

Evaluation of Rural Electrification Concessions in sub-Saharan Africa

Detailed Case Study: Uganda

Report to World Bank

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Executive Summary

Although still low, Uganda's rural electrification rate has risen significantly, from two percent in 2001, to eight or nine percent in 2015. In that time, electricity concessions have been used to extend connections to over 140,000 rural households. The concession for the national distribution system, UMEME, has been the primary driver of this electrification, responsible for around 75 percent of these rural connections. Several other smaller rural-only concessions have been established to manage grid extension projects financed by the Government of Uganda (GoU).

History: In 1999, Uganda embarked on a comprehensive electricity sector reform program to unbundle and privatize the sector. The existing distribution grid was concessioned to a private operator, UMEME, in 2005, following international competitive bidding. Electricity distribution in rural areas was opened to competition, with the intention of supporting private initiatives to serve other parts of the country. One off-grid area in the West Nile region of Uganda was concessioned through a bidding process won by a company called WENRECo. The hope was that private firms would then propose new areas to electrify on a concession basis. This did not occur. Instead, the Rural Electrification Agency (REA) built grid extension projects itself and then leased these assets to small concessionaires to operate.

UMEME: The largest concession, UMEME, has significantly improved rural access to electricity—achieving close to 400,000 new connections since entering private hands. While this concession was designed for urban electrification, at least 30 percent of total connections are in rural areas. UMEME has successfully reduced system losses from 38 percent in 2005 to 21 percent in 2014 and increased collections from 80 percent in 2005 to 99.1 percent in 2014.

Rural-Only Concessions: The first rural-only concession in Uganda, WENRECo, initially proved financially unviable. The deal had to be restructured with significantly more government and donor funding—as a result it only started substantially expanding access in 2012. It now has around 6,000 connections. Starting in 2006, the Rural Electrification Agency financed and built several grid extensions projects, and brought in private operators using a concession model to manage the facilities. In all, ten licenses were distributed to six different operators. Two of the operators were local entrepreneurs, three were cooperatives, and the last was the government distribution company UEDCL. These six entities have added around 25,000 new rural connections.

Challenges: A continuing problem is the interface between UMEME and grid extensions outside the UMEME concession. The UMEME concession is for a 1 km footprint around the grid as it was in 2005. UMEME has neither the obligation nor the right to extend service beyond this area. The REA wants to develop multiple regional concessions or cooperatives. However, REA failed in its attempt to negotiate a consolidation of UMEME around the central area, with the longer 'tentacles' of its concession being taken from it and included in new area concessions, to be given to other operators. REA perceived this as obstructive by UMEME. A downside of this strategy is that it excludes the existing grid operator from assisting with grid extensions. Grid extensions will be left to small, under-capitalized and inexperienced entities handicapped by not being able to serve the main concentrations of demand within the areas they serve.

New Directions: Going forward, the Government is planning to have private entities operate ‘zonal’ concessions outside the UMEME service area. REA intends to plan and build the network extensions itself, then lease them to the operators. It will also provide subsidies for new connections, cover the cost of major maintenance and provided technical assistance. REA is currently in negotiation with the existing concessionaires in some of the zones to convert their current concessions (which are to operate particular lines) into area concessions. In time, REA hopes the operators will develop into viable utilities.

Key Lessons:

- Rural electrification in most places is not a commercially viable business. Subsidies and guarantees from the Government are needed to encourage private sector involvement.
- Implementing a concession for the existing national distribution network can yield positive results. Though it was conceived of as an urban concession area, UMEME has connected around 100,000 customers in rural areas. By comparison the projects focused exclusively on rural electrification have achieved less than 40,000 connections altogether.
- In Uganda, government-financed grid extensions have been leased to new, inexperienced operators and exclude the existing large concessionaire. This need not be the case. The same government-financed grid extensions can be transferred to the existing viable operator. Economies of scale suggest this strategy may be more efficient.
- Concessions should be designed that target commercial loads. While the government may rightfully focus on household electrification, a complementary focus on financial viability is also necessary. Concessions that specifically target large-load customers provide more substantial revenues to concessionaires while also improving the locality’s economic situation. Such a strategy improves the long-term viability of rural electrification projects and reduces subsidies necessary to prop up smaller operators.

1 Introduction

Uganda has had several public-private “concessions” for rural electrification. The purpose of this report is to review the experience of rural electrification concessions in Uganda and evaluate their performance. For the purposes of this report, a rural electrification concession is a public-private partnership in which a private entity is granted a long-term right to provide electricity service in rural areas through a distribution grid. This report is one of six detailed case studies that form a body of evidence on the experience and successes of rural electrification concessions across sub-Saharan Africa.

Uganda’s rural electrification approach and background information on the power market are presented in Section 2. Distinct “types” of concessions for rural electrification can be found in Uganda. The Government of Uganda has granted a concession for the national distribution grid to a private entity, UMEME, for 20 years. This concession is discussed in Section 3. In Section 4 we analyze Uganda’s two types of “rural-only” concessions: including, first, WENRECO, and second, the smaller grid-extension concessions that have been granted since 2006. We conclude in Section 5 with an evaluation of the relative success of these concessions at sustainably increasing access to electricity. Appendix A is a detailed case study presenting the experience of one small rural concessionaire, the Kyegegwa Rural Electricity Cooperative Society Ltd. (KRECS).

2 Uganda Background

To put Uganda's rural electrification concessions in context, we first present the historical, economic and political context. Table 2.1 gives reference statistics for Uganda.

Table 2.1: Uganda Summary Statistics

Indicator	Value
Demographics	
Population, total (2014)	38,844,624
Population growth, 10-year average (2004-2014)	3.36%
Rural population (% of total population) (2014)	84.23%
Rural population growth, 10-year average (2004-2014)	3.01%
Population density (people per sq. km of land area) (2014)	194.4
Economy	
GDP per capita (2014, current US\$, market exchange rate)	677.4
Real GDP per capita growth, 10-year average (2004-2014)	3.32%
Debt to GDP (2014)	35.70%
Electricity Sector	
Access to electricity, rural (2012, % of rural population)	8.05%
Access to electricity, national (2012, % of total population)	18.16%
Electric power consumption (kWh per capita) (2012)	Not available
Governance	
Ease of Doing Business index (2015 ranking out of 189 countries)	150
CPIA property rights and rule-based governance rating (2014); 1=low to 6=high	3.5
Government bond ratings (S&P Long-Term)	B (2014)
Corruption Perceptions Index (2014) - scale of 0 (highly corrupt) to 100 (very clean)	26
Legal system	Common law
Administrative tradition	English
Fragile or conflict-affected state (any year, 1990-2015)	No

Economy and demographics

Uganda's population is almost 39 million people. Income levels are low at US\$680 per capita. Over the last 10 years, population has been growing steadily around 3.4 percent per year, while GDP per capita (in real PPP terms) has grown at 3.3 percent per year. Rapid

urbanization means that rural population growth has hovered around 3 percent, while the growth of the urban population over the last ten years has been roughly constant at 5.4 percent.¹

Politics and governance

A former British colony which gained independence in 1962, Uganda has been ruled by President Yoweri Museveni and his party, the National Resistance Movement, since 1986. Elections were nominally reintroduced in 2006, but President Museveni remains in power and is generally able to unilaterally make policy decisions. Transparency International's corruption perceptions index ranks Uganda at 142 out of 175, one of the poorest rankings in the world.² Government structures retain Westminster system influences, overlaid with the reality of a dominant president and an entrenched ruling party. The legal system is based on English common law, with the final court of appeal being the Supreme Court.³ These structures were implemented with the establishment of the current constitution in 1995.

The background to President Museveni's rise to power was a period of military dictatorship under Ida Amin from 1971 to 1979. After Amin attempted to invade Tanzania in 1978, Tanzanian forces combined with the previously ousted Ugandan prime minister, Milton Obote, to expel Amin. Obote eventually re-obtained power with help from a military general, Tito Okello. Obote reigned until 1985, when Okello organized a coup to expel him. Museveni finally obtained control of Uganda and declared himself president in 1986 after a protracted conflict between his National Resistance Army and the incumbent forces which began in the 1980s after Obote reclaimed power.

This country is not a fragile or conflict-affected state, and has not been since the inception of such classifications in 2006.⁴ Despite the high corruption levels in Uganda, President Museveni and his regime are credited for largely eliminating egregious civil and human rights abuses and restoring Uganda to a high degree of order. He has also incorporated advice from multilateral institutions and donor governments to implement successful economic reforms and other liberalizations.⁵

2.1 Power Market Structure and Evolution

The power market in Uganda is presented in Figure 2.1.

¹ World Bank World Development Indicators, 2015, accessed on September 18, 2015.

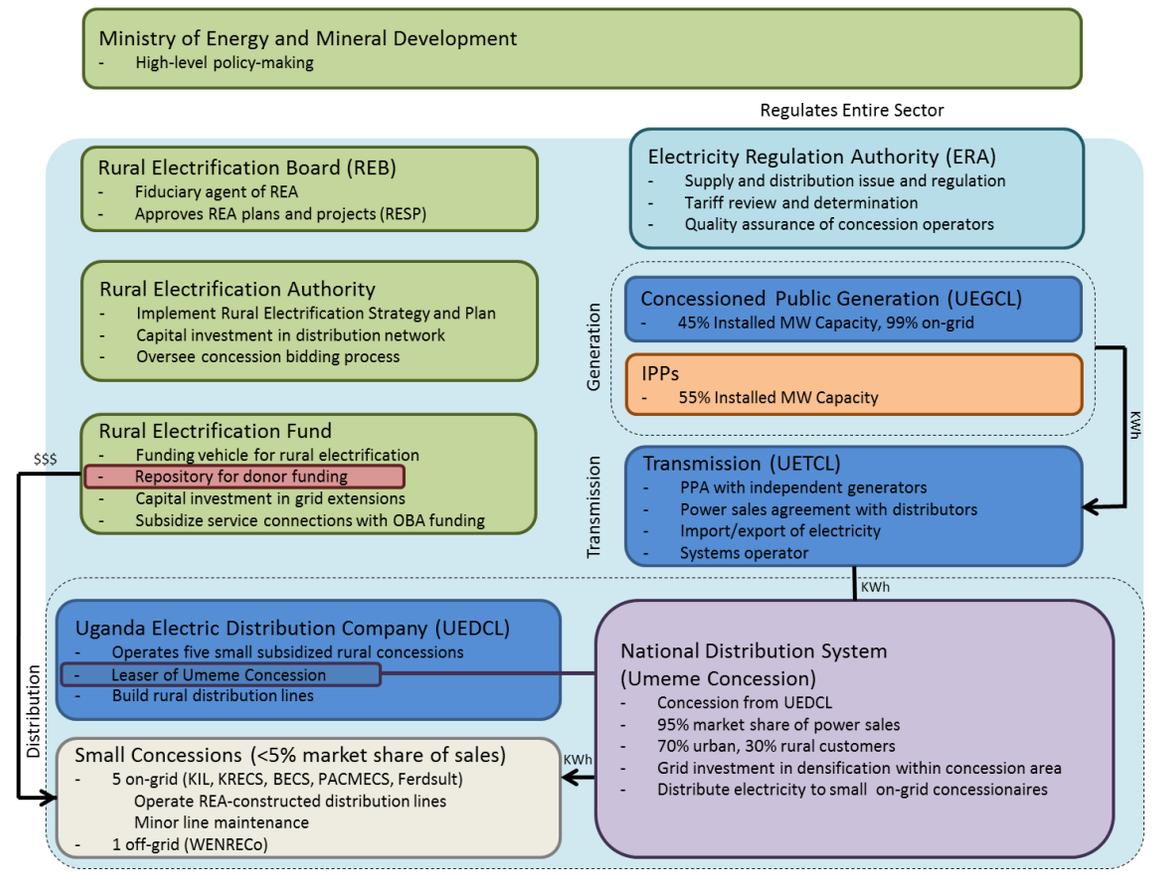
² Transparency International, "Corruption Perceptions Index," 2014, available at <https://www.transparency.org/country/#UGA>, accessed on September 18, 2015.

³ The Republic of Uganda Judiciary, "Supreme Court," available at <http://www.judicature.go.ug/data/smenu/7//Supreme%20Court.html>, accessed on September 18 2015.

⁴ According to the World Bank's Harmonized List of Fragile Situations for Fiscal Year 2015, available online at: <http://www.worldbank.org/content/dam/Worldbank/document/FY15%20Fragile%20states%20list.pdf>

⁵ Library of Congress Country Studies (Public Domain compilation on Wikipedia), "Uganda," available at [https://en.wikipedia.org/wiki/History_of_Uganda_\(1979%E2%80%93present\)](https://en.wikipedia.org/wiki/History_of_Uganda_(1979%E2%80%93present)), accessed on September 18, 2015.

Figure 2.1: Uganda Power Market Structure



The Ministry of Energy and Mineral Development (MEMD) sets policy for electrification. It administers a large portfolio concerned with energy resources development that includes the entire electricity sector.

Responsibilities for rural electrification lie primarily with the Rural Electrification Authority (REA), overseen by the Rural Electrification Board (REB). The REB is responsible for approving REA plans and acting as liaison between the MEMD and the REA. The REA is a public entity whose duties include implementing rural electrification plans approved by the REB, as well as selecting, designing and analyzing projects. In addition, the REA helms the concession bidding process, serving as the decision-maker for submitted bids.

