost energy resources. On top of this inherent disadvantage, as Rwanda pursued rapid expansion of the generation sector to avoid power deficits and fuel industrial growth, new generation projects were procured without adhering to least-cost planning principles. Most contracts to develop domestic capacity were procured through bilaterally negotiated deals rather than competitive procurement. Taken together,

Table 2.1: Rwanda's objectives for the power sector under EESP (2017/18-2023/24)

ESSP Objectives	Baseline (2017)	Target (2023-24)
Achieve universal electrification	40.7%: 29.7% on-grid, 11% off-grid	100%: 52% on-grid, 48% off-grid
Reserve margin	n.a.	15%
Average number of interruptions per year	265	92
Average total duration of interruptions per year	44 hours	14 hours
Reduce transmission and distribution network losses	22%	15%
Expand electricity access to productive users ¹	72.6%	2020-21: 100%

Note: ¹ As per the ESSP, productive users utilize energy for activities that enhance income and welfare and include health and education facilities, public infrastructure and industry
Source: MININFRA (2018)

Table 2.2: Estimated investment needs during 2017/18-2023/24 to achieve ESSP targets

ESSP Objectives	Investment	US\$ million	Main source
Supply security	Generation pipeline	1,200	Private
	Related transmission investments	470	Public
Supply security	Transmission upgrade & strengthening	111	Public
Supply security	On-grid, including productive users	745	Public
	Off-grid	146	Private
Street lighting in all national and district roads	Street lighting	88	Public
System loss reduction	Infrastructure and equipment investments	53	Public
	Total	2,813	

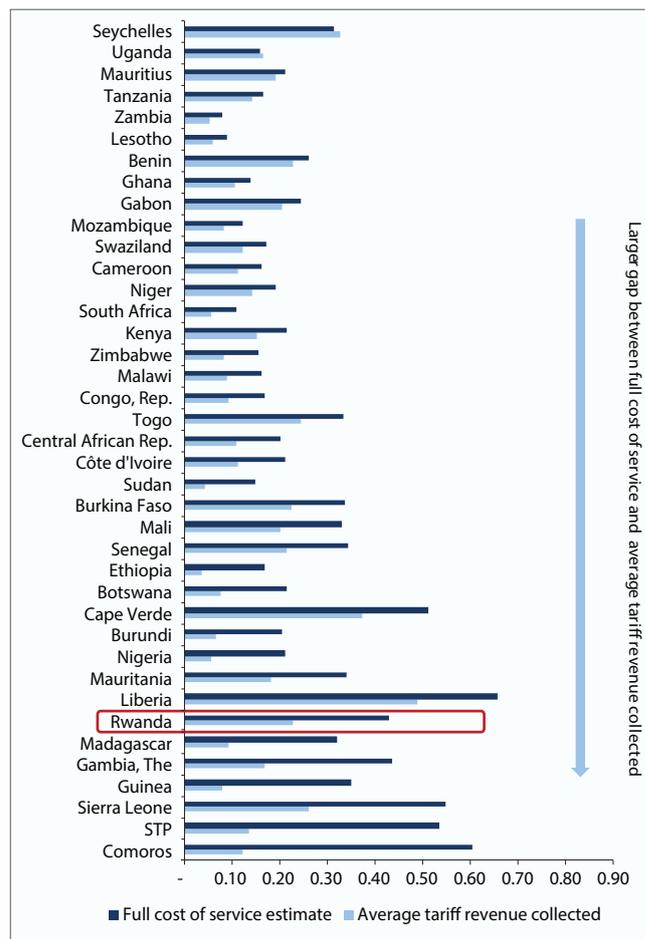
Source: MININFRA (2018)

⁷ The Government's targets refer to the tiers defined under the Sustainable Energy for All (SE4ALL) Multi-Tier Framework (MTF); see Section 3 for details. Under the MTF, Tier 1 (minimum 12 kWh per day) is defined as providing access up to four hours per day and at least one hour at night and can be used for basic applications such as task lighting, radio, and phone charging (<http://trackingenergy4all.worldbank.org>).

