

LAD CASE STUDY

Building Hydropower Plants in Uganda: Who is the Best Partner?

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Introduction

In May 2011, Ugandan President Yoweri Kaguta Museveni tapped Irene Muloni to head the nation's Ministry of Energy and Minerals Development (MEMD). An engineer by training, Muloni's primary responsibility is to oversee construction of two large-scale hydropower plants (hydropower project), at Karuma (600MW) and Isimba (183 MW). (See Appendix G.) The country has long been plagued by chronic power shortages and the two new facilities would significantly enhance Uganda's generation capacity, thereby allowing for increased economic growth and political stability.

It is now 2013, and Muloni has identified two options for financing and building the hydropower facilities, each with advantages and disadvantages. One option is to build the dams as independent power projects (IPPs), a type of public private partnership (PPP).¹ IPPs are developed, constructed, operated and sometimes owned by private investors and developers, they rely heavily on private finance, and usually include long-term power purchase agreements (PPAs) with a public utility or other entity acting as an off-taker in a country.² Uganda's 250 MW Bujagali Hydropower Plant, commissioned in 2012, is an example of an IPP.

Alternatively, Muloni could secure Chinese financing for the Karuma and Isimba dams. The China Eximbank has offered to provide 85% of the funding for the projects in the form of subsidized loans if the MEMD uses a Chinese engineering, procurement and construction (EPC) contractor for each project. Under this arrangement, the government of Uganda (GoU) would own and operate the dams when completed.

Which option should Muloni choose and why?

Uganda's Economic Challenge

Dubbed "The Pearl of Africa" by Winston Churchill in 1907 for its abundant flora and fauna, Uganda is a landlocked nation located on the East African plateau. The country shares a large portion of Lake Victoria, Africa's largest lake by area, with Kenya and Tanzania. After the long civil wars from 1971 and 1986, Uganda's economy has rebounded, with GDP growing substantially from Shs 6 trillion in 1986 to Shs 74 trillion by 2014. Determined to boost economic growth to double digits,³ Uganda's President Museveni has targeted the nation's weak export sector as the major obstacle to future growth⁴—Uganda had a trade deficit of US\$3.7 billion in 2014⁵—and the cause of the nation's weak currency. Top exports are coffee, raw

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tobacco, tea, fish and cement. With more robust exports, Museveni believes, Uganda would “already be a middle-income country.” To stop the trade “hemorrhage” and attract greater investment, Museveni has called for infrastructure improvements and specifically, increased hydroelectric capacity.⁶

Chronic Power Shortages Have Hamstrung Development

Rich in hydropower resources (with an estimated 2300 MW hydropower potential),⁷ Uganda built its first large hydropower plant in the early 1950s at Nalubaale (Jinja) on the White Nile; with upgrades, Nalubaale generated enough power for domestic and export consumption. However, beginning in 1971, the chaos of civil war disrupted power generation across Uganda, for example, causing Nalubaale’s capacity to fall by more than half, to 60 MW.

Once political stability was restored and Uganda’s economy began to recover, The World Bank funded rehabilitation and upgrade projects that increased Nalubaale’s generation capacity to 180 MW by 1996. The Bank, together with the Norwegian Agency for Development Assistance (NORAD) and the Swedish International Development Agency (SIDA), also financed construction of the 200 MW Kiira hydropower plant; both facilities now serve Jinja, Uganda’s second-largest industrial city.⁸

Uganda’s dependency on hydropower, however, inevitably rendered the power sector vulnerable to unfavorable hydrological conditions. Between 1998 and 2008, the average water level in Lake Victoria, the main reservoir for Nalubaale and Kiira, the country’s two major hydropower plants, dropped by 1.5 meters and in 2005, reached its lowest level since 1951. As a result, Uganda’s total installed generation capacity dropped by 60%.⁹