In 1997, the Government of Uganda (GoU) developed and ratified a proposal to restructure the then state-owned, vertically-integrated monopoly entity, the Uganda Electricity Board (UEB). In the distribution sector, this strategy called for concessioning the existing distribution network to a private entity. This was conceived primarily as an efficiency and financing measure. As summarized by the World Bank, the main objectives were to:

*Reduce power supply deficits, high losses, low levels of revenue recovery, inability to service government debt, significant financial losses and consequential needs for subsidies, severe resource constraints and weak accountability.*⁶

The primary goal was to reduce the fiscal burden of the electricity sector on the government. Access was not an initial priority.⁷ In 1999, the Public-Private Infrastructure Advisory Facility (PPIAF) of the World Bank Group funded a report outlining options for rural electrification in Uganda.⁸ In the same year, the GoU ratified the 1999 Electricity Act which laid out a plan for restructuring the electricity sector to allow competitive concessions for generation and distribution services.

The 1999 Electricity Act formally unbundled the monopoly UEB. It allowed for the eventual concession of its main urban distribution sector in 2005 to a foreign consortium initially jointly owned by both a UK-connected firm, Globeleq and a South African company, Eskom. This concession, UMEME, is the largest distribution company in Uganda, with 95 percent market share as of September 2015.⁹ However, GoU has taken a separate strategy for electrifying areas outside of UMEME concessions. This separation of electrification approaches between the between the main utility and rural concessions has critically shaped rural electrification in Uganda. This is discussed more in Section 1.2.

Regulation of the power sector, including rural electrification systems, is performed by the Electricity Regulation Authority (ERA). The ERA issues licenses to concessions, sets service standards for all electricity distribution in Uganda, and is the ultimate authority in charge of setting and adjusting tariffs.

A map showing the major existing network and load centers is presented in the figure below.

⁶ The World Bank Group Public-Private Infrastructure Advisory Facility, “A Country Framework Report: Private Solutions for Infrastructure: Opportunities for Uganda,” 2001, available at http://www.ppiaf.org/sites/ppiaf.org/files/publication/Uganda-CFR_0.pdf, accessed on September 18, 2015. Page 13.

⁷ Simon D’Ujanga (Member of Ugandan Parliament), “Power Sector Reform in Uganda,” 2004?, available at http://www.un.org/esa/sustdev/sdissues/energy/op/parliamentarian_forum/uganda_dujanga_psr.pdf, accessed on October 1, 2015. Slide 11.

⁸ The World Bank Group Public-Private Infrastructure Advisory Facility, “Uganda: Strategic Options for Rural Electrification in Uganda,” November 13 1999, available through <http://www.ppiaf.org/project/uganda-strategic-options-rural-electrification-uganda>, accessed on September 18, 2015.

⁹ Isaac Mufumbiro, Email Correspondence, October 1, 2015.

Figure 2.2: Map of Uganda's Distribution and Transmission Network



Source: Uganda Rural Electrification Agency, August 2015.

2.2 Rural Electrification Approach

The approach to rural electrification is best understood in the context of electricity reform as a whole. Uganda's approach to expanding electricity access uses concessions to private operators. Government was initially supposed to play a limited role in investment, but has recently taken a larger stake in increasing access.

The push for a concession approach to rural electrification in Uganda originated in the late 1990s as part of the IMF's debt forgiveness program for heavily indebted poor countries (HIPC).¹⁰ One of the terms of the 2000 phase of debt relief was Uganda's creation of a poverty reduction strategy, which included a plan to introduce competition and greater levels of efficiency to the electricity sector.¹¹ The electricity reform dialogue in Uganda was in part driven by the World Bank. To kick-start the 'private initiative' program, the World Bank assisted GoU in developing a rural electrification master plan. This was intended to identify additional opportunities for private investment in rural electrification, some of which were to be bid out, and others of which could be left for decentralized private initiative.¹²

In 2001, MEMD published its first comprehensive Rural Electrification Strategy and Plan (RESP) for 2001-2010, which it subsequently updated in 2013 to cover the years 2013-2022. The second plan was created by the REA. The RESP encouraged rural electrification through demand-driven, private sector-derived proposals, including PPPs where market conditions made rural electrification projects only viable with capital subsidies. The policy created a Rural Electrification Fund (REF), to be administered by a Rural Electrification Agency (REA). This agency and fund would provide necessary capital contributions (viability gap funding) to create a market attractive to the private sector. The underlying assumption was that rural electricity service would be able to recover all its operating costs and generate cash flow to service some, but not all, of the capital costs.

A second RESP, published in 2013, notes the difficulties of attracting and retaining sufficient commercial interest in the initial approach. It cites the high risk of capital investments in small scale electricity projects.¹³ The plan formally increases government participation by publicly financing grid extensions to lease to licensed operators. The government has already begun providing this low-risk leasing option to the market, but the plan takes this a step further by formally drawing large concession zones for auction. The plan also highlights the willingness of the government to substantively finance small, off-grid concessions.¹⁴

This report now highlights three key pathways through which Uganda has attempted rural electrification.

¹⁰ International Monetary Fund, "HIPC Debt Relief for Uganda Increased to a Total of US\$2 Billion: Additional Relief vital for Uganda's Poverty Reduction Programs," February 8 2000, available at <https://www.imf.org/external/np/sec/pr/2000/pr0006.htm>, accessed on September 18, 2015.

¹¹ Republic of Uganda Ministry of Energy and Mineral Development, "Rural Electrification Strategy and Plan Covering the Period 2001 to 2010," February 2001, Page 2.

¹² Ibid, pages iv and 4.

¹³ Republic of Uganda Ministry of Energy and Mineral Development, "Rural Electrification Strategy and Plan Covering the Period 2013 to 2022," July 3 2013, Page 2.

¹⁴ Ibid, page 8.

- The first pathway is via UMEME, the privatized national distribution company. Although the national distribution company was conceived as a part of a plan to improve the mostly urban electricity sector, it has connected many rural customers within its concession area.
- The second pathway is via a first phase of programmatic rural electrification. This was an attempt to follow through on the original RESP created by the REA.
- The third pathway is via the second phase of programmatic rural electrification. This was a response to the lessons learned in the first phase and entailed much more government involvement. This phase is also largely reflective of the most recently published second RESP mentioned above.

3 The UMEME Concession for the Existing Grid

In 2005, following international competitive bidding, the main distribution grid was concessioned to UMEME Ltd, a private company owned by Eskom (the South African state-owned electricity utility) and Globeleq, an emerging markets-focused energy company founded by the Commonwealth Development Corporation (CDC).¹⁵ Actis LLC managed CDC's investment in Globeleq beginning in 2004 and in 2009, Globeleq's stake was officially transferred to Actis.¹⁶ In October 2012, UMEME had its Initial Public Offering (IPO), releasing nearly 40 percent of its shares to the public.¹⁷ In 2014, Actis sold its majority stake in UMEME.. The senior management and board still continue to rely heavily on Actis.

UMEME's concession area was defined as the entire area within 1 kilometer of the existing distribution lines. The UMEME concession area is shown in Figure 2.1.

Before the concessioning of UMEME, the previous state-owned UEDCL was slowly expanding its grid coverage in both urban and rural areas. Therefore, UMEME's allotted concession zone contained substantial amounts of standing infrastructure in rural areas. UMEME subsequently took over the assets and began adding connections within its granted area. According to interviews with UMEME managers, 30 percent of UMEME's total connections are considered to be in rural areas.¹⁸

The Government and UMEME did not to make rural electrification targets a condition of the concession agreement. UMEME's board was eventually approached about performing grid extensions outside of its concession area,¹⁹ but the CEO at the time, Charles Chapman, was not interested because of what were in his mind the low prospects for profitability.

However, UMEME's interest in grid extensions has grown under the leadership of the new CEO, Selestino Babungi, but the government is now less amenable to the idea.²⁰ The GoU strategy currently conflicts with this plan. The REA is promoting a more decentralized grid expansion focusing on cooperatives, small private operators and government financing. Uganda may be split into 13 concession zones for lease to operators other than UMEME. UMEME's current distribution lines weave throughout the concessioned areas.²¹ This leaves these peripheral extensions highly dependent on the main network both operationally and in terms of future network planning.

¹⁵ Paul Busharizi, "UEDCL sold, \$65m injection seen by 2010," May 17 2014, available at <http://www.newvision.co.ug/D/8/220/360861>, accessed on September 24 2015.

¹⁶ Jeff Mbang, "Uganda: How UMEME made free money, but could face tougher times," October 28 2014, available at <http://allafrica.com/stories/201410290263.html>, accessed on September 23, 2015.

¹⁷ Stephen Ilungole, "Regulators finally approve UMEME IPO," October 12 2012, available at <http://www.newvision.co.ug/news/636316-regulators-finally-approve-UMEME-ipo.html>, accessed on September 24, 2015.

¹⁸ Isaac Mufumbiro, Email Correspondence, October 1, 2015.

¹⁹ UMEME, Interview, September 2015.

²⁰ Ibid.

²¹ Republic of Uganda Ministry of Energy and Mineral Development, "Rural Electrification Strategy and Plan Covering the Period 2013 to 2022," July 3 2013, Pages 7-8.

In 2005 UMEME served 280,000 connections. By 2015 it had increased connections to 651,000. UMEME does not record data on the electrification rate within its concession.²² Outside of the 1km concession area, it is our understanding that UMEME has no service obligation under its contract to provide electricity.

A summary of the concession’s key characteristics is presented in Table 2.1.

Table 3.1: UMEME Concession Summary

Indicator	Value
Number of total connections (year)	651,000 (2015 Q3)
Number of rural connections (year)	195,300 (2015 approximate)
Concession area covered (km of lines)	27,942
Contract type	Concession
Year concession (or concession model) started	2005
Duration of concession contract	20 years
Electrification strategy used	Grid extension
Generation technology used	Hydroelectric (>80%)

3.1 Key Objectives, Challenges and Risks

From the Government’s standpoint, the main objectives for the UMEME concession were:

1. Reducing the fiscal burden by reducing system losses, increasing collection efficiency, and providing private finance for investment in the network
2. Improving service standards for existing customers

Key risks included:

1. Uncertainty about whether the desired improvement in system losses and collection efficiency – on which the success of the concession rested – could be achieved
2. Availability and cost of generation. Near the time of concession, peak demand was 300MW while generation only provided 290MW, and demand was growing²³
3. Political and regulatory risk. Uganda was still perceived as emerging from civil war, with politics based on the ‘movement’ system, rather than multi-party

²² Isaac Mufumbiro, Email Correspondence, October 1, 2015.

²³ Ibid.

democracy. Furthermore, the regulator had just been established in 2000 and had not regulated a private business before

4. Government payment risk.

Mitigants for these risks included:

1. A promised 20% return on assets in the concession, to attract capital in the face of the perceived risks²⁴
2. Political risk insurance from MIGA²⁵
3. Partial Risk Guarantee from IDA²⁶
4. Government to remain responsible for contracting with generators through the UETCL
5. An escrow fund to ensure payments from the government to the concessionaire.²⁷

3.2 Stages of Development

The concession began operations in March 2005.²⁸ The institutional and legal conditions were put in place in 1999, with the establishment of the ERA. In April 2002, the RFP was issued. UMEME was selected in May 2004.²⁹ The transaction advisors to the government were Hunton and Williams,³⁰ and local law firm Shonubi, Musoke and Company Advocates. The advisors to the bidders were Chadbourne and Parke.³¹

A timeline showing the major stages of development leading up to the concession is presented in Table 3.2.

²⁴ UMEME, “Results Presentation FY 2013,” slide 16.

²⁵ Neha Sud, “IFC backs UMEME IPO to Support Uganda’s Power Sector,” December 4 2012, available at <http://ifcext.ifc.org/ifcext/pressroom/IFCPressRoom.nsf/0/D9F09A16DDF819CC85257ACA0026B0B7>, accessed on September 23, 2015.

²⁶ Ibid.

²⁷ Joseph Katera, “UEDCL Presentation: Energy and Minerals Joint Sector Review,” November 2014. Slide 8.