these decisions led to rapid sector expansion but at excessively high unit costs of service (around US\$0.28 per Kilowatt hour (kWh) in FY2016/17). A recent World Bank study of 39 countries in Sub-Saharan Africa, ‘Making Power Affordable for Africa and Viable for its Utilities’ (Kojima & Trimble, 2016), notes that the revenue gap in Rwanda, in spite of high tariffs, is the seventh-highest in Africa (see Figure 2.8). The 39 assessed countries had a weighted average tariff of US\$0.08 per kWh and a median tariff of US\$0.15 per kWh, compared to US\$ 0.23 and US\$0.43 in Rwanda, respectively (data for 2014).

Second, even though tariffs are subsidized, the high cost of electricity service constraints Rwanda’s economic and private-sector development. Electricity tariffs are relatively high by global comparison, ranging between US\$0.12 and US\$0.28 per kWh, which makes electricity unaffordable for many, especially households and industry. Electricity access is largely concentrated in urban areas and in the top two quintiles of income. A subsistence level of electricity (30 kWh per month) is unaffordable for more than three-quarters of the unelectrified population (comparable only to Burkina Faso and Madagascar (Kojima et al., 2016). This problem will become even more evident as the electrification program reaches ever poorer and more rural areas. Even at a subsidized rate, firms pay a higher price of electricity compared to neighboring countries, making access to electricity among the main constraints to scaling up private investment flows. While Rwanda’s rank in the Doing Business indicators jumped from 41 (out of 190) in 2018 to 29 in 2019, including a sharp improvement in its rank in getting electricity from 119 in 2018 to 68 in 2019, it still has one of the highest electricity tariffs in the region, impeding further progress on the indicator. Larger firms, including manufacturing, report affordability of electricity as a binding constraint, an important

Figure 2.8: Electricity tariff revenue and economic cost of service in regional comparison



Source: Trimble et al. (2016)

consideration as they are an important contributor to jobs, export, foreign direct investments, and growth.

Third, caught between the high cost of electricity and limited affordability, the Government has stepped in to fill the gap and spend about a tenth of its annual budget on transfers to the sector. Total budget transfers to the power sector declined from 2.3 percent of GDP in FY2014/15 to 1.35 percent of GDP in FY2017/18, driven down by a lower allocation for investment.⁸ The Government’s draft medium-term fiscal framework (MTF) for FY2018/19 to FY2020/21 includes budget allocations for the power sector in the order of 1-1.5 percent of GDP per

⁸ Besides covering costs-revenues gap (budget transfers to support REG’s operating expenditures categorized under the Treasury’s “Recurrent Budget”), the Government also provides budget transfers to support sector investments (“Development Budget”).

⁹ The Government does not publish the allocation of budget to specific investments.

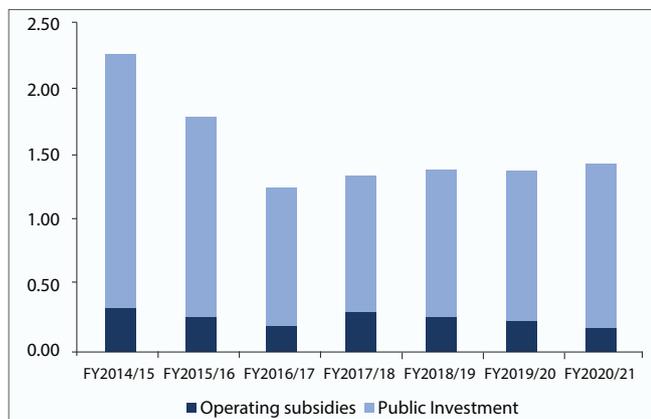
year. The draft budget, as laid out in the MINECOFIN Budget Framework Paper 2018/2019–2020/2021, is presented below in Figure 2.9. The budget allocated is expected to see a minor rise to 1.44 percent of the GDP by FY2020/21.⁹ However, the Government's medium-term fiscal budget may not fully account for fiscal risks from anticipated cost escalations in the power sector that may arise from (i) planned large-scale investments in grid expansion and densification to meet the electrification targets, (ii) excess unutilized electricity capacity in the short- to medium- term with take-or-pay contracts as a result of generation planning that was so far based on an overestimation of demand and did not follow least-cost principles, and (iii) limited scope for tariff

increases as electricity is already barely affordable for much of the population. These drivers of cost-escalation may push fiscal transfers above 4 percent of GDP in 2022/23 (Figure 2.10). Thus, without urgent measures, high sector costs may make the expansion of electricity services fiscally unaffordable and will undermine the overall fiscal and debt sustainability of the power sector.