Poor electricity infrastructure exacerbated the problem. Distribution losses were 40% in 1988 and by 2012 remained an unacceptably high 27%, when a supply crisis led to extensive load shedding. In recent years, Ugandan business enterprises have lost an average of 90 operating days annually due to power outages, and the combined capacity of standby power generators business owners installed amounts to one third of the Uganda Electricity Board’s (UEB) generation capacity.¹⁰

In 2006, the electricity supply deficit ranged between 90 to 210 MW.¹¹ Load-shedding was widespread until 2012 when the 250MW Bujagali hydropower project was commissioned and began generating electricity. Compared to the 60 MW capacity in 1986, Uganda had, by 2015, installed generation capacity of 850 MW and already has a surplus of 100 MW.¹² (See Appendix E.) Power load-shedding has been eliminated, though outages still occur periodically due to transmission and distribution network maintenance.¹³ However, with demand for electricity growing at an annual rate of 10-12%, Uganda must continually expand generation capacity¹⁴ yet it lags behind its own goal of increasing annual per capita consumption from 75 Kwh/Capita (2010) to 674 Kwh/Capita (2015). (See Appendices F and K.) That means adding an additional 3500 MW generation capacity.¹⁵

The Ministry of Energy and Minerals Development (MEMD) drafted short, medium and long term goals in 2006 to remedy the power supply shortfall. To mitigate the impact of the immediate power crisis, the MEMD relied on short-term expediciencies such as thermal generation and improved demand side efficiency. Included in the medium-term plan were construction of

the 250MW Bujagali hydropower project as well as smaller plants throughout the country. The longer-term solution is construction of more large-scale hydropower plants,¹⁶ including fast-tracking the Karuma (600MW) and Isimba (183MW) projects.¹⁷

Uganda's Power Sector Reform

While political and hydrological instability seriously affected Uganda's power generation capacity, the poor management and performance of the Uganda Electricity Board (UEB), the country's vertically integrated utility, has exacerbated the power supply crisis. Financially disabled and highly dependent on government assistance, the UEB has been unable to finance investments or upgrade existing plants.¹⁸

With passage of the 1999 Electricity Act, Uganda launched a power sector reform initiative. In addition to improving capacity and overall performance, the reform prioritized increased private sector investment. The National Energy Policy of 2002 underscored this goal.

To "enhance operating efficiency and attract private sector investment into the industry," the formerly state-owned UEB was unbundled and corporatized.¹⁹ (See Appendix D.) This process took six years starting in 1999, and resulted in the creation of three parastatals. The Uganda Electricity Generation Company Ltd. (UEGCL) is responsible for power generation. The Uganda Electricity Transmission Company Ltd. (UETCL) is responsible for transmission, and the Uganda Electricity Distribution Company Ltd. (UEDCL) for distribution. Minister Muloni, who holds an MBA as well as an engineering degree, was the managing director of UEDCL from 2002 until 2011 when President Museveni tapped her to run MEMD.

UEGCL retained the ownership of state assets—the Kiira and Nalubaale hydropower stations—but in 2003, operation and maintenance (O&M) of the plants was outsourced under a 20-year concession agreement through international competitive bidding to Eskom Uganda Ltd., a company owned by the South Africa electricity utility enterprise Eskom Holdings. Similarly, the GoU, through UEDCL, owns Uganda's electricity distribution assets but O&M was handed over to another private company, Umeme Ltd. in 2005. The GoU retains a presence only through the UETCL, which owns and operates the transmission grid. In Uganda's single-buyer model, the UETCL serves as the sole off-taker of all power generated.²⁰ Besides the extensive unbundling and corporatization, an independent Electricity Regulator Authority (ERA) was founded to serve as the regulator consistent with reform principles laid out by the World Bank.²¹

The 1999 and 2002 legislation also gave MEMD a primary role in expanding generation capacity. Whether directly or through parastatals (e.g. UEGCL), the MEMD remains in charge of procuring public and emergency projects.²²

The Bujagali Hydropower Project as a Cautionary Tale

The World Bank had prioritized construction of the Bujagali hydropower facility over the Karuma project, which was first proposed in 1995. After passage of the 1999 Ugandan power sector reform, the MEMD took the lead in funding Bujagali, and in 2001, awarded the construction contract to the US-based AES Corp. However, corruption allegations in 2002 seriously delayed the project which resumed only in 2005 under the supervision of the World Bank and the European Investment Bank.