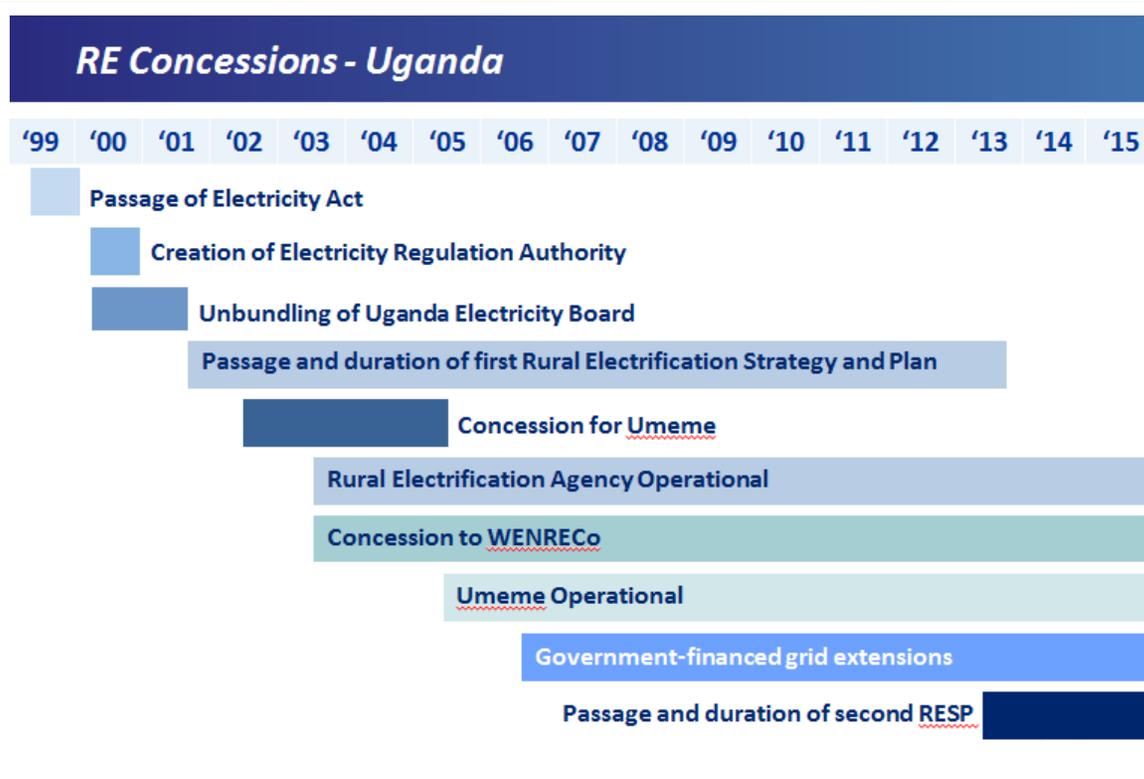
²⁸ Paul Mare, “An insight into UMEME concession and work,” August 16 2007, available at <http://www.newvision.co.ug/D/8/459/581721>, accessed on September 24, 2015.

²⁹ Simon D’Ujanga (Member of Ugandan Parliament), “Power Sector Reform in Uganda,” 2004?, available at http://www.un.org/esa/sustdev/sdissues/energy/op/parliamentarian_forum/uganda_dujanga_psr.pdf, accessed on October 1, 2015. Slide 31.

³⁰ Nelson Wesonga, “UMEME Threatens to Terminate Contract,” April 30, 2012, available at <http://www.monitor.co.ug/News/National/-/688334/1396456/-/avglmkz/-/index.html>, accessed on October 1, 2015.

³¹ Chadbourne, “Chadbourne Represented Globeleq, Eskom, and UMEME in Uganda Electricity Distribution Deal,” March 8, 2005, available at <http://www.chadbourne.com/node/25034>, accessed on October 1, 2015.

Table 3.2: Stages of Development of UMEME Concession



3.3 Financing Arrangements

UMEME’s capital funding strategy relies on a mixture of private and donor money. UMEME was originally financed via its private controlling interests with loans underwritten by Multilateral Investment Agency Group (MIGA) guarantees. MIGA’s US\$40 million guarantee covered risks including breach of contract, war, and political unrest.³² Much of the actual capital raised was in the form of shareholder loans, which was guaranteed a 12 percent per annum return.³³ Capital expenditures to maintain and upgrade the existing asset base were guaranteed a net return of 20 percent per annum.³⁴ Revenues are generated through cost-reflective tariffs, which have been raised with the REA’s approval a number of times.³⁵

³² MIGA, “MIGA in Sub-Saharan Africa,” April 2013, available at <https://www.miga.org/Documents/SubSaharanAfrica.pdf#search=UMEME>, accessed on September 23, 2015.

³³ Harper, Paul, “Public-private partnerships and the financial cost to governments: Case study on the power sector in Uganda,” August 2015, page 3.

³⁴ UMEME, “Results Presentation FY 2013,” slide 16.

³⁵ Harper, Paul, “Public-private partnerships and the financial cost to governments: Case study on the power sector in Uganda,” August 2015, page 2.

In terms of donor money, UMEME received a US\$25 million loan from the IFC in 2009, as well as a US\$4.9 million equity injection from the IFC at the time of the IPO.³⁶

In addition, UMEME also has access to output-based aid (OBA) to subsidize connections for households within the no-pole distance of the nearest distribution transformer (typically 35 meters). Under this scheme, the World Bank pays an OBA subsidy to the utility after verifying that the utility has connected a new customer under certain conditions.³⁷ The subsidy is financed by the World Bank.³⁸

UMEME is currently not receiving any subsidies from the GoU. However, from 2005 to 2012 GoU provided customer-facing subsidies to lower the cost of electricity to end-users.³⁹

3.4 Contractual Arrangements

UMEME's contractual arrangement with the GoU is divided into a few components. The lease agreement is between UMEME and the UEDCL. The distribution and supply licenses are between UMEME and the ERA. The concession also has a support agreement with the GoU codifying a single buyer model. Finally, UMEME has a power sales agreement with the state-owned transmission company, UETCL.⁴⁰

The governing document is the lease agreement with the UEDCL. Under this agreement, UMEME pays a monthly leasing fee. In return, it receives the right to operate and maintain a rate of return on assets, earn revenues from government power purchases, and charge end-users directly for electricity.

The UEDCL, under the authority of the ERA, is the contracting entity for the leasing agreement. This state-owned company would take over operations of the distribution and supply business in the event of an early termination between UMEME and GoU.⁴¹

The concessioner leases existing assets to the concessionaire, including the transfer of assets during the 20-year time period. UMEME's capital expenditures are included in the rate base, subject to the approval of the ERA. The concessionaire is required to make the investments necessary to pursue certain targets as mandated by the government. The concessionaire is further obligated to meet specific service standards.

3.5 Regulatory Arrangements

All concessions are regulated by the Electricity Regulation Authority. The basis for establishing tariffs and service standards has consistently focused on the principle of

³⁶ Neha Sud, "IFC backs UMEME IPO to Support Uganda's Power Sector," December 4 2012, available at <http://ifcext.ifc.org/ifcext/pressroom/IFCPressRoom.nsf/0/D9F09A16DDF819CC85257ACA0026B0B7>, accessed on September 23, 2015.

³⁷ Benon M. Mutambi, ERA, "Uganda's Experience with Promotion of Rural Electrification – Connection Subsidies," November 2011, accessed September 23, 2015.

³⁸ Ibid.

³⁹ Harper, Paul, "Public-private partnerships and the financial cost to governments: Case study on the power sector in Uganda," August 2015, page 3.

⁴⁰ UMEME, "Results Presentation FY 2013," slide 18.

⁴¹ Uganda Electricity Distribution Company Limited, "Welcome to UEDCL," available at <http://www.uedcl.co.ug/>, accessed on September 23, 2015.

allowing cost recovery for operations as well as investments.⁴² Tariffs for UMEME were at a low subsidized rate of UGX\$171.4/kWh in 2004 before UMEME took over, but have steadily increased to UGX\$558.4/kWh as of early 2015.⁴³ Tariff changes follow a consultative process and the concession is authorized to apply for rate changes if covered costs “have substantively changed since the issuance of the license or approval of the existing tariffs.”⁴⁴

The legal instruments embodying the rules is a series of regulations and laws including the National Environment Act Cap 153 and statutory instruments and guidelines periodically issued by the ERA.⁴⁵ However, licenses may have additional conditions or allowances for each concession.⁴⁶

Changes to the rules governing UMEME are possible, and have been initiated from both parties. For instance, in 2006, UMEME amended its supply license from the ERA forcing government compensation in the case of power shortages.⁴⁷ In 2010, the ERA attempted to alter the tariff structure in a way that limited the financial position of UMEME.⁴⁸ UMEME has engaged with the ERA in an extended dispute to contest the changes.

In the case of disagreements between the concessionaire and the government, GoU has established the Electricity Disputes Tribunal. This tribunal has the authority to “hear and determine all matters referred to it relating to the electricity sector.”⁴⁹ The affected party has the ability to appeal to the High Court and then the Court of Appeals if they are unsatisfied with the court’s ruling.⁵⁰

The concession establishes an escrow account which provides assurance of bill payment from the government to the concessionaire. This provides some degree of risk mitigation to UMEME. However, this account has dried up since the UEDCL has failed to meet bill

⁴² ERA, “Statutory Instruments: The Electricity (Tariff Code) Regulations, 2003,” 2003, available at <http://www.era.or.ug/index.php/2013-12-14-14-58-04/regulations-codes>, accessed on September 24, 2015, pages 3-4.

⁴³ Electricity Regulation Authority, “Domestic Tariff: Electricity Distribution – Weighted Average Domestic Tariffs,” available at <http://www.era.or.ug/index.php/statistics-tariffs/tariffs/distribution-tariffs/2014-10-14-10-24-55?resetfilters=0&clearordering=0&clearfilters=0>, accessed on September 17, 2015.

⁴⁴ The Uganda Gazette, “Statutory Instruments Supplement, the electricity (application for permit, license and tariff review) regulations, 2007, available at <http://www.era.or.ug/index.php/2013-12-14-14-58-04/regulations-codes>, accessed on September 24, 2015, page 765.

⁴⁵ ERA, “Overview of Electricity Regulation in Uganda,” January 8 2014, available at <http://www.era.or.ug/index.php/sector-overview>, accessed on September 24, 2015.

⁴⁶ The Uganda Gazette, “Statutory Instruments Supplement, the electricity (application for permit, license and tariff review) regulations, 2007, available at <http://www.era.or.ug/index.php/2013-12-14-14-58-04/regulations-codes>, accessed on September 24, 2015, page 763.

⁴⁷ Jeff Mbanga, “Uganda: How UMEME made free money, but could face tougher times,” October 28 2014, available at <http://allafrica.com/stories/201410290263.html>, accessed on September 23, 2015.

⁴⁸ Ibid.

⁴⁹ Government of Uganda, “The Electricity Act, 1999” available at <http://www.era.or.ug/index.php/2013-12-14-14-58-04/laws-polices/laws>, accessed on September 24, 2015, Part XIII.

⁵⁰ Ibid.

dues.⁵¹ UMEME has also ceased paying lease fees to offset this loss of revenue. Technically, this leaves the government in breach of contract.⁵²

3.6 Technological Approach

UMEME operates the national distribution network. It purchases power from the transmission company UETCL, which in turn purchases its power from independent power producers (IPP), the largest of which is the Bujagali hydropower plant, and government-owned power plants.

UMEME does not operate isolated grids, nor does it supply electricity through home-based systems.

⁵¹ Jeff Mbanga, “Uganda: How UMEME made free money, but could face tougher times,” October 28 2014, available at <http://allafrica.com/stories/201410290263.html>, accessed on September 23, 2015.

⁵² Joseph Katera, “UEDCL Presentation: Energy and Minerals Joint Sector Review,” November 2014. Slide 9.

4 Uganda's Rural-Only Electrification Concessions

The Electricity Regulatory Authority currently licenses nine separate entities to distribute electricity in Uganda, including UMEME. Seven of these entities, including UMEME, can be considered “concessions” for the purposes of this study.⁵³ These concessions hold a total of twelve distribution licenses. The development of these concessions is outlined below.

The rural electrification rollout outside the UMEME service area has occurred in two, overlapping phases. The first phase allocated substantial portions of overall risk to a contracted concessionaire in the Northwest of the country (WENRECO). This concession included build, operation, demand and fuel price risk, although the latter two could be passed to customers through tariff adjustments. In the second phase, the REA took build risk for concessionaires, developing distribution networks and auctioning them off to viable operators at low commercial costs. This was a response to the realization that the commercial sector shouldered too much risk in Phase One (WENRECO) for the expected return.

4.1 Phase One (2001-2012): WENRECO

Phase One was originally designed to encourage a diverse body of entrepreneurially-minded entities, foreign and domestic, to electrify regions on the principle of commercial viability. The initial objectives of this initiative were to increase equitable access to electricity, maximize the benefits of then-existing rural electrification subsidies, encourage both on-grid and off-grid rural electrification, and encourage supply-side innovation.⁵⁴

Many risks were originally allocated by MEMD to future concessionaires. MEMD allocated build, operation, demand, and fuel price risk to the private entity. The rationale was to provide public financing in the form of capital subsidies for proposals which were projected to be operationally profitable if private financing was not available.⁵⁵

However, market-sourced bids under the new system were not forthcoming. In order to encourage private investment, MEMD delineated a promising concession area in northwest Uganda for the populace in the West Nile sub-region.⁵⁶ The most populous city in the region was the town of Arua, with a population of 63,000.⁵⁷

MEMD shortlisted six bidders for a 20-year concession to generate, distribute and sell electricity within the concession area.⁵⁸ Five of the potential bidders were commercial investors with experience in electrification projects. The only one to bid was the sixth, a subsidiary of the Aga Khan Fund for Economic Development named Industrial Promotion Services (IPS). This firm is an investment organ with a strong development objective that

⁵³ We did not count the ninth, Kalangala because it is an investor-owned utility.

⁵⁴ Republic of Uganda Ministry of Energy and Mineral Development, “Rural Electrification Strategy and Plan Covering the Period 2001 to 2010,” February 2001, Page 3.