Fourth, besides direct subsidies, the Government has supported the power sector through sovereign guarantees for power purchase agreements (PPAs) between REG and independent power producers (IPPs), creating contingent liabilities that are insufficiently managed and understood. To encourage private participation in the energy sector, the Government of Rwanda previously provided sovereign guarantees to backstop government financial commitments for generation projects. The World Bank's PPP Diagnostic (The World Bank, 2017) identified a total of 29 such projects. The Government no longer expects to provide government guarantees for all privately-owned generation projects. However, existing PPAs will represent contingent liabilities for the Government for decades to come. To better manage the associated fiscal risks, the Government should institute a process to assess, measure, monitor, and manage contingent liabilities from the power sector.

Figure 2.9: Subsidies to the power sector as a percentage of the GDP

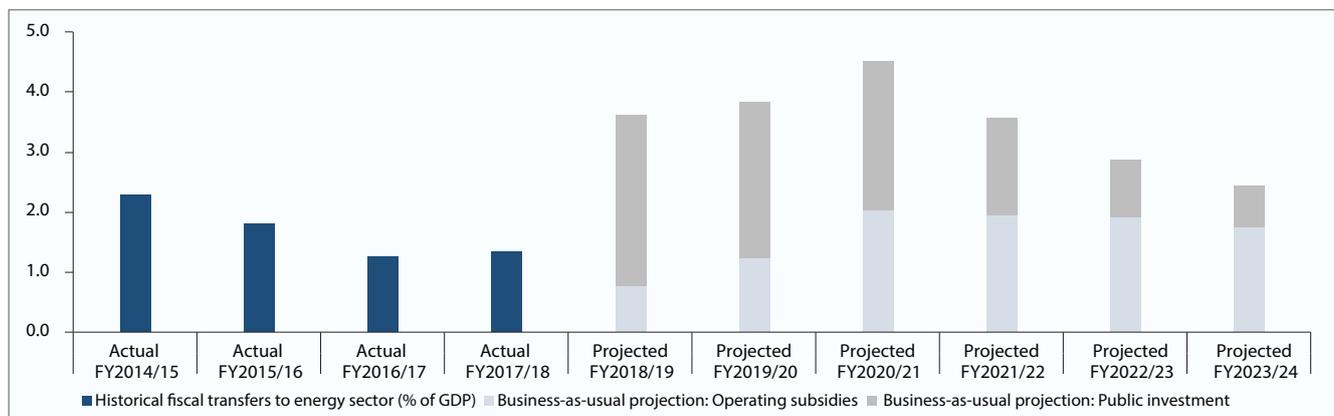
(FY2014/15 – FY2017/18: Actual; FY2018/19 – FY2020/21: Medium-Term Fiscal Framework)



Source: MINECOFIN

Figure 2.10: Potential escalation in the subsidies to the power sector as a percentage of the GDP

(FY2014/15 – FY2017/18: Actual; FY2018/19 – FY2023/24: World Bank Analysis)



Source: For actual historical data: MINECOFIN; for projection: World Bank Analysis

3. Towards Affordable, Reliable, Sustainable Energy for All

The government's vision is for the power sector to become an engine of inclusive growth. This will require the sector to deliver low-cost, reliable, and clean power, for the government to get out of providing subsidies except for the poorest and most vulnerable, and for REG to become a world-class utility with smooth commercial operations, skilled staff at all levels, modern information systems, and state-of-the-art infrastructure.