Before Bujagali began operation in 2012, Uganda had no choice but to rely on costly alternatives—thermal power as well as oil and diesel-powered generators—to meet demand. These measures financially burdened UETCL, the single buyer. Compounding that burden was a sharp 25% depreciation of the Uganda shilling against the US dollar in 2011, declining World Bank funding for thermal-based power generation, and a low end-user tariff that remained unsustainable until 2012. Moreover, along with paying large subsidies to UETCL, the GoU in 2005, unable to supply Umeme Ltd. with the agreed electricity supply, had to compensate the contractor with funds from federal coffers. By contrast, the publicly funded Kiira hydropower plant, commissioned in 2003, was completed without these complications and delays.

The problems with Bujagali did not end with its completion in 2012. Delay and inflation caused the dam's cost to soar from US\$460 million to US\$862 million. Instead of the estimated US\$ 6 cents per kilowatt hour, power from Bujagali now sells for US\$ 11.51 cents per kilowatt hour, much higher than the US\$1.12 per kilowatt hour for power from the state-owned Kiira and Nalubaale dams. As a result, President Museveni concluded it was a “mistake” to have accepted the PPA with the IPPs developing the Bujagali. Participation from private investors, he believed, incurred “a hidden cost” because they naturally seek high return, transforming the cost of international finance into a form of high tariffs. At one point, Museveni considered using oil industry revenue to buy back the ownership of the Bujagali dam in order to cut the cost of power.

The Karuma and Isimba HPPs

Karuma began in the late 1990s as an IPP led by Norway's Norpak Ltd., but Norpak withdrew from the project in 2008 when it failed to find sufficient funds to move beyond the feasibility stage. The GoU resumed the project in 2010 and hired an Indian firm, Energy Infratech, to conduct new feasibility studies. Infratech redesigned the power plant, increasing capacity from 250MW to 750MW although the project has since been scaled back to 600MW.²³

The feasibility study for the Isimba facility was conducted by joint venture partners Fichtner and Norplan in 2010. Located downstream of the 250 MW Bujagali hydropower project, the Isimba hydropower project was initially designed to have a generation capacity of at least 100 MW but was later upscaled to 183 MW.²⁴

The 1999 power sector reform envisioned that new generation capacity would be mainly financed as IPPs through competitive bidding by the private investors and developers.²⁵ Uganda seems to have been doing well in this regard; by 2012, ten IPP projects had been completed,

adding a combined installed capacity of 389 MW to the grid, representing 51% of Uganda's total installed capacity.²⁶ (See Appendix E.) The 250 MW Bujagali dam is so far the most significant IPP project in Uganda. However, that painful experience has caused GoU officials, including Minister Muloni, to question whether IPPs should be the vehicle for the Karuma and Isimba hydropower projects, with concerns that this model is too expensive and time-consuming.

The Chinese Alternative or the IPP Model?

At first glance, working with the Chinese seems to carry clear advantages over the IPPs.²⁷ Instead of the twelve years it took to build Bujagali, the Chinese estimate of six years to build both Karuma and Isimba looks particularly attractive. Financing and construction would certainly be much quicker and more efficient. (See Appendix C)

Compared with the direct public procurement based on an engineering and construction procurement (EPC) contract, the IPP model relying on international competitive bidding (ICB) is more complex and time-consuming involving bidding and negotiation with multiple investors, often generating high transaction costs and delay. Compliance with judicial and regulatory restrictions at multiple jurisdictions can cause further delay, particularly when allegations of corruption or the violation of laws surface. Compliance with international environmental protection requirements and social responsibility guidelines can also slow the project and add cost.²⁸ A government-led public procurement that awards the EPC contract to a Chinese company seems likely to avoid the problems imbedded in the IPP model.