⁵⁵ Ibid, page vi.

⁵⁶ Kariuki, Kevin, “West Nile Rural Electrification Project Case Study,” March 2006, Slide 11.

⁵⁷ UBOS. “The Population of The Regions of the Republic of Uganda And All Cities And Towns of More Than 15,000 Inhabitants”. Citypopulation.de Quoting Uganda Bureau of Statistics (UBOS). August 2014. Accessed September 16, 2015.

⁵⁸ Kariuki, Kevin, “West Nile Rural Electrification Project Case Study,” March 2006, Slide 11.

lacked significant experience in rural electrification projects. However, IPS had previously co-sponsored distribution network projects with the IFC.⁵⁹

IPS's bid was based on projections of demand and willingness-to-pay performed by World Bank consultants. IPS never performed private due diligence on the analyses provided to them.⁶⁰ Due to the solitary bid of IPS and its meeting of bid qualifications, IPS was ultimately selected by the ERA in April of 2003.⁶¹ It created the West Nile Rural Electrification Company (WENRECo) to build and operate a hydro power plant and attached distribution lines.

The concession was a “20-year license to build, own and operate electricity generation, distribution and sales facilities in the West Nile region.”⁶² The position of the WENRECo service area within Uganda is shown in Figure 4.1 below, and an enlarged map is shown in Figure 4.2. The concession included the transfer of assets previously held by UEB, including an inefficient 1.5MW diesel generator in Arua and the distribution lines already constructed in the area.⁶³ The contract also obligated WENRECo to invest and construct a 3.5MW hydropower plant on the Nyagak River as well as a new, more efficient 1.5MW thermal plant in the interim. In addition, the contract mandated WENRECo to build out the distribution network to meet license obligations.⁶⁴

Financing for WENRECo was initially provided by the World Bank under the Energy for Rural Transformation Project.⁶⁵ WENRECo was granted a one-off capital subsidy of US\$14.75 million and also guaranteed IRR of 15 percent.⁶⁶ WENRECo was also required to cap its tariff at UGX\$360 until the completion of the hydropower plant.^{67,68} Due to the tariff cap, the project was unprofitable from day one as WENRECo was unable to recover additional capital costs. In March 2009, WENRECo stopped generating due to inability to meet operational costs.⁶⁹ The concession was eventually able to secure a grant of US\$1.3

⁵⁹ Ibid, slide 10.

⁶⁰ WENRECo, Interview, September 2015.

⁶¹ Electricity Regulation Authority, “West Nile Rural Electrification Company Ltd. 2013 Tariff Review, Public Hearing at Arua Public Primary School,” April 2013, Page 12.

⁶² Electricity Regulation Authority, “West Nile Rural Electrification Company Ltd. 2013 Tariff Review, Public Hearing at Arua Public Primary School,” April 2013, Page 12.

⁶³ Kariuki, Kevin, “West Nile Rural Electrification Project Case Study,” March 2006, Slide 11.

⁶⁴ Electricity Regulation Authority, “West Nile Rural Electrification Company Ltd. 2013 Tariff Review, Public Hearing at Arua Public Primary School,” April 2013, Page 12.

⁶⁵ Kariuki, Kevin, “West Nile Rural Electrification Project Case Study,” March 2006, Slide 11.

⁶⁶ Ibid, slides 11-12.

⁶⁷ Electricity Regulation Authority, “West Nile Rural Electrification Company Ltd. 2013 Tariff Review, Public Hearing at Arua Public Primary School,” April 2013, Page 14.

⁶⁸ Electricity Regulation Authority, “Domestic Tariff: Electricity Distribution – Weighted Average Domestic Tariffs,” available at <http://www.era.or.ug/index.php/statistics-tariffs/tariffs/distribution-tariffs/2014-10-14-10-24-55?resetfilters=0&clearordering=0&clearfilters=0>, accessed on September 17, 2015.

⁶⁹ World Bank, “Case Study 5: Uganda – West Nile Rural Electrification Project,” available at <http://www-csd.worldbank.org/refine/>, accessed on September 17, 2015.

million from the German development bank KfW to support operations costs and subsequently restarted operations.⁷⁰

The financial situation for WENRECo worsened after the completion of the diesel generator within the concession area. The Nyagak hydropower plant began construction in 2006, but due to the global financial crisis of 2008, planned capital subsidies were delayed and construction halted until August 2010.^{71,72} Customer subscription rates were lower than projected by World Bank estimates. In September 2012, the plant was finally completed, but only after KfW committed US\$12 million to financing the final stages of construction.⁷³ Shortly thereafter, in 2013, the REA approved a tariff hike for WENRECo.⁷⁴ The construction of the plant drove generation costs down sufficiently to create a comfortable profit margin for WENRECo. However, WENRECo's past financial problems have decreased the company's willingness to finance future distribution network development with its own capital. WENRECo is however willing to lease and operate GoU-financed network extension.⁷⁵

In 2013, WENRECo began a US\$13.5 million network expansion project jointly financed by GoU, WENRECo, KfW and the EU Energy Facility Pooling Mechanism.⁷⁶ WENRECo has increased its customer base from 1,200 customers in April 2003⁷⁷ to 6,800 as of the beginning of 2015.⁷⁸ Currently, GoU is planning to connect WENRECo to the main grid system, a process that is expected to be completed by 2019.

⁷⁰ Electricity Regulation Authority, "West Nile Rural Electrification Company Ltd. 2013 Tariff Review, Public Hearing at Arua Public Primary School," April 2013, Page 14.

⁷¹ Kalyango, Ronald, "Uganda: Construction of Nyagak Power Dam to Resume," August 2010, available at <http://allafrica.com/stories/201008060368.html>, accessed on September 17, 2015.

⁷² Electricity Regulation Authority, "West Nile Rural Electrification Company Ltd. 2013 Tariff Review, Public Hearing at Arua Public Primary School," April 2013, Page 2.

⁷³ Aga Khan Development Network, "Nyagak I Hydropower Plant Inaugurated," 14 September 2012, available at <http://www.akdn.org/Content/1148>, accessed on September 17, 2015.

⁷⁴ Electricity Regulation Authority, "Domestic Tariff: Electricity Distribution – Weighted Average Domestic Tariffs," available at <http://www.era.or.ug/index.php/statistics-tariffs/tariffs/distribution-tariffs/2014-10-14-10-24-55?resetfilters=0&clearordering=0&clearfilters=0>, accessed on September 17, 2015.

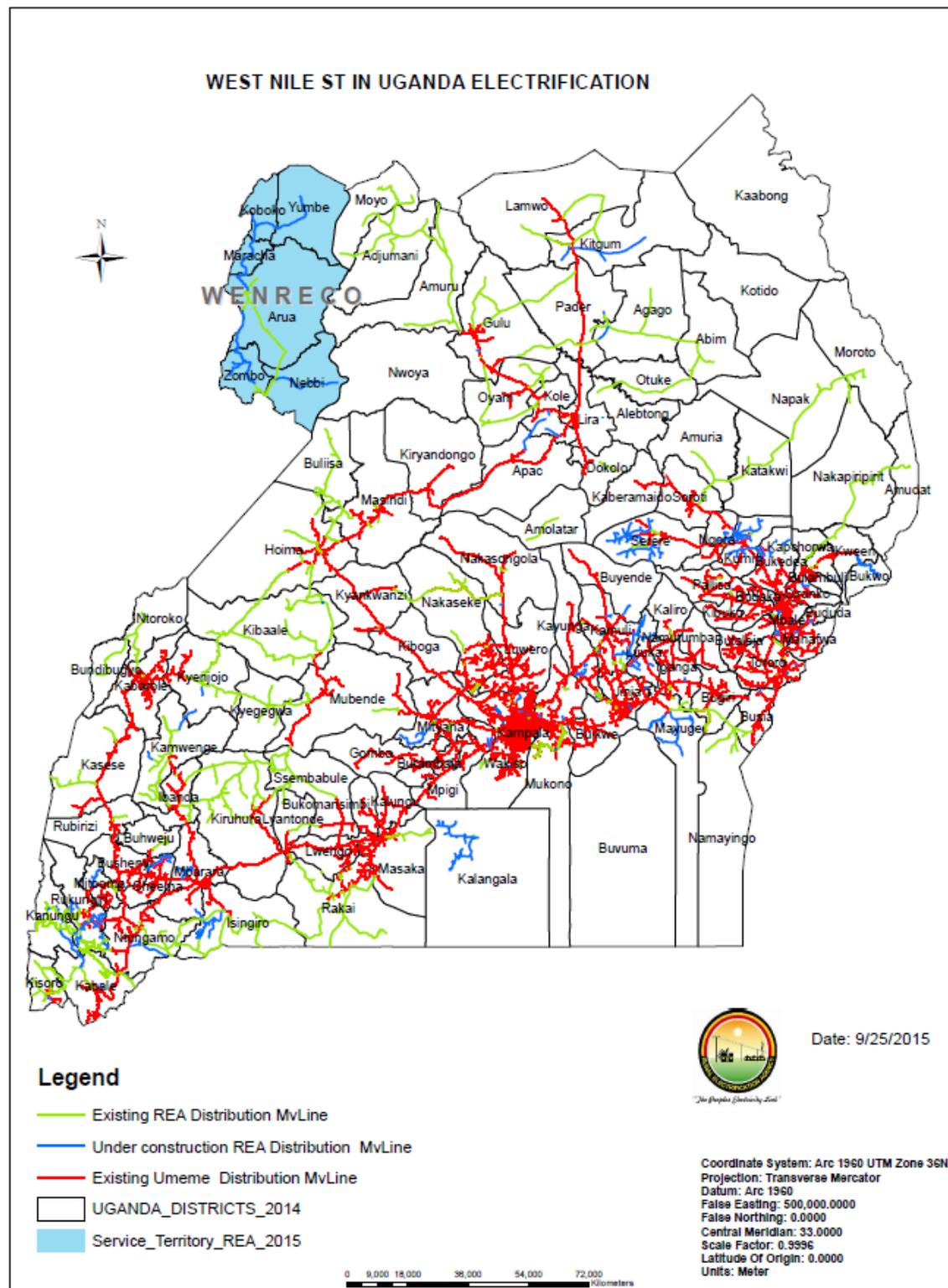
⁷⁵ WENRECo, Interview, September 2015.

⁷⁶ ESI Africa, "West Nile rural electrification project," October 8 2012, available at <http://www.esi-africa.com/west-nile-rural-electrification-project/>, accessed on September 17, 2015. Also Ondoga, Ayiga, "West Nile grid extension on schedule," July 30 2014, available at <http://www.newvision.co.ug/news/658170-west-nile-grid-extension-on-schedule.html>, accessed on September 17, 2015.

⁷⁷ Electricity Regulation Authority, "West Nile Rural Electrification Company Ltd. 2013 Tariff Review, Public Hearing at Arua Public Primary School," April 2013, Page 12.

⁷⁸ Electricity Regulatory Authority, "Electricity Distribution Statistics," May 18 2015, available at <http://www.era.or.ug/index.php/statistics-tariffs/2013-11-27-16-54-30/distribution-statistics>, accessed on September 17, 2015.

Figure 4.1: WENRECo Location



Source: Uganda Rural Electrification Agency, September 2015.

Figure 4.2: WENRECo Concession Service Territory



Source: Uganda Rural Electrification Agency, September 2015.