In view of the ambitions and challenges laid out above, the Government is implementing a number of critical investments and reform measures. These are targeting security and diversification of supply, operational efficiency, affordability, and accountability of electricity service.

Balancing demand and supply at least cost

The Government is institutionalizing least-cost planning along the value chain so that supply resources are optimally deployed, and demand and supply are in balance. This includes, the adoption of a first least-cost generation expansion plan in 2018, the preparation of Rwanda's first sector-wide master plan in 2019, and the least-cost electrification plan currently in the final stages of development. The Government has also given REG the mandate to update these plans regularly, and the utility has successfully built up the capacity to do so without external assistance. The next step will be to ensure its implementation through better integration of system planning and system operation functions in REG and its subsidiaries.

The new PPP law of 2016 and the implementation guidelines approved in 2017 provide a clear mandate to the sector to pursue competitive procurement of private sector-owned electricity infrastructure. The only exceptions are mini-grids

that do not require off-taker agreements with the public sector. Implementation of the PPP law's provisions will be critical to ensure that Rwanda gets value-for-money when procuring new generation capacity. However, it will require EDCL to take the lead in identifying resources and preparing the feasibility studies for them, a task that will require additional capacity building in the company.

This agenda also includes developing regional hydropower plants and regional interconnections to exploit economies of scale and regional trade.

Two projects are currently under preparation: an 80 MW regional Rusumo Falls hydropower plant, to be equally shared by Rwanda, Tanzania, and Burundi, is currently under construction (with the support of World Bank financing) and is expected to be operational in 2020; and a 147 MW regional Ruzizi III hydropower plant project, to be equally shared by Rwanda, DRC, and Burundi, is under preparation. Rwanda is also developing several transmission interconnections with neighboring countries in anticipation of becoming an electricity-trading partner and potential exporter of electricity to the region. Rwanda is already a member of the East African Power Pool and the Nile Basin initiative and is interconnected to neighboring countries via the following lines: (i) the 200 kV Mirama-Shango line (93.5 km to Uganda) and the (ii) the 220 kV Shango-Karongi-Rubavu-Goma line (167 km to DRC). The possibility of regional trade potentially offers an opportunity to tap inexpensive sources of electricity (import limits of 20% of the energy mix have been set in order to balance energy security objectives). The Government is in discussions with Kenya, Uganda, and Ethiopia on power imports. A first transaction for electricity imports from Kenya, for 30 MW per year, has been in place since 2015; the Government has signed a Memorandum of Understanding with Ethiopia for additional power imports.