More importantly, the Chinese offers attractive financial assistance. "Our biggest advantage is that we have the money," said a Sinohydro staff member. "Competition in the market is fierce, and nowadays contractors not only have to be technically competent, but also be able to bring the money to the project."²⁹

Chinese loans generally have a much larger "ticket size" than the maximum amount international financial institutions can offer, as well as a lower interest rate.³⁰ For the proposed Karuma and Isimba projects, China Eximbank alone can loan 85% of the total project cost, saving Minister Muloni the time and hassle involved in coordinating multiple financiers. (See Appendices A & B.)

Importantly, a loan from China Eximbank has no strings attached, meaning the Chinese are unlikely to interfere with Ugandan politics or internal affairs. In 2014, by contrast, the World Bank postponed a loan of US\$ 90 million, aimed at boosting health services, after Uganda passed anti-gay legislation.³¹ A President Museveni lashed out, insisting, "...you can't impose middle class values on a pre-industrial society. How can you make peasants have middle class values? They are peasants. Many of them are pre-capitalists. How can you make them have values such as liberalism?" The Chinese, Museveni noted, "are more practical."³²

At the same time, the China Eximbank loan carries some uncertainties. Muloni takes some risk regarding the project's quality. Chinese contractors would be hired only as builders of a turnkey project, with no ongoing role as the dams' owner or operator. The structure of this working relationship would possibly encourage shoddy work, as the contractors would be motivated to reduce cost. Even in cost-plus contracting, quality can be compromised since every penny saved becomes profit. Muloni's background and training notwithstanding, most of the MEMD staff

does not have the technical knowhow to effectively supervise the projects. Muloni could hire third-party consultants or supervisors but the information asymmetry problem will remain.

There are financial risks as well. Because the bank requires the GoU to fund 15% of the project costs, the government will have to draw on a consolidated fund it has accumulated since 2007 for developing generation capacity.³³ Moreover, as with other projects, the government will likely have to advance that payment to begin construction before China Eximbank approves its loan.³⁴ That approval may be delayed; for example, the Chinese completed a feasibility study for the Imboulou Dam in the Republic of Congo in 1992 but did not release funding until 2003.³⁵

In addition, the GoU will have to repay the Chinese loan through tariffs. The loan repayment also requires a separate government sovereign guarantee.³⁶ President Museveni is optimistic that the loan would not carry future risk of default because investments in hydropower can boost economic growth and investment, thereby generating more tax revenue for repayment.³⁷

But concern over Uganda's solvency remains. First, China Eximbank requires that 45% of the loan for the Karuma facility will take the form of an export buyer's credit with a floating interest rate—an annual rate equal to the London Interbank Offered Rate (LIBOR) plus 3.5 percent. (See Appendix A.) This means that the loan interest might increase substantially over time in unfavorable market situations. Also, repayment of the Karuma and Isimba loans will overlap with the repayment of the proposed \$3.2 billion Standard Gauge Railway loan from the China Eximbank, still in negotiation.³⁸ As a result, Uganda's public debt, already at 34% of GDP, will increase as the GoU borrows for other planned infrastructure projects.³⁹

Finally, China's willingness to offer the loan seems to be predicated on Uganda's oil reserve.⁴⁰ But oil production has been delayed due to disputes with the three current Ugandan operators over taxes, refining and export.⁴¹ Given the oil market's volatility, this is not a solid guarantee.⁴² Indeed, a joint report from the World Bank and Uganda's Ministry of Finance Planning and Economic Development warned of the "Ghana trap"—as global oil price fell dramatically in 2012, Ghana suffered from insolvency and its economy slowed sharply. "The government may be tempted to spend in advance some of its future oil revenue through substantial borrowing on the financial markets. This may generate short-term benefits through growth of private consumption but would have negative long-term consequences as savings are sacrificed."⁴³

The IPP model addresses some of the risks inherent in working with the Chinese. For instance, the contracting process will likely be more transparent with greater adherence to regulatory and environmental standards.