4.2 Phase Two (2006-Present): Small Grid-Extension Concessions

Recognizing the commercial risks inherent in rural electrification, GoU elected to shift more risk to the public sector in an attempt to encourage more investment in rural network development. In November 2010, the MEMD consulted with the US-based National Rural Electric Cooperative Association (NRECA) to help shape its second RESP.⁷⁹ As Uganda's second Rural Electrification Strategy and Plan states,

Little entrepreneur-led electrification investment actually occurred [in phase one], as this policy proved to have placed excessive faith on the motivation of capacities of private sponsors to undertake risk and perform this role. To fill the void, Government stepped in with a more direct approach to funding and implementing rural electrification, with improved results in terms of investment flows...⁸⁰

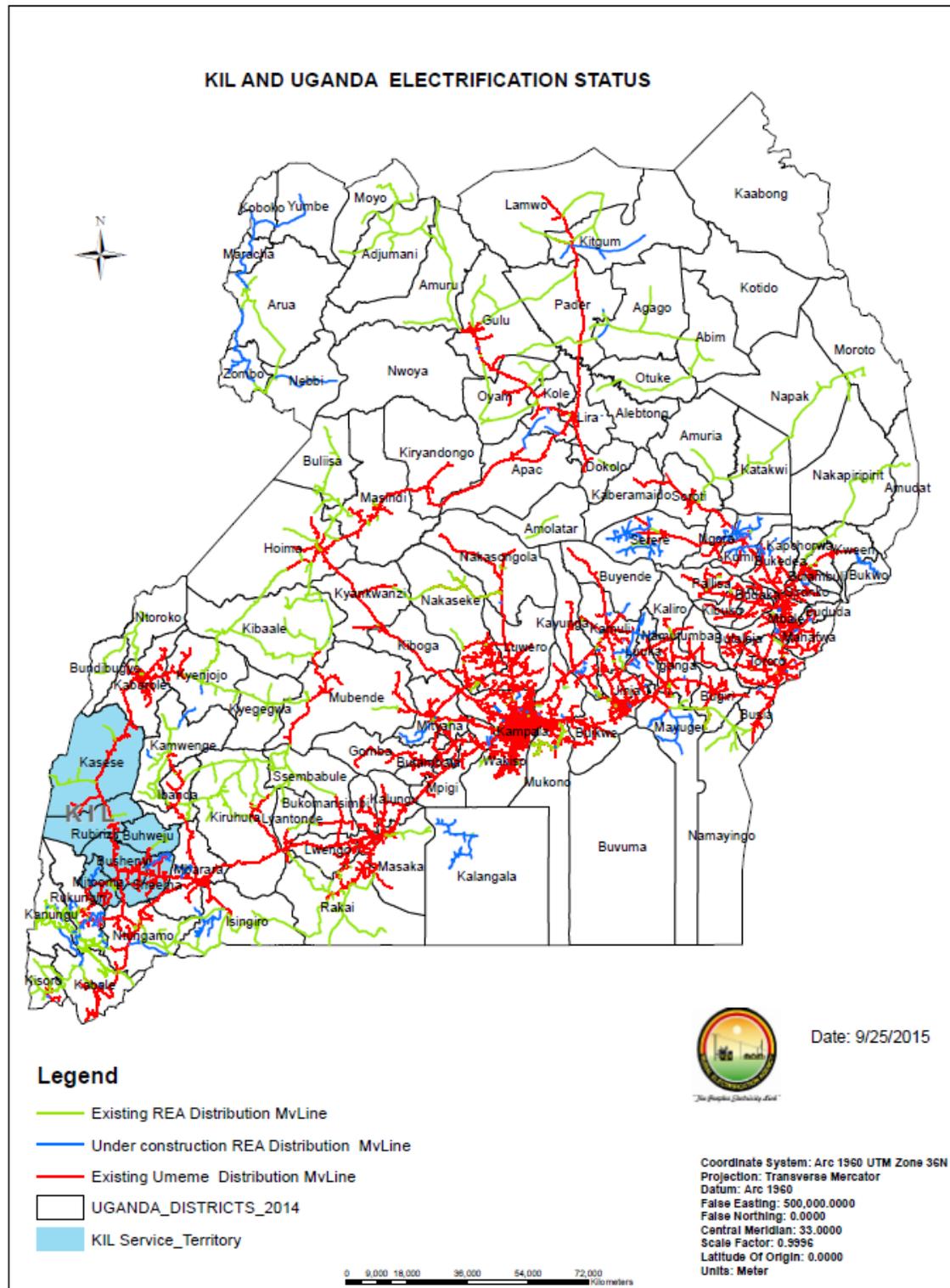
Due to the lack of commercial interest in financing electrification projects, the GoU would finance and construct grid extension projects itself, through the REA. These lines would then be leased to private entities. The rationale was that simple operating agreements allocated less risk to the private sector and would therefore increase interest. The operators that function under this arrangement are called: BECS, Ferdsult, KRECS, KIL, and PACMECS.

The maps below show where some of these operators and their size relative to the country and to UMEME. The location of the KRECS service area within Uganda is shown in Figure 4.3 and it is enlarged in Figure 4.4. The location of KIL within Uganda is in Figure 4.5, and an enlargement of the service area is in Figure 4.6.

⁷⁹ NRECA, "Uganda," 2015, available at <http://www.nreca.coop/what-we-do/international-programs/country-projects/uganda/>. Accessed on October 1, 2015.

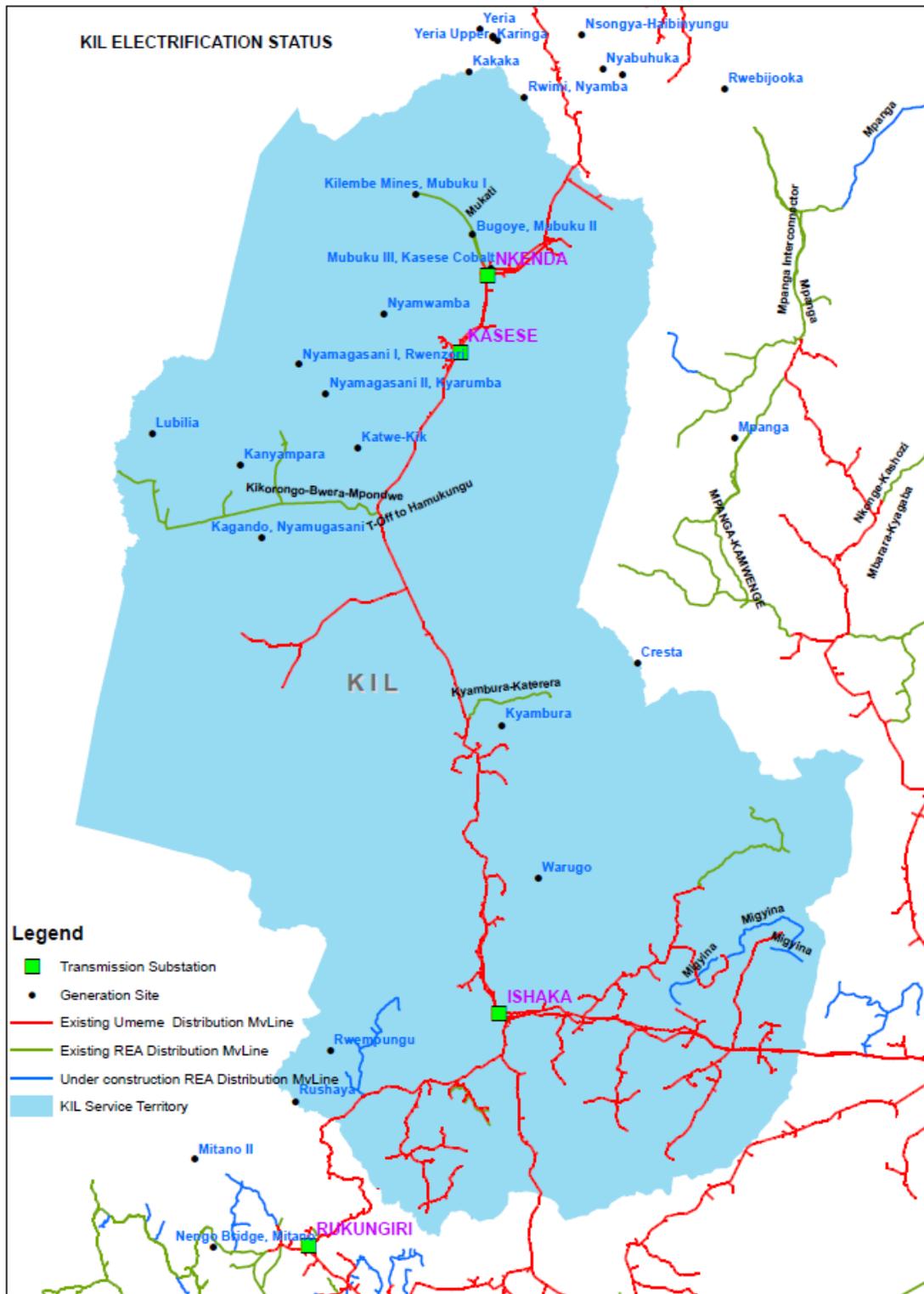
⁸⁰ Republic of Uganda Ministry of Energy and Mineral Development, "Rural Electrification Strategy and Plan Covering the Period 2013 to 2022," July 3 2013, Page 2.

Figure 4.5: Location of KIL in Uganda (Light Blue in Western Part of Country)



Source: Uganda Rural Electrification Agency, September 2015.

Figure 4.6: KIL Service Territory



Source: Uganda Rural Electrification Agency, September 2015.

4.2.1 Operations and Management

The concessionaires have diverse ranges of skills sets and management capacity. Some are entrepreneurial and forward-thinking while others are content to minimize risk and responsibility. As the REA plans investments and leases lines to concessionaires to operate, many of the concession arrangements define similar scopes of responsibility.

One specific goal detailed by the concession is connection targets. For instance, the KRECS leasing agreement obligates the cooperative to “connect at least 25,000 consumers...during the term of the agreement.”⁸¹

Concession agreements typically state annual performance targets with attached bonuses and penalties. These targets include percentage of fee collection for connections, O&M expense reduction, percentage of damaged transformers repaired, ratio of connected consumers to applications, length of time to wait for connection, and timeliness in complaint response.⁸²

4.2.2 Financing Arrangements

The capital funding strategy is typically through public financing, with ongoing investments also secured and financed by the public sector. While REA offers capital subsidies universally, it heavily prefers to avoid ongoing subsidies except to UEDCL-operated concessions. Tariffs are designed to be cost-reflective, as designed in the original RESP for 2001-2010.⁸³ Four of the concessions—Ferdsult, KIL, BECS and PACMECS—have posted tariffs averaging UGX\$527/kWh. By comparison, UMEME and WENRECo are slightly higher at UGX\$557/kWh.⁸⁴

KRECS is an exception to this tendency. While the cooperative is deemed commercially viable, it has not yet reached profitability due to insufficient scale. In 2014, KRECS ran a deficit of UGX\$221,263,361, or roughly US\$60,000. As it depends on REA to provide capital to fund further connections, the REA pays ongoing subsidies to KRECS in the meantime. To our knowledge only KRECS receives ongoing subsidies for operations.

How KIL came to be involved in rural electrification provides an interesting example of a way to finance a concession. KIL was created by a group of workers from a copper mine in Kilembe. This group had an aspiration to start an investment company. Their initial target for investment was the mine itself, which was in the process of privatization. KIL planned to provide outsourced services for mine operations. However, the mine was eventually sole-sourced to a Chinese firm, leaving the workers with an investment fund and no investments. When the REA announced its plans to open up rural electrification to private investment, KIL approached the REA. Although KIL started with limited capital, eventually the REA had to intervene and provide viability gap financing to sustain the project. Despite the

⁸¹ Ibid, Article III, 3.6.

⁸² Republic of Uganda, “Lease agreement relating to the supply of electricity services in the central service territory between the government of Uganda represented by the rural electrification board and Kyegegwa Rural Electricity Cooperative Society Limited,” July 27 2015. Appendix E.

⁸³ Republic of Uganda Ministry of Energy and Mineral Development, “Rural Electrification Strategy and Plan Covering the Period 2001 to 2010,” February 2001, Page v.

⁸⁴ Electricity Regulation Authority, “Domestic Tariff: Electricity Distribution – Weighted Average Domestic Tariffs,” available at <http://www.era.or.ug/index.php/statistics-tariffs/tariffs/distribution-tariffs/2014-10-14-10-24-55?resetfilters=0&clearordering=0&clearfilters=0>, accessed on September 17, 2015.

overwhelming contribution of government capital, KIL was still allowed to claim a return on rate base in its leasing agreement.⁸⁵

4.2.3 Contractual Arrangements

Three documents define the right and responsibilities of the parties to the concession. The first two are the licenses for the sale and distribution of electricity. These are provided by the ERA. The third is a lease contract provided by the REA.

ERA licenses have varied durations. BECS, Ferdsult, KIL, KRECS, and PACMECS are all valid for ten years, while the government-owned operator (UEDCL)'s are only good for three years. However, longer licenses also exist, such as the 25 year license for the investor-owned utility, Kalangala Infrastructure Services.⁸⁶ The leasing agreement is signed by the private entity with the REA's overseeing body, the REB.⁸⁷

Under the leasing agreement, the concessionaire is obligated to recruit personnel, maintain the good repair and working condition of assets, respond in a timely manner to electricity disruptions, provide simple line maintenance, promote customer awareness, and "provide electricity services in the entire service territory."⁸⁸

More recent contracts have a tendency to appropriate less risk to the private sector. The KRECS lease is more similar in form to a management contract as it provides the REA authority to terminate the contract without warning, at convenience, without termination payments.⁸⁹ Further, it allows the concessionaire to appeal to the REB for financial assistance in the case of "repairs or replacements above the Cooperative's financial capacity."⁹⁰

4.2.4 Technological Approach

Distribution in each concession is performed via grid extension. In cases of grid extension, the concession negotiates a PPA with Uganda Electricity Transmission Company Limited (UETCL).⁹¹ In this case, the concession works closely with the transmission sector, but is once-removed from generation, for the UETCL functions as a single-buyer on the main grid. On-grid generation is provided by a portfolio of which 84 percent of 822MW installed

⁸⁵ KIL, Interview, September 2015.

⁸⁶ Electricity Regulation Authority, "Issued Licenses," available at <http://www.era.or.ug/index.php/licences-permits/2013-10-15-15-43-41/issued-licences?resetfilters=0&clearordering=0&clearfilters=0>, accessed on September 17, 2015.

⁸⁷ Rural Electrification Agency, "Financing for REA projects," available at <http://www.rea.or.ug/index.php/tutorials/financing-for-rea-project>, accessed on September 17, 2015.

⁸⁸ Republic of Uganda, "Lease agreement relating to the supply of electricity services in the central service territory between the government of Uganda represented by the rural electrification board and Kyegegwa Rural Electricity Cooperative Society Limited," July 27 2015. Article III.

⁸⁹ Republic of Uganda, "Lease agreement relating to the supply of electricity services in the central service territory between the government of Uganda represented by the rural electrification board and Kyegegwa Rural Electricity Cooperative Society Limited," July 27 2015. Clause 7.7.