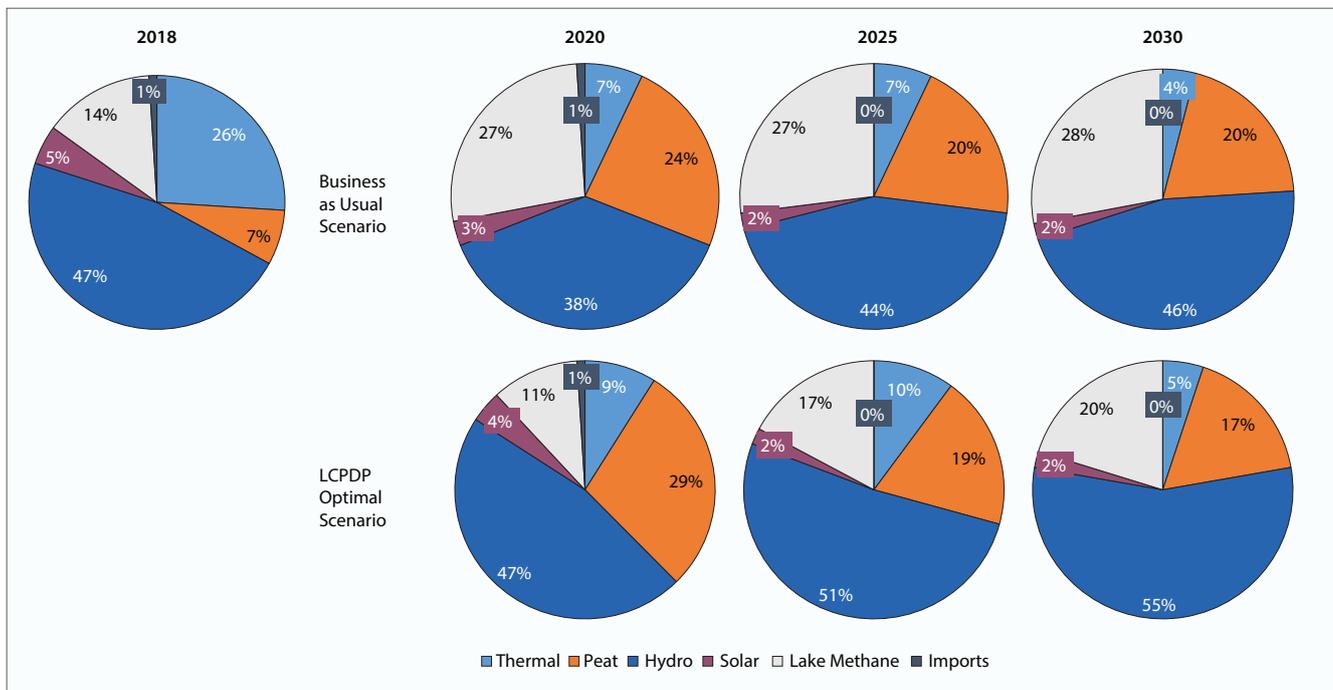
Facilitating a clean energy transition

Greening Rwanda’s power sector is a key priority in the country’s Nationally Determined Contribution (NDC) under the Paris Agreement. Specifically, the NDC defines Rwanda’s contribution as emission reductions compared to a counterfactual (or business-as-usual) scenario, based on policies and actions conditional on availability of international support for finance, technology and capacity building. In the power sector, the NDC prioritizes (a) increasing in the share of new grid-connected renewable capacity compared to fossil fuels; (b) installing solar PV in rural communities; and (c) increasing energy efficiency through demand-side measures and grid-loss reduction.

The most important priority for the Government for implementation of the NDC is improved sector planning, especially the better utilization of the country’s hydro and solar resources, which can significantly reduce generation cost and greenhouse gas emissions compared to the

business-as-usual. The draft Least-Cost Power Sector Development Plan prepared by the Government shows that adherence to least-cost sector expansion increases the share of renewable energy in the capacity mix by one fifth and reduces emissions by 800,000 tCO_{2eq} by 2030 compared to the business-as-usual scenario (an 8 percent reduction). Bulk of the reduction in emissions is achieved by higher utilization of hydropower resources and lower utilization of peat-based power. There is potential for solar power to be exploited more aggressively to achieve the NDC’s objectives. Experience from countries in the region is that on-grid solar can be developed through the private sector at low cost if capacity is procured competitively and with adequate risk mitigation. To scale-up off-grid solar and achieve the targets under the new NST—which puts a much stronger focus on off-grid—the Government needs to finalize the National Electrification Plan and Investment Prospectus and closely monitor the private sectors’ adherence to off-grid technology standards.

Figure 2.11: Rwanda’s electricity capacity mix in 2020 and future projections under business as usual and least cost sector expansion



Source: World Bank estimates based on REG data

Further optimizing electricity pricing

A series of tariff reforms, the latest in August 2018, has helped move tariffs closer to cost-reflective levels while maintaining affordability of electricity for low-income groups. Since 2015, Rwanda has implemented a series of changes in electricity tariffs to gradually recover the price of electricity (see Figure 2.12). In 2017, the tariff scheme changed from a flat rate of RWF 182 per kWh (US\$0.24 per kWh) to a block structure. For residential users consuming less than 15 kWh, the price was set at RWF 89 per kWh (US\$0.11 per kWh); for residential usage between 15 kWh and 50 kWh, the price was set at RWF 182 per kWh (US\$0.22 per kWh); and for residential consumers with a per month usage higher than 50 kWh, the price was RWF 189 per kWh (US\$0.22 per kWh). In August 2018, tariffs were adjusted again, blocks 1 and 2 stayed the same and block 3 increased by RWF 21 per kWh to RWF 210 per kWh (US\$0.24 per kWh). Tariffs for selected non-household consumers that are not exposed to international competition—commercial customers, broadcasters, telecom towers and health facilities—have been brought closer to cost recovery. General industrial tariffs have been refined to promote competitiveness while flattening the demand profile during the day by keeping maximum demand charges for non-peak hours substantially lower than that for peak hours. The government is keen on exercising additional opportunities for tariff increases by further