Moreover, since the private developers and investors not only finance and construct the hydropower plants but also own and/or operate the completed dams, investors have stronger incentives than the Chinese to maintain quality standards.⁴⁴ Private investors would recoup their investment by selling electricity the new dams generate to Uganda and since they will own what they build and have negotiated a price for power generated in advance, shoddy construction and poor or unreliable management means higher costs and lower profits. For example, the contract to build the Bujagali dam was a build-own-operate-transfer (BOOT) agreement where the risks are borne by private investors and developers.

Other Issues Minister Muloni Should Consider

China's History in Africa

Chinese companies are relative late-comers to African investment, but have actively forged diplomatic relationships with several nations on the continent in order to project their economic influence. As a result, any failure of Chinese-funded projects would deal a heavy blow to the positive profile China has taken pains to create.

China and Uganda established diplomatic relations in 1962. The Chinese government has concentrated its Ugandan investments in infrastructure development including roads, hospitals, railways, electricity and communication. In 2007, China wrote off a debt of US\$30 million—usually debt cancellation would be approved only when the principal had been fully paid back.⁴⁵

Chinese State-Owned Enterprises

Nominally owned by the state, China's SOEs, and their subsidiaries, enjoy a high degree of independence from government control. Largely profit-oriented, the goals of those SOEs sometimes may run counter to state objectives, and Chinese SOEs leaders usually have higher administrative ranks than those at the government agencies that supervise them. Yet, according to a Sinohydro employee, SOEs must still defer to officials at the Ministry of Commerce and at the Economic and Commercial Counsellor's Office at Chinese embassies, under the leadership of the Ministry of Foreign Affairs. (See Appendix H.) Although SOEs have become increasingly market oriented and seek maximum profit, they remain under Party control. For instance, central government ministries arbitrate and have final authority over disputes among SOEs, and all the large SOEs maintain offices in Beijing in order to lobby relevant ministry and central government officials.

To make up for their late entrance into the African market, some Chinese state-owned enterprises have tried to build market share by every possible means, including underbidding their competitors. SOE leaders apparently calculated that losing money on early projects would help them in the long run to gain business, build their reputation and realize profits. With reputation-building in mind, it is not in the company's interest to do shoddy work.⁴⁶ However, whether all Chinese SOEs think alike in seeking long-term profits is another question. A midlevel manager at China International Water and Electric (CWE) told a journalist that the current strategy of many Chinese SOEs in hydropower construction is to win the project first at any cost and then try to skim off profits by outsourcing parts of the contract. "We all know that there is no way to do it (with such a low price)."⁴⁷ The logic seems to work in this way: we first take away our profit and let the next downstream producer, who is held accountable by legal contract, figure out how to do it.⁴⁸

Moreover, the Chinese government has intervened on occasion to fix problems. A case in point: In 1996, the Uganda Electricity Board terminated a contract with China Sichuan International Co-operation Co Ltd (Sietco) to extend the Owen Falls Dam. Sietco was lagging behind the construction timelines and suffering financial difficulties.⁴⁹ On April 3, 1997, the Supreme Court of Uganda ruled that Sietco should reimburse the government US\$ 1.23 million plus 12% interest and legal fees. Sietco turned to the Chinese central government for help. To mitigate the

negative impact of this failed project on China's image, the Chinese State Council extended Sietco a China Eximbank loan of US\$ 10 million.⁵⁰

At the same time, reforms of Chinese SOEs during the 1990s that made those public enterprises more market oriented and price sensitive triggered, in the view of some, "a race to the bottom." A 2016 report by the China Academy of Social Science, *Yellow Book of Africa: Chinese Enterprises' Performance in Africa: Achievements, Challenges and the Way Out*, notes that Chinese companies were engaged in "vicious competition."⁵¹ (See Appendix J.)