⁹⁰ Ibid, Appendix G, Section III.

⁹¹ Ferdsult Website, "Concession areas," available at <http://www.ferdsult.net/concession.html>, accessed on September 17, 2015.

capacity is hydropower.⁹² Diesel and negligible amounts of renewable energy sources make up the difference.

4.2.5 Regulatory Arrangements

Concessions are regulated by the Electricity Regulatory Authority. The legal instrument embodying the rules is similarly a detailed contract with regulatory and statutory guidelines also administered by the ERA. These rules can only be modified with the express written approval of both parties.⁹³

In the case of disagreements between the concessionaire and the government, appeals are possible. The license agreements allow the creation of an arbitration panel, composed of three panelists. One is selected by each party, and the third selected by the two. This person is also the president of the arbitral tribunal.⁹⁴

Tariffs are stated in the distribution license,⁹⁵ which is subject to review in the case of substantial cost changes, as indicated above.

4.2.6 Extent of Risk Transfer

Limited risks are transferred to the concessionaire. In many cases, Phase Two leases allow the operator to apply for tariff reviews on the basis of fuel price, operating expenses, capital expenses, insufficient returns, inflation, foreign exchange rates and “other costs approved by the authority.”⁹⁶ Many management investment decisions, including “developing, updating and implementing the Master Plan” are the responsibility of the REB.⁹⁷ The main risk is the obligation to pay the lease and avoid conditions for default or termination, which include overly poor service and corruption or misallocation of funds.⁹⁸ Also significant is performance risk, as concessionaires are accountable for performance targets dependent on REA’s investment decisions, and therefore the set-up creates the risk of non-performance due to interdependency.

⁹² Energypedia, “Uganda Energy Situation,” available at https://energypedia.info/wiki/Uganda_Energy_Situation, accessed on September 17, 2015.

⁹³ Republic of Uganda, “Lease agreement relating to the supply of electricity services in the central service territory between the government of Uganda represented by the rural electrification board and Kyegegwa Rural Electricity Cooperative Society Limited,” July 27 2015. Article XI, Clause 11.3.

⁹⁴ Ibid, Article IX, 9.3.

⁹⁵ Ibid, Appendix G, Section IV.

⁹⁶ The Uganda Gazette, “Statutory Instruments Supplement, the electricity (application for permit, license and tariff review) regulations, 2007, available at <http://www.era.or.ug/index.php/2013-12-14-14-58-04/regulations-codes>, accessed on September 24, 2015, page 765.

⁹⁷ Republic of Uganda, “Lease agreement relating to the supply of electricity services in the central service territory between the government of Uganda represented by the rural electrification board and Kyegegwa Rural Electricity Cooperative Society Limited,” July 27 2015. Article IV, Section 4.7.

⁹⁸ Ibid, Article VII.

5 Assessment of Uganda's Concessions

The concessions have each succeeded to varying degrees, especially when weighing different means of evaluation. This section analyzes the varying elements of each approach to rural electrification and discusses the implications of these results.

5.1 Evaluating Success of Concession

This section details the success of Uganda's concessions at extending electricity connections to rural households. We specifically evaluate the impact on, quality of service, sustainability of the concessions, efficiency, as well as secondary impacts of the concessions.

5.1.1 Access

The REA has specifically stated its rural electrification goals twice. Each of the RESPs outlined goals with timeframes. The 2001-2010 RESP specified a rural electrification rate of 10 percent by 2010.⁹⁹ When the document was published in 2000, rural electrification stood at less than two percent. The difference represented a net increase of 400,000 connections to rural households by 2010.¹⁰⁰ The 2013-2022 RESP specified a rural electrification rate of 26 percent by 2022, from the then current level of 7 percent.¹⁰¹ Therefore, the initial RESP came short of its goal by more than 3 percent.

Table 4.1 compares concessions in Uganda. Table 4.2 shows the growth of concessions by initial and actual connection numbers. Below the table is a discussion of the specific goals and progress of some of the major concessions in Uganda.

⁹⁹ Republic of Uganda Ministry of Energy and Mineral Development, "Rural Electrification Strategy and Plan Covering the Period 2001 to 2010," February 2001, Page v.

¹⁰⁰ Ibid.

¹⁰¹ Note that the REA's 2011/2012 annual report states a percentage of 22 percent.

Table 5.1: Summary of Concession

Name (Year)	UMEME (2006)	WENRECo (2003)	KIL (2007)	KRECS (2014)	PACMECS (2011)	BECS (2011)	Ferdsult (2007)
Concession Type	Lease	Lease	Lease	Lease	Lease	Lease	Lease
Asset Owner	GoU	GoU	GoU	GoU	GoU	GoU	GoU
Owner	Priv.	Priv.	Priv.	Coop	Coop	Coop	Priv.
Number of Staff	1,365	55	19	-	26	30	55
No. of Cust.	>700,000	7,000	7,700	1,900	2,200	4,200	19,500
Energy Sold (2015 Q1)	608 GWh	-	1,129 MWh	-	462 MWh	330 MWh	3,903 MWh
Energy Losses (2015 Q1)	20%	-	0%	-	18%	37%	31%

Note: “-” denotes that we could not find this information.

Table 5.2: Change in Number of Rural Connections, Selected Concessions (2003-2015)

Indicator	Total Connections (start)	Actual Value (2008)	Actual Value (2012)	Actual Value (2015)
UMEME (rural estimate)	87,000 (2005)	91,500	153,900	195,000
WENRECo	1,200 (2003)	2,600	3,300	6,800
KIL	950 (2010)	N/A	1900	6,500
KRECS	N/A	N/A	N/A	2,000
PACMECS	<800 (2010)	N/A	1,200	2,000
BECS	<900 (2010)	N/A	1,600	4,100
Ferdsult (three)	1,200 (2008)	2,800 (2009)	7,100	17,000

UMEME has added more new rural electricity connections than any other concession. Thirty percent of UMEME’s connections have been in peri-urban or rural areas. Access rates have been increasing within UMEME concession areas, with average connection increases of

12 percent year on year until 2013, and 13 percent in 2014.¹⁰² Moving forward, UMEME has allocated US\$73 million of its planned capital expenditure towards new connections through 2018.¹⁰³ However, the UMEME concession contract does not focus specifically on rural electricity access indicators.

WENRECo, after struggling through a protracted period of financial instability, is providing connections for its customers. The concession may have been given specific connection targets by the GoU. However, WENRECo did not mention these goals in its tariff review. Rather, it states that “The Company’s target is therefore to connect all customers who apply, and are willing to pay, for electricity in [its concession area].”¹⁰⁴ In a period of 11 years it has added 5,600 connections, commercial and residential, in a region populated by 2.3 million.¹⁰⁵ However, connection rates increased almost 30 percent last year, compared to 20 percent the year previous.¹⁰⁶

KRECS has recently signed a new lease with GoU. The KRECS lease details connection performance targets. It states that KRECS should connect 25,000 customers by 2022. It also outlines specific yearly goals. These are: 1,500 new connections in 2014; 2,000 in 2015; 2,500 in 2016; 3,000 afterwards until 2021; and 4,000 in 2022.¹⁰⁷ As of August 2015, KRECS has 2,000 active connections.¹⁰⁸ It is therefore behind schedule by at least 1,000 connections.

KIL’s electrification rate has been more accelerated in the short period of its existence. Between 2010 and early 2015, it went from 953 combined residential and commercial connections to 6897 connections.¹⁰⁹ KIL’s service area has a population of 1.2 million, so there is still considerable room for progress.

5.1.2 Quality of service

UMEME’s service quality has seen marked improvements. According to a survey conducted by UMEME, customer satisfaction scores on a scale of one to seven increased from 3.1 to 4.1 between 2011 and 2014. UMEME regarded the increase as resulting from introducing prepaid metering, which allows customers to avoid unexpected bills, as well as mobile and

¹⁰² UMEME, “Results Presentation FY 2013,” available at Slide 3. And UMEME, “Shareholders,” available at <http://www.UMEME.co.ug/news-and-events/company-profile/news/share-price.html>, accessed on September 25, 2015.

¹⁰³ UMEME, “Results Presentation FY 2013,” available at Slide 4.

¹⁰⁴ Electricity Regulation Authority, “West Nile Rural Electrification Company Ltd. 2013 Tariff Review, Public Hearing at Arua Public Primary School,” April 2013, Page 12. Page 20.

¹⁰⁵ Taken from Uganda 2014 Census Data.

¹⁰⁶ Electricity Regulatory Authority, “Electricity Distribution Statistics,” May 18 2015, available at <http://www.era.or.ug/index.php/statistics-tariffs/2013-11-27-16-54-30/distribution-statistics>, accessed on September 17, 2015.

¹⁰⁷ Republic of Uganda, “Lease agreement relating to the supply of electricity services in the central service territory between the government of Uganda represented by the rural electrification board and Kyegegwa Rural Electricity Cooperative Society Limited,” July 27 2015. Appendix E.

¹⁰⁸ Electricity Regulatory Authority, “Electricity Distribution Statistics,” May 18 2015, available at <http://www.era.or.ug/index.php/statistics-tariffs/2013-11-27-16-54-30/distribution-statistics>, accessed on September 17, 2015.

¹⁰⁹ Ibid.

online means of bill payment.¹¹⁰ Furthermore, safety of the network has improved. Fatalities resulting from electricity accidents on the UMEME grid decreased from a peak of 17 in 2008 to zero in 2013.¹¹¹

The quality of service from small concessions varies widely. The first phase of rural electrification featured poor quality of service during the first few years of WENRECo. During a tariff review for WENRECo in 2013, one regulator mentioned that “power fluctuations had been so prevalent. WENRECo was overcharging customers, had weak mechanisms to respond to customer complaints, [and] slow responses to issues relating to internal policies.”¹¹² Others expressed that the “government should review the WENRECo concession so that different players can join the industry just like other parts of the country...to promote efficiency in service delivery.”¹¹³ However, the hydropower plant’s completion has eased cash flow concerns and allowed the concession to focus more on improving service quality.

The second phase of rural electrification has resolved some of the problems of the first. By creating concessions less focused on capital improvement, the operator can focus more resources on customer relations, minor line maintenance, bill rectification, and business development. However, arguably the most important measure of service quality is access to electricity. The timeliness of billing and voltage fluctuations are of little importance if there is no access at all. Given the extremely low levels of rural electrification in these areas, it is clear that there is much room for improvement.

5.1.3 Sustainability

The financial sustainability of rural electrification efforts in Uganda depends on the entity in question. The UMEME concession is in a relatively financially sustainable position. It is openly traded on two African stock exchanges and has achieved profitability in recent years. Connection rates have remained consistent. Most importantly, the concession has stemmed the flow of government subsidies to the electricity distribution sector, and has made sector financially viable by reducing losses, increasing collection and increasing tariffs to a cost-recovery level.

Some of the rural distribution concessions are also financially viable, at least in the short-term. Ferdsult, KIL and WENRECo are currently in a position of cash receipts exceeding cash expenses. However, the pattern of capital subsidies and pre-financed connections continues for these and other concessions. For instance, WENRECo’s plan to electrify 6,000 more homes within two years would not be possible without the donor financing of KfW and the European Union’s Energy Facility Pooling Mechanism.¹¹⁴ The small concessions are partly dependent on Output-based aide (OBA) for connections.

¹¹⁰ UMEME, “Results Presentation FY 2013,” slide 9.

¹¹¹ Ibid, slide 3.

¹¹² Electricity Regulation Authority, “West Nile Rural Electrification Company Ltd. 2013 Tariff Review, Public Hearing at Arua Public Primary School,” April 2013, Page 7.

¹¹³ Ibid, page 9.

¹¹⁴ ESI Africa, “West Nile Rural Electrification Project,” October 8, 2012, available at <http://www.esi-africa.com/west-nile-rural-electrification-project/>, accessed on October 2, 2015.

Other concessionaires don't appear to be in a financially sustainable position. For example, KRECS, despite its achievements, is unlikely to remain operational in the near term without substantial government funding. It currently operates with a monthly negative cash flow of around US\$5,000 before subsidies.¹¹⁵ The prospects for financial sustainability may be higher after it obtains more experience with managing and operating its respective service area.

5.1.4 Efficiency

The approach to rural electrification in Uganda has not been the most efficient. The practice of government-financed grid extensions not operated by UMEME has detrimental effects. First, it reduces the potential benefits of greater economies of scale. Leasing these extensions to new operators means a replication of personnel that would otherwise be unnecessary. Second, the new service areas conceived in the most recent RESP do not logically overlap with the existing UMEME concession. The areas have been drawn to intersect with current lines, meaning that grid expansion will need to be a more centralized process. If the REA hopes to eventually stop its program of capital subsidies for grid extension, this strategy of overlaying areas through UMEME territory hurts prospects for future entrepreneurialism.

5.2 Arrangements that Could Have Delivered Better Results

Ex-post, we see a few changes in rural electrification strategy and implementation that may have delivered better results for improving access to electricity in rural areas.