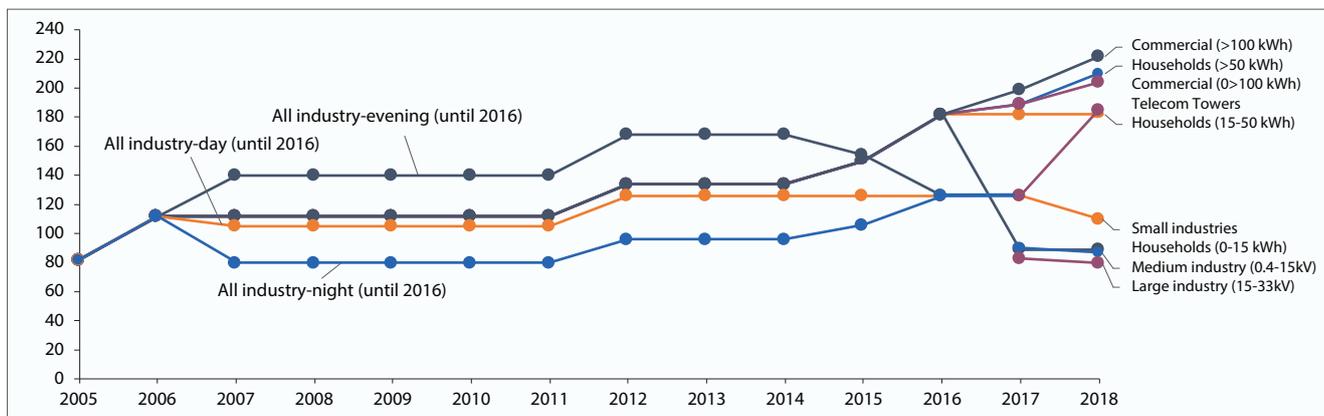
disaggregating the tariff categories and charging cost-reflective tariffs to consumer categories that can do without subsidies.

When calculating effect of these two tariffs increases on households using the subsidy simulation (SUBSIM) model, the results show insignificant poverty impact. It is estimated that the direct welfare impact on residential consumers was very small or in the case of the households in the first two quintiles, the change in welfare is even positive. This is because 93 percent of all households (including 100 percent of households in the poorest quintile) are within the first two blocks that either paid less or stayed the same because of the tariff reform of 2017 and stayed the same during the last tariff reform of 2018. The tariff reform in August 2018 also included the approval of a tariff adjustment mechanism to reduce the sectors' financial vulnerability to fuel price or exchange rate variations.

Bringing both grid and off grid supply solutions within the access paradigm

In view of falling cost of off-grid solutions and increasing cost of grid connections, as well as taking into consideration positive effects of electrification, Rwanda has recently moved to a strategy of incentivizing off-grid private-sector investments

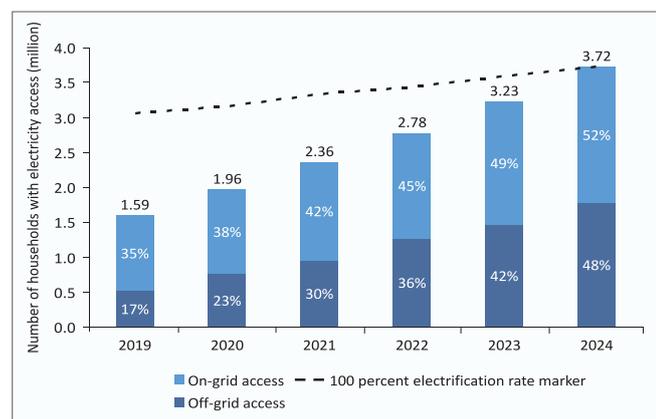
Figure 2.12: Electricity tariffs in Rwanda, 2005-18
(in RWF, nominal)