For example, CPNC and Sinopec, China's two national oil companies, have long competed for projects in Sudan's oil fields. In a public bidding to build a 1380km oil pipeline, Sinopec surprisingly underbid its Chinese counterpart CNPC by US\$ 60 million to win the project.⁵² Similarly, when Chinese Premier Li Keqiang visited Uganda in May 2014 to attend the signing ceremony for the Uganda-Kenya Railway, the two Chinese SOEs competing for this project were still sniping at each other on local media.⁵³ The US\$ 8 billion (Shs 20.8 trillion) railway will connect Uganda to Kenya, Sudan and Rwanda. In January 2012, China Civil Engineering Construction Corporation (CCECC) signed a contract with Uganda Ministry of Works and Transport (MWT) to build the railway for US\$ 1.75 billion. But shortly afterward the MWT switched to another Chinese SOE, China Harbour Engineering Company Limited (CHECL), which offered to build the line at US\$ 1.25 billion. In July 2014, CCECC sued the MWT to win back the project.⁵⁴

Ensuring Quality Construction

This heated competition generates concerns about project supervision. The fact that Uganda by itself is not technically capable of building its own hydropower plants indicates that the MEMD may also lack the ability to effectively supervise construction. MEMD or the UEGCL, the official owner of the nation's hydropower facilities following Uganda's power sector reforms, could hire third-party consultants to supervise the dam projects. But as noted above, outsourcing supervision does not solve the information asymmetry problem: How can the Ministry or UEGCL ensure that the consultants effectively supervise the project? A possible solution would be to hire multiple consultants but that might cause confusion and raise further concerns. For example, how many consultants would be sufficient to ensure quality construction? Who would have the final say if conflicting opinions arose among those consultants? And, of course, hiring more than one consultant will raise the projects' cost. Ideally, UEGCL should be the chief supervisor of the Karuma and Isimba projects with responsibility to oversee the construction of the dams, because as the ultimate owner it has direct stake in their quality construction.

Minister Muloni theoretically has the authority to charge the UEGCL with supervisory responsibility, but she might need to justify her move to defuse any dissent. At the same time, relinquishing her ministry's authority to oversee key public procurement projects to a subordinate parastatal may be politically controversial and unwise. Potential rent seekers in the Ministry would strongly oppose Muloni.⁵⁵

Safeguarding Uganda's Environment

In 2007, the World Bank and the GoU signed an agreement as part of the Bujagali Hydropower Project that protects the Kalagala Falls ecosystem. The Bank and other stakeholders have renewed concerns about the negative impact of the proposed Isimba project on that site.⁵⁶ The

Isimba dam would create long sections of flat water, worrying environmentalists as well as those who earn their living from ecotourism. The Karuma project has generated more concern over compensation for displaced local residents than environmental issues.

The Ugandan government obviously believes that construction of the dam is worth the tradeoff. “Uganda doesn’t have enough energy to drive its economic development programs,” MEMD spokesman Bukenya Motovo said, adding that while rafting and kayaking are available at other sites, only a limited number of locations are suitable for hydropower dams. Moreover, Motovo argues that the revenue generated by tourism cannot compete with the economic benefit brought by the hydropower plant.⁵⁷ While some have suggested that the compromise could be a dam of smaller scale, a smaller facility would not be economically viable given the burden of foreign loans.⁵⁸

In addition, the fact that China achieved its own rapid economic growth in the past four decades at a huge environmental cost has given rise to widespread concern over the destructive environmental practices of Chinese companies abroad. Yet in international settings, the Chinese have behaved more in line with international standards. Since 2007, the China Eximbank has required an environmental impact assessment (EIA) and reserves the right to withhold loans and require early repayment if borrowers do not properly address environmental and social issues. For example, the Eximbank’s refusal to finance Gabon’s Belinga Dam may be due to the bank’s environmental concerns.⁵⁹

Moreover, environmental opposition to hydropower projects may be inevitable, no matter if a Western or Chinese company builds the facility. Environmentalists tried resolutely, but ultimately unsuccessfully, to derail the Bujagali project.⁶⁰ Nevertheless, if the Ugandan government chooses the Chinese builders, it must effectively minimize damage from the dam projects and force the contractors to meet environmental standards.