- First, the concession of the monopoly distribution company could have had a path for the main distribution utility to eventually electrify regions outside of its obligatory service area instead of introducing small service providers. UMEME, the most viable operator in Uganda, could have been encouraged to participate in rural electrification if it saw worthwhile projects.
- Second, once the government decided to finance grid extension directly, it could have sought to have UMEME operate them, rather than leasing them to less viable operators. Such a strategy is more efficient than the current strategy because of the economies of scale in network distribution. This strategy would limit the risk of grid extension to unprofitable areas by treating these extensions separately from grid densification to profitable areas.
- Third, the GoU could have experimented with greater flexibility in the tariff arrangement for unprofitable loads through this financing arrangement with UMEME. The required 20 percent return on all assets guaranteed to UMEME could have been avoided had the government leased lines to UMEME. This would have allowed UMEME to charge a different tariff for subsidized line extensions. Just as the tariff rates for each of the concessionaires differ currently, UMEME's main grid and grid extension tariffs could have differed as well.
- Fourth, given the strategy of decentralizing grid operation, the government could have done more to assess the ambition and capacity of different operators. In conversations with KIL, we learned that they felt slowed down by relying on the REA to build out its grid.¹¹⁶ They seemed desirous and capable of finding funding

¹¹⁵ From Castalia's analysis of KRECS financials.

¹¹⁶ KIL, Interview, September 2015.

for independent grid development. In essence, they wanted greater ownership of their operations. KIL has recently looked at revaluing its equity to allow greater financial flexibility. In contrast, KRECS and other cooperatives (PACMECS and BECS) seemed much more dependent on government involvement. While both cooperatives and privately-owned concessions have offered shares to the market in order to raise funds, KIL seems more likely to pay consistent dividends in the near term. GoU could allocate more risk and potential for return to able concessionaires, allowing for private sector initiative where such exists.

5.3 Reasons for Results

The results of the concessions are explained by the following key factors:

- The GoU was originally overly optimistic in its ability to attract commercial interest in creating concessions for rural electrification. A desire to introduce competition into electricity distribution led to an initially decentralized approach to increasing electricity access
- In many areas, the required cost-reflective tariff to provide a return on the private cost of capital exceeds willingness to pay for significant portions of the country. Therefore, the private sector has largely shied away from taking on overly risky projects
- The low connection rates of publicly-financed rural concessions are in part due to inconsistent capital streams. Although asset replacement costs such as decayed poles are all supposedly covered by the REF, this does not always happen on time.¹¹⁷

5.4 Replicability of Experience and Success

The concession model used in this country has some replicable elements.

- First, the pattern of publicly financed grid extensions leased to operators is a worthwhile strategy for small-scale projects. This is true for countries where a high cost of capital exists and personnel capacity is limited. In such areas it may be necessary for the government to simultaneously expand the network while also increasing private sector participation. In the case of Uganda, ambitious small concessionaires have been able to gain experience through their low-risk operating contracts. Entities such as these provide a larger pool which the GoU can call upon as the power sector continues to grow
- Second, it is clear from UMEME's story that large distribution companies do electrify rural areas within their concessions. Even independent of a coordinated rural electrification effort, UMEME has a large enough concession area to justify grid densification. Large, cash flow-positive distribution companies can perform rural electrification without it squeezing margins as it does for small operators
- Third, OBA assistance from donors helps rural populations overcome the high upfront cost of connecting to the grid. Even if the tariffs are affordable, getting onto the grid can be infeasible without subsidies. Such assistance unlocks a much

¹¹⁷ KRECS, Interview, September 2015.

larger potential customer base for small concessions in especially poor areas. This allows the provider of capital to spread investments over a larger rate base, driving down costs.

5.5 Lessons for Future Concessions

The concession illustrates lessons for governments considering using a concession approach to rural electrification:

- Rural electrification in most places is not a commercially viable business. Subsidies and guarantees from the Government are needed to encourage private sector involvement.
- Implementing a concession for the existing national distribution network can yield positive results. Though it was conceived of as an urban concession area, UMEME has connected around 100,000 customers in rural areas. By comparison the projects focused exclusively on rural electrification have achieved less than 40,000 connections altogether.
- In Uganda, government-financed grid extensions have been leased to new, inexperienced operators and exclude the existing large concessionaire. This need not be the case. The same government-financed grid extensions can be transferred to the existing viable operator. Economies of scale suggest this strategy may be more efficient.
- Concessions should be designed that target commercial loads. While the government may rightfully focus on household electrification, a complementary focus on financial viability is also necessary. Concessions that specifically target large-load customers provide more substantial revenues to concessionaires while also improving the locality's economic situation. Such a strategy improves the long-term viability of rural electrification projects and reduces subsidies necessary to prop up smaller operators.

Appendix A: KRECS: Small Concessionaire Summary

The Kyegegwa Rural Electricity Cooperative Society Ltd. operates a grid extension scheme constructed by the Uganda's Rural Electrification Authority. The scheme takes power from the UMEME-operated grid at Mubende, and extends 105km west serving the town of Kyegegwa (pop. 19,000), and continuing along the main road to the town of Kyenjojo (pop. 23,000). The utility has been in operation since November 2013 and has almost 2,000 customers.

The Chairman of the cooperative previously ran an unlicensed microgrid serving around 100 customers in Kyegegwa. He is also the mayor of the town. The Rural Electrification Agency (REA) persuaded him to help form the cooperative, and to abandon the minigrid, as part of REAs plan to build new distribution lines to serve the area.

KECS main challenges include signing up customers, and replacing transformers when they break or are overloaded—the cooperative relies on REA to do this, but REA often lacks the funds and so can't respond quickly. KRECS itself is not yet financially viable, and is under-capitalized for the role it has taken on. The Board, management, and staff are however very enthusiastic about their work and the contribution they are making.

Formation of the cooperative, background and motivation

Prior to 2013, Kyegegwa and the surrounding districts had no formal electricity supply. Mr. Musa Swaibu Rutangi, a community leader, was running an unlicensed microgrid. He learned that the government was supporting rural electrification, and approached the government seeking assistance for Kyegegwa.

The Rural Electrification Agency (REA) agreed to extend the electricity lines from the UMEME grid into Kyegegwa and Kyenjojo districts, and encouraged the formation of the cooperative with Mr. Rutangi as Chair. The cooperative has a Board of nine, elected by the General Assembly of members.

The cooperative was incorporated in April 2012 under the Cooperatives Act 1992. By 2015, it had 467 paid up members. Members have to subscribe for at least a minimum shareholding in the cooperative. It is not necessary to be a cooperative member to be a customer. Moreover, some members are not yet customers, because the lines have not yet been extended to where they live.

In deciding to promote the formation of a cooperative it seems that the REA did not seriously consider the alternative of licencing the existing microgrid and assisting Mr. Rutangi to expand his own business. REA seems to have believed that (a) unlicensed businesses should not be regularized by being offered licences, and (b) the technology employed in the microgrid was not adequate, and needed to be replaced to offer a robust electricity service.

Figure A.2 shows the KRECS head office, and part of the distribution line.

Figure A.2: KRECS Office and Distribution system in Kyegegwa Town



Source: David Ehrhardt, Castalia LLC

KRECS serves almost 2,000 customers from 108km of low voltage lines. The low voltage lines are fed by 155km of medium voltage line. The medium voltage lines picks up supply from the UMEME operated grid in Mubende. The line was built by REA, and leased by KRECS for UGX\$8 million (US\$2,200) per year.

Table A.1: Key Facts - KRECS

Power source	Grid
Installed capacity (kW)	0
Distribution line length (km)	263
Total paid staff	10
Connections	
Residential	1,944
Non-residential	41
Total	1,985
Consumption per connection	
Residential (kWh/month)	30
Non-residential (kWh/month)	1,500
Tariffs	
Average kWh charge (Residential) c/kWh	525
Average fixed charge (Residential) \$/month	-
Average kWh charge (Other) c/kWh	448
Average fixed charge (Other) \$/month	-
Monthly bills	
Average monthly bill (Residential) (\$/month)	15,747
Average monthly bill (Other) (\$/month)	61,500
Revenue	
From residential customers (\$/month)	30,612,168
From other customers (\$/month)	2,521,500
Total (\$/Month)	33,133,668
Collections	
Billing system (residential)	Prepaid
Billing system (other)	Postpaid
Collection efficiency %	100%
Cash collected (\$/month)	33,133,668
Operating expenses	
Fuel or purchased power (\$/month)	31,832,961
Other fixed operating and maintenance costs (\$/month)	19,546,773
Total operating and maintenance expenses (\$/month)	51,379,734
Cash from operations	(18,246,066)

Notes: (1) Revenue is estimated from figures given by the manager in an interview, and corresponds closely to revenue figures reports in the accounts energy sales in 2014

The average residential customer consumes 30kWh/month, for a monthly bill of UGX\$1,600 (US\$4.30) per month. The tariff is charged on energy at a rate of UGX\$525 per kWh (US\$0.14/kWh). Management's view is that most people in the area can afford this level of bill. They say the real challenge is the connection cost, which is typically UGX\$411,600 (US\$112), and the household wiring, which is typically UGX\$ 200,000 (US\$54). The residential customers signed up so far all had their connection costs fully paid by government and donor-funded subsidy programs. Even so, some customers could not connect because they could not afford household wiring.

Non-residential customers number just 41, or two percent of total customers. However, because they consume on average 1,500kWh per month, they account for 47 percent of revenues. These non-residential customers take three-phase supply, for which they pay a slightly lower per kWh charge. Non-residential customers include maize millers, small hotels, schools and clinics.

Figure A.3: Small Hotel Served by KRECS



Source: David Ehrhardt, Castalia LLC

Operator's responsibilities

Compared to a typical lease or concession operator, KRECS' role is limited. The cooperative makes the community aware of how to apply for an electricity connection, signs up customers, connects them to the network, and manages meter, billing and collections. Metering is largely on a pre-payment system. KRECS also manages simple maintenance jobs such as clearing the line of vegetation. It organizes the community to protect transformers from damage, and engages in a number of community enhancement operations, such as promoting tree planting.

Most other responsibilities are discharged by REA. REA planned and constructed the distribution system. If major maintenance is needed, such as repairing or replacing transformers, KRECS turns to REA to do this. REA purchases the material needed for new connections (such as poles, meters, and the conducting wire) and provides this to KRECS—KRECS is supposed to pay for these materials in installments. REA has trained KRECS in cooperative management. KRECS stated that “65 percent of what has been achieved can be attributed to REA.”

Financials

The first full year of operations for KRECS was 2014. In this year, it served fewer than 2,000 customers. Its audited financial statements for the year show a bottom line profit of UGX\$1.7 million (US\$4,600) on total revenue of UGX\$629 million (US\$172,000). Even this slim profit figure is somewhat misleading. The figure includes profits made on the new residential connections, which were almost 100 percent paid for by the government and GIZ (total revenue of UGX\$202 million, or US\$55,000), and also counts UGX\$38 million (US\$10,000) of donated capital as ‘revenue’.

Table A.2 shows income and expenditure items just related to the sale of power to customers, so far as possible. It is clear that, in its first year of operations at least, KRECS was far from a sustainable business. Of its revenue from power sales of UGX\$395 million (US\$107,856), UGX\$382 million (US\$104,228) went to pay for purchased power. Only three percent of revenue (UGX\$13 million, US\$3,628) remains to cover the costs of the distribution business.

This thin margin on power sold is clearly not enough. The cost of the Board alone was more than two and half times the gross profit generated from power sales. The cost of employing KRECS’ 10 full time staff took up more than five times the gross profit generated.

Table A.2: KRECS Income and Expense from Sale of Power

KRECS Income and Expenditure related to power sales, 2014	UGS	USD	% of Gross Profit
Revenue from power sales	395,293,447	107,856	
Cost of purchased power	381,995,534	104,228	
Gross profit from power sales	13,297,913	3,628	
Staff costs	77,468,000	21,137	583%
Board costs	36,982,900	10,091	278%
Professional expenses	8,800,000	2,401	66%
Operating costs	129,039,374	35,209	970%
Repairs and maintenance	10,854,000	2,962	82%
O&M costs	263,144,274	71,799	1979%
<i>minus</i>			
Connections	6,883,000	1,878	52%
Sub-contracting / line extension	21,700,000	5,921	163%
O&M costs excluding extensions and connections	234,561,274	64,000	1764%
Operating profit (loss) from supply of electricity	(221,263,361)	(60,372)	-1664%

The table presents revenue and expenses from powers sales only—revenue and costs from connections are omitted, as is revenue from membership fees (which is minimal). Capital grants are also not included in revenue. (3) Collection efficiency was given by the general manager as close to

100% due to prepaid meters. (4) KRECS has no generation assets, as it buys power from the grid. It has no distribution assets, as it leases the lines from REA for the nominal annual fee of UGX\$8 million (around US\$2,200 per year).

KRECS and REA point out that the business needs to grow its sales in order to become sustainable. There are signs that sales are indeed growing strongly. However, with operating and maintenance costs totaling almost 20 times the gross profit from power sales, it seems that, at the current margin between its tariffs and the bulk supply tariff, KRECS would have to increase its sales almost twenty-fold to reach financial break-even on a steady state basis. Moreover, this is with KRECS not having made any capital investment, not providing for depreciation, and paying a lease fee that is only nominal.

Cashflow is a problem for KRECS. Its payables exceed its receivables, indicating that the cooperative is operating with negative working capital. On the positive side, customer receivables are low indicating that the pre-pay meter system is working well to ensure payment for power. The largest receivable is from GIZ for payment for connections. The largest payable is to UETCL (the Uganda Electricity Transmission Company Limited, which sells KRECS power). This amount outstanding is equivalent to 4 months of power purchases. The record of bill payments by KRECS to UETCL (helpfully annexed to the accounts) clearly suggests that delaying payments to the bulk supplier is an important cashflow-management technique for the cooperative.

Technical skills

KRECS manager frankly acknowledges that the team lacks some skills. The staff are working hard to acquire these. REA is assisting with training and visits from an experienced cooperative liaison officer. The cooperative does well in running meetings with clear agendas and attendance records.

Technical skills lacking in the first year included: checking on transformers; protecting them from lightening; and keeping lines clear of vegetation. These skill gaps all contributed to service interruptions and maintenance costs that could have been avoided. The cooperative is also not able to analyze the load on its system properly in order to know which transformers are likely to get overloaded.

Impact on the community

Extension of electrification has had a strongly positive impact on the community, especially in the two towns in the service area: Kyegegwa and Kyenjojo. Economic activity has increased. A number of maize mills have opened up, meaning that farmers can get their maize milled and sold locally, instead of having to sell it unmilled for processing in Kampala. These millers are starting to offer contract farming arrangements, with cash advances against future crops that allow farmer to increase production.

Welding shops, hair salons, guest houses, eating and drinking joints, and other small business have opened up or expanded operations, bring increased employment. Battery charging businesses have developed—these provide electricity supply to those still off the grid, by allowing car batteries to be charged and then carried back to the off-grid premises. Jobs have been created as young people learn to become electricians, wiring premises and helping with electrical equipment. Increased economic activity has increased tax revenues for the local council, allowing improvements in municipal services.

Social services have improved. Clinics now provide more treatments in Kyegegwa and Kyenjojo, so people no longer have to travel to the further away town of Mubende. Lighting in schools has allowed the Kyegegwa Junior School to offer classes at night. One school has been able to offer a boarding facility because of the availability of electricity for the boarding accommodation.

Residential customers are pleased with electric lighting, the ability to charge phones, and run fans and televisions, and operate radios without batteries. Previously, most households used kerosene lamps or wax candles for lighting. Electric lighting is not only higher quality, but also safer, and cheaper than the alternatives, according to KRECS.

Sustainability and growth

KRECS' only hope for financial sustainability is to expand sales (and possibly increase tariffs). To expand sales, KRECS needs to invest in larger transformers and additional lines. It must focus on adding commercial customers to its grid. However, KRECS's ability to do these things is severely hampered by the fact that it has no capital of its own to invest. It therefore depends on REA for all capital expenditure. REA itself lacks capital, meaning that vital investments are often delayed.

The most striking example of this phenomenon is KRECS' inability to serve growing demand in Kyegegwa. Rapid growth in the town has resulted in the two transformers that serve the town becoming overloaded. KRECS asked REA to provide larger transformers, and to relocate the existing ones to elsewhere on the network where they could serve additional small loads. At the time of writing, KRECS had been waiting more than 6 months for any definitive response from REA.

In the meantime, KRECS is trying to persuade the large commercial users, such as maize millers, to operate in the off-peak period (from around 11p.m. to 6 a.m). Understandably, the customers are reluctant to do this. The result is low voltage for all customers, with flicker and lights dimming. The overloaded transformers cause additional system losses, increasing costs. Ultimately if the transformers are stressed too far their fuses blow (to protect the transformer) cutting off power all together. The positive dynamic of development from electrification is being strangled by a lack of capital for a couple of new transformers.

KRECS ability to achieve financial sustainability is further challenged by REA's non-commercial approach to network planning. When REA plans investments, it focuses more on serving households than on picking up larger loads that could help with the economic viability of the system. When it constructed the network, REA installed 43 transformers. Many of these transformers serve just a few households, and are thus grossly under-utilized. A more commercial approach to network planning would have seen less invested in serving these households, and more invested in larger transformers for Kyegegwa Town, enabling KRECS to serve a larger commercial load.

Another example of non-commercial planning is the failure to extend the network to pick up a large telecommunications tower just a few kilometers from KRECS' office. These towers currently rely on a diesel generator, to which fuel needs to be regularly trucked. Had the installation been connected to the grid, it would be a significant income generator for KRECS. It would presumably have been possible to get the tower operator to contribute toward the cost of the line (given the significant savings grid supply would offer over diesel). However, REA did not attempt this. Instead, capital is being spent to connect other, smaller

settlements to the grid. KRECS has written to the tower operator to suggest supplying them, but because KRECS has no capital, it will require the operator to pay 100 percent of the cost of the line, which the operator is reluctant to do.

Even to sustain existing service, KRECS is completely dependent on REA, since KRECS has neither the capital or the expertise to carry out major maintenance, for example on transformers. Thus if REA is short of funds in the future, it is likely that the service KRECS can offer will deteriorate.

Contracts and licences

KRECS operates under two key documents: its Licence from the ERA, and its lease contract with REA. The original lease contract signed on 27 August 2013 seems to have been modelled on the UMEME lease. This was replaced on 27 July 2015 with a new contract.

Under the 2015 lease, the allocation of risk to KRECS is closer to what one would expect under a management contract than under a conventional lease. The 2015 lease is not a contract that any sensible commercial operator would sign. In particular, it provides that REA may terminate the contract for convenience, without warning, and without making any termination payment to the operator [7.7]. This clause alone turns the cooperative into the servant of REA, since REA is legally entitled to effectively take the cooperative's business, at any time, and without having to give a reason.

Indeed, REA and the cooperative see the relationship as one in which KRECS is really REA's 'agent'. KRECS gets customers signed up, manages the relationship with them, runs the metering and collection system, and does light maintenance. Real direction and control lie with REA.

Key terms of the Licence and 2015 lease are discussed under the headings below.

Coverage and service standards

The 2015 lease notes that the Rural Electrification Board has 'demarcated the country into 13 service territories' [Preamble] and wishes KRECS to provide electricity service within one of these territories. The service territory, shown in a map in Annex D, is referred to as the Central Service Territory.

The 13 Service Territories were developed by National Rural Electric Cooperative Association (NRECA) under a project financed by the World Bank. While REA is enthusiastic about the service territory concept, other stakeholders are concerned that it has not been properly worked out. Examination of the Service Territory in KRECS 2015 suggests that there are grounds for such concerns.

In particular, although KRECS currently provides services in Kyenjojo district, this District is not part of the service area shown in the map. Nevertheless, the electricity distribution network defined in Appendix C clearly includes lines in Kyenjojo District.

Another oddity is that, while the definition of the Service Territory is given in the lease as 'the area outside UMEME's footprint covering the districts of Mubende and Kyegegwa, as more particularly reflected in the map of the Central Service Territory', the map includes 13 districts in addition to Mubende and Kyegegwa. One of these districts is the capital, Kampala.

The cooperative is to be ‘responsible for the provision of Electricity Services within the entire Service Territory and for the management of the Power System’¹¹⁸ [2.1]. It is obligated to ‘Provide Electricity Services within the entire Service Territory’ [3.1]. However, it is not clear that these stipulations have any real effect. This is because the phrase ‘within the entire service territory’ is ambiguous. This phrase certainly does not obligate service to *all* potential customers in the service territory. If the obligation was just to ‘provide service within the Service Territory’ the letter of the agreement could be complied with if just one customer in the territory was served. The question then is, ‘what does the word ‘entire’ add to the meaning?’ ‘Entire’ seems intended to convey the idea of extensive service provision, but it may not be precise enough to attach any legally enforceable meaning to.

The meaningful obligations of the cooperative, as far as providing access and service are concerned, are:

- To connect 25,000 customers [3.6]
- To carry out annual consumer awareness campaigns [3.7]
- To help operate a revolving fund for connections [3.9]
- To ensure that the distribution network is kept working [3.13 and 3.4]
- To notify REA if there is major damage to the network [3.8]
- To cooperate in a Clean Development Mechanism project developed by the World Bank with REA [3.17].

Connections targets are set out in Appendix E for the period 2014 to 2022. In the first year, 1,500 new connections are to be added, followed by 2,000 in 2015 and 2,500 in 2016. The requirement is then to add 3,000 more each year until 2022. In 2022, 4,000 connections are to be added, to bring the total to 25,000.

If the cooperative can exceed these targets, it will be paid UGX\$20,000 (US\$5.46) for each connection above the target, up to a cap of UGX\$6,637,039 (US\$1,800). It may be that this is intended to be an annual cap, though a literal reading seems to suggest this is the total cumulative amount allowed over the period. Conversely, failure to achieve the connections target will result in penalties of UGX\$5,000 for each connection lacking. If the shortfall rises above a specified level, it is grounds for termination of the lease.

Problems in applying these provisions have already arisen. KRECS argues that the targets must be read to apply a year later than specified in the contract, as REA was late in completing the distribution system. It is clearly not possible for KRECS to meet its 2015 target of 3,500 connections when, in August 2015, it has just under 2,000 customers connected. Connecting more requires REA to provide new lines and additional transformers, which REA has not yet done.

These difficulties will continue in the future, since the contract does not clearly specify REA’s obligations to build new lines, or to provide other capital items on which KREC’s ability to provide service relies. The contract does not make KRECS’ obligations meet

¹¹⁸ Numbers in square brackets refer to Articles in the 2015 Lease

targets contingent on REA providing the lines, nor does it provide a mechanism for adjusting the targets if the lines are not built at the rate that was expected.

Table A.3: Stated Service Standards in KRECS Concession Lease

Target (pulled directly from lease)	Best Practice	Baseline as of June 30, 2015	Target for June 30, 2016
Ratio of damaged & repairable transformer against total installed transformer	2%	16.2%	5%
Percentage of damaged transformers repaired/replaced	98%	50%	90%
Ratio of connected consumers against received applications	90%	90%	95%
Average length of time consumer has to wait to get connected after payment of connection fees – this could be a relevant indicator – lower the better.	10 days	10 days	5 days
Timeliness to attend consumers' complaints	24 hours	24 hours	24 hours

Source: KRECS lease agreement

Tariff setting and subsidies

Tariffs for KRECS are determined by the Electricity Regulation Authority, as established under the 1999 Electricity Act. The basis for establishing tariffs and service standards has consistently focused on the principle of allowing cost recovery for operations as well as investments. In the case of KRECS, the government continues to provide a tariff subsidy as the REA has lagged in necessary investments to scale KRECS's distribution network to a profitable size. Tariff rate changes are a consultative process and the concession is authorized to apply for rate changes if covered costs "have substantively changed since the issuance of the license or approval of the existing tariffs."¹¹⁹

Main challenges and problems

KRECS' Board and management describe their fundamental challenge as being the low income of customers in the area, which limits households' consumption and the tariff they can pay.

¹¹⁹ The Uganda Gazette, "Statutory Instruments Supplement, the electricity (application for permit, license and tariff review) regulations, 2007, available at <http://www.era.or.ug/index.php/2013-12-14-14-58-04/regulations-codes>, accessed on September 24, 2015, page 765.

Further, KRECS has very little capital. The cooperative lacks even working capital to pay operating expenses at times. There is certainly no capital to invest in fixed assets. For this the cooperative relies entirely on REA.

Reliance on REA is itself a major hurdle to growth and sustainability. The Board attributes the successes achieved so far to REA have constructed the lines and provided training. KRECS's reliance on REA for connection materials, transformer replacements, and expansion of the network, has become a significant challenge to growth and sustainability. This is because cashflow problems and other delays at REA mean that KRECS has long periods in which it is not able to repair or replace damaged or overloaded transformers. There are also periods in which it cannot provide new connections because REA has not restocked KRECS' supply of connection materials.

Related to this, customers in areas not served by the grid. Some are even joining the cooperative, expecting to be served. Currently, KRECS is unable to respond to these demands. It wants to diversify into provision of solar home systems, so that it is able to assist customers in regions where grid extension is not anticipated in the near future.

Poor maintenance and construction has also been a problem. It is not clear to what extent the problem lies with REAs designs and construction supervision practices, and to what extent with the cooperatives own lack of skills and experience. Whatever the cause, three of the transformers installed were damaged by thieves stealing the oil and copper out of the transformer between when they were installed and when the system was ready to be energized. Customers who were to have been supplied by those transformers could not be supplied. Other transformers have lacked proper protections. If the baseline figures in the lease are to be believed [Appendix E], a shocking 16 percent of all transformers were damaged in the first 12 to 18 months of operation. Of these, only half were repaired or replaced. Poor vegetation management also caused loss of conductors and poles when branches fell on lines.

Successes and opportunities

KRECS main achievements, of which it is justifiably proud, include:

- Connecting and serving almost 2,000 customers in less than two years
- Contributing significantly to the development of economic activity, employment and improved services, particular in Kyegegwa Town
- Building a community organization with nearly 500 members which is not only running the electricity distribution network, but becoming a force for community development more generally, with additional activities such as a tree nursery and plans to operate a water system
- Acquiring land in Kyegegwa Town on which to build headquarters in the future. This acquisition aims to protect the cooperative from the effects of land-price increases which development, driven by electrification, is already starting to cause.