Source: RURA

in areas where extending the grid is not financially viable in the short term. Because of growing cost of connecting rural households to the grid, low rural residential electricity demand and poor affordability, the Government's new ESSP puts a much stronger emphasis on alternatives to grid expansion than past strategy documents. Where grid-connections are not feasible in the short term, the Government aims to expand off-grid solutions in the form of solar home-systems and mini-grids (see Figure 2.13). To improve affordability of off-grid solutions, especially for rural population, the Government is looking for ways to improve households' access to affordable finance. For the most vulnerable households that would remain out of reach for the commercial off-grid market, the Government is exploring the ways to develop and put in place a mechanism to provide those families with off-grid solutions.

Figure 2.13: Electricity access targets from 2019 to 2024 in the ESSP



Source MININFRA (2018)

Rwanda's National Strategy for Transformation is consistent with the above targets and aims to institutionalize those, including a monitoring framework. The strategy is also aligned with the global momentum on Sustainable Development Goals and Sustainable Energy for all and the Sustainable Development Goal 7 (SDG7) on energy access. The international community has coalesced

around supporting Sub-Saharan African countries in their national aspirations of universal access to energy services and clean energy transition. In line with SDG7, Rwanda's National Strategy for Transformation sets the target of reaching a universal basic level of access to electricity (Tier 1)¹⁰ by 2024 (52 percent on-grid, 48 percent off-grid).

Promoting service delivery and productive uses of electricity

The Government's electrification program during the implementation of ESSP has a strong focus on service facilities and productive uses in rural areas.

Rwanda's electrification program has put emphasis on electrifying facilities that are critical for social and rural development. As at August 2018, 100 percent of hospitals, 92.1 percent of health centers, 94.5 percent of administrative offices, and 77.2 percent of primary and secondary schools have been electrified. Under the ESSP, street lighting is expected to be expanded to cover 100 percent of national and district roads, and 100 percent of productive users are expected to have access to electricity, up from the current level of 69 percent. Connecting productive users away from cities will support rural economic development and, as they have a higher ability to pay for energy services than households, improve the sustainability of the sector. By 2024, 91 percent of productive users are expected to be connected to the national grid, with the remaining 9 percent connected via off-grid solutions.

Strengthening utility financial management and operational efficiency

REG is modernizing its financial accounting and reporting, a reform that is essential to improve transparency and accountability of REG. International experience suggests that countries that reform electricity subsidies without having in

¹⁰ The Government's targets refer to the tiers defined under the Sustainable Energy for All (SE4ALL) Multi-Tier Framework (MTF); see Section 3 for details. Under the MTF, Tier 1 (minimum 12 kWh per day) is defined as providing access up to four hours per day and at least one hour at night and can be used for basic applications such as task lighting, radio, and phone charging (<http://trackingenergy4all.worldbank.org>).

place solid financial management and accounting systems often risk racking up off-balance-sheet losses and cross-debt between public sector entities. Transparent accounting and reporting improve financial accountability to a utility's stakeholders. It also makes the sector more attractive for private finance. Recognizing these benefits, the Government had initiated planning for the transition to IFRS when the utilities were separated in 2014. This included: preparation of an action plan in 2016, installation of new Integrated Business Management System (IBMS)/information technology (IT) software and hardware in 2016, hiring of an experienced professional as the director of finance, completion of asset revaluation in 2017, and hiring of international auditing firms to confirm compliance. In 2018, for the first time ever, EUCL published its externally audited financial statements within three months of the end of the financial year. REG plans to achieve the same soon for EDCL and the consolidated statements on the holding company level.