Conclusion

Minister Muloni must select the most reliable and capable partner to build the Karuma and Isimba hydropower plants. GoU officials seem to hold an unstated belief that the IPP model is needlessly costly and time-consuming, the Bujagali hydropower project experience being the best evidence. The Chinese alternative looks attractive in several aspects: The Chinese government, through the China Eximbank, will provide necessary financing at a lower interest rate than other potential lenders and could save the Ministry time and energy dealing with multiple financiers.

On the other hand, there is concern about whether Ministry staff effectively supervises the Chinese contractors. Third party consultants could serve as proxies of the Ministry in this regard, but effective supervision through outside consultants depends on how well Minister Muloni could coordinate and incentivize relevant actors within the Ministry and the power sector to avoid corruption and destructive turf wars. Finally, choosing the Chinese means accepting uncertain timing of the Eximbank loan release, the government’s capacity to repay the loan, and concerns about environmental protection.

How should Irene Muloni finance and build the Karuma and Isimba dams?

NOTES:

¹ “What are Public Private Partnerships?” <http://ppp.worldbank.org/public-private-partnership/overview/what-are-public-private-partnerships>.

² Anton Eberhard, Katharine Gratwick, Elvira Morella, and Pedro Antmann, *Independent Power Projects in Sub-Saharan Africa: Lessons from Five Key Countries* (Washington DC: International Bank for Reconstruction and Development/The World Bank, 2016), Executive Summary xxiii.

³ James Kynge, “Uganda turns east: Chinese money will build infrastructure says Museveni,” *Financial Times*, Oct. 21, 2014,

<https://next.ft.com/content/ab12d8da-5936-11e4-9546-00144feab7de#axzz48ytgPUc3>.

⁴ “Uganda State of the nation address: Museveni calls for more expo,” Jan. 5, 2016, <http://www.busiweek.com/index1.php%3FCtp%3D2%26pI%3D5228%26pLv%3D3%26srI%3D79%26spI%3D454>

⁵ http://atlas.media.mit.edu/en/profile/country/uga/#Trade_Balance.

⁶ “Uganda State of the nation address.”

⁷ Ministry of Commerce of the People’s Republic of China, “Wuganda shuidian fazhan qingkuang” (The situation of Uganda’s hydropower development), 22 August 2008,

<http://www.mofcom.gov.cn/aarticle/i/dxfw/gzgd/200808/20080805739185.html>.

⁸ The project had five 40 MW units, with the first two units being commissioned in 2001, the third in 2002 and the last two in 2007. Kapika and Eberhard, *Power-Sector Reform and Regulation in Africa*, 90.

⁹ Kapika and Eberhard, *Power-Sector Reform and Regulation in Africa*, 85.

¹⁰ Kapika and Eberhard, *Power-Sector Reform and Regulation in Africa*, 91.

¹¹ Eberhard et al., *Independent Power Projects in Sub-Saharan Africa*, 231.

¹² “Uganda State of the nation address.”

¹³ Julius Businge, “Uganda: Leading Uganda’s Power Generation Efforts,” Feb. 8, 2015,

<http://allafrica.com/stories/201502090046.html>.

¹⁴ Emma Onyango, “Uganda to increase power generation,” Feb. 3, 2014,

<http://www.busiweek.com/index1.php?Ctp=2&pI=470&pLv=3&srI=53&spI=20&cI=11>.

¹⁵ John Odyek, “Cost of electricity to go down,” Nov. 9,

2015, http://www.newvision.co.ug/new_vision/news/1411453/cost-electricity.

¹⁶ Other large hydropower projects in addition to Karuma and Isimba planned for the near future include the 650MW Ayago hydropower project, Koriang, Kiba and Ayago South. When completed, these dams are expected to add a combined generation capacity of about 2000MW. “Increase of electricity fosters economic growth,” Oct. 10, 2013, http://www.newvision.co.ug/new_vision/news/1333422/increase-electricity-fosters-economic-growth#sthash.kSZKxEC3.dpuf.

¹⁷ Once Karuma and Isimba become operational, the existing Nalubaale plant is to be gradually phased out due to high cost and risk in maintenance as the plant's equipment has become obsolete. Businge, “Uganda: Leading Uganda’s Power Generation Efforts.”

¹⁸ The UEB was crippled by its financial difficulties. Electricity tariffs rose to 7.3 US¢/kWh in 1993 from “unrealistically” low past levels, but that change was offset drops in an already poor collection rate, from 58% in 1997 to 50% in 1998 as result of the GoU’s failure to pay its own electricity bills. Adding to UEB’s financial burden was the fact that the size of the staff increased by over 50% from 1991 to 1993. Kapika and Eberhard, 90-91.

¹⁹ Uganda Electricity Regulatory Authority, *Strategic Plan 2014/15 - 2023/24*, p. 1.

²⁰ Eberhard et al., *Independent Power Projects in Sub-Saharan Africa*, 86-93, 227-264.

²¹ Section 11 of the 1999 Electricity Act states that the ERA’s major responsibilities include licensing and establishing tariffs and technical standards. Two other administrative units of the power sector spun out of the reform are the Rural Electrification Agency, charged with managing the Rural Electrification Fund established mainly for rural electricity expansion, and the Electricity Disputes Tribunal, where “ERA decisions can be appealed, and disputes arising in the sector are adjudicated.” Kapika and Eberhard, *Power-Sector Reform and Regulation in Africa*.

²² Concerns have surfaced over whether MEMD’s leading role in the public procurement of the Karuma and Isimba hydropower plants is inappropriate and has become “a challenge for the integrity of sector structures.” Critics charge that the 1999 Electricity Act did not clearly empower the Ugandan government to play a direct role in procuring power generation projects. On the other hand, as a World Bank report observed, based on the design of the 1999 reform, the ERA oversees power projects using the IPP model, and parastatals such as the UEGCL and UETCL are

supposed to take the lead in public EPC procurement. Citing Sections 30 and 34 of the 1999 Electricity Act, the report argues that the MEMD, as a government ministry, is not qualified to hold a permit or license to carry out public procurement. See Eberhard et al., *Independent Power Projects in Sub-Saharan Africa*, 227-264.

²³ Betty Obbo, "Uganda's Dams Leave Affected People Behind," *World Rivers Review*, Vol.28/No.3, Sept. 2013, http://www.internationalrivers.org/files/attached-files/wrr_sept_2013_6.pdf, p11; Eberhard et al., *Independent Power Projects in Sub-Saharan Africa*, 231, 251-253.

²⁴ "Norplan consortium signs contract for the Isimba hydro power project in Uganda," Norplan official website, Mar. 3, 2010, <http://norplan.com/norplan-consortium-signs-contract-for-the-isimba-hydro-power-project-in-uganda/>.

²⁵ Kapika and Eberhard, *Power-Sector Reform and Regulation in Africa*, 92.

²⁶ Kapika and Eberhard, *Power-Sector Reform and Regulation in Africa*, 94.

²⁷ Supporters of the IPP model, however, argue that the Bujagali problems were not caused by the ICB but rather by the Ugandan government's failure to follow the standard procedures. Eberhard et al., *Independent Power Projects in Sub-Saharan Africa*, 73.

²⁸ Eberhard et al., *Independent Power Projects in Sub-Saharan Africa*, 258.

²⁹ Interview with Sinohydro staff.

³⁰ Eberhard et al., *Independent Power Projects in Sub-Saharan