REG is implementing an aggressive program to improve its operational performance. The underlying principle is to incorporate state-of-art tools (information systems and advanced metering technologies) to support efficient, transparent and accountable execution of operations in all business areas, with particular focus on reducing commercial losses (unmetered consumption) and improving quality of electricity supply and customer service. Key activities being carried out for that purpose include the implementation of a new IBMS to support efficient, transparent and accountable execution of operations in all business areas,¹¹ and implementation of the Revenue Protection Program targeting sales to large customers. The plan for the new IBMS includes the full incorporation and systematic use of information systems to support all commercial functions, processes and activities for effective fast attention

and resolution (service restoration) of customers' complaints related to outages and other incidents affecting quality of electricity supply, as well as management of all corporate resources (accounting, finances, human resources, procurement, logistics, corporate planning).

4. Reform Priorities for the Power Sector

The overarching vision—delivering clean and reliable power, phasing out subsidies except for the poorest and most vulnerable, and REG becoming a world-class utility—is achievable for Rwanda. The following six priority measures will be critical to reap the benefits of and deepen the government's reform program over the coming decade.

First, pursuing sector expansion in line with least-cost sector planning. This will require regular updates of the least cost power development plan, based on reliable demand forecasts, and strict adherence to competitive procurement.

Second, putting REG into the driving seat of developing new PPP investments identified in the least-cost plan. This will require REG to take on feasibility studies and safeguards assessments for the indigenous energy resources available for electricity generation, with particular focus on dissolved methane in Lake Kivu, and then competitive tendering of these resources under the new Public-Private Partnership (PPP) law.

Third, accelerating efforts to decarbonize the power sector and adapting to climate change. While the power sector in Rwanda is relatively clean, with hydropower as the mainstay of the installed capacity, there is potential for further improvements by more aggressive utilization of on-grid and off-grid solar power. Experience from countries in the

¹¹ When it was founded after the split of the integrated water and electricity utility, EWSA, in 2013, REG and its subsidiary companies took over several separate IT solutions, based on varied technological platforms and often operating in isolation. These created problems in delivering reliable customer service and a failure to comply with reporting requirements.

region is that on-grid solar can be developed at low cost if capacity is procured competitively and with adequate risk mitigation. The power sector also has a role to play in climate adaptation, through better planning for hydrology risks and mitigating their impact on the security of supply by developing alternative energy sources.

Fourth, regularly adjusting tariffs for changes in cost and, over time, expanding the groups of electricity consumers that do not need tariff subsidies and are charged the full cost of service.

However, implementation of tariff reforms will have to be done carefully to ensure continued support to low-income consumers. The remaining funding gap between sector costs and tariff revenues will have to be filled by transfers from MINECOFIN that are provided in a timely and transparent manner.

Fifth, providing a state-of-the-art framework for private sector participation in off-grid electrification and targeted incentives to make off-grid solar affordable. This will require translating the government's commitment towards using off-grid electrification solutions into a consistent and clearly defined set of targets and plans that encourage private sector participation in achieving the government's target of universal access; a transparent and attractive program of government incentives for companies to reach the poorest and most vulnerable customers; as well as realistic and strictly enforced technical standards and guidelines.

Sixth, promoting regional electricity trade through bilateral contracts to tap lower cost supply sources and better integrate variable renewables. This will require closely coordinating with neighboring countries to ensure the planned cross-border transmission infrastructure projects are not delayed further to take advantage of the regional energy potential and becoming an active participant in developing the East Africa Power Pool platform to create trust and a consistent framework for trade.

Seventh, doubling down on the modernization of REG's operations to ensure improvements in the quality of electricity supply and reduce technical and commercial losses. This will require full integration of the new IBMS into the day-to-day operations of REG and its subsidiaries (EUCL and EDCL) and transition towards fully digitalized performance monitoring and optimization; strengthening the planning function and more closely integrate system planning and system operation functions in REG's subsidiary companies, including by (a) regularly updating the Least-Cost Power Development Plan; and (b) expanding the use of geospatial information systems and fully integrating them into utility operations; building financial, legal and commercial capacity in REG's subsidiary companies and set up a team that can follow the procurement process of new independent power producers (IPPs) from inception to plant commissioning; and improving the financial viability and accountability of the sector, with a view to make REG ready to access commercial financing for debt and/or equity in the medium term.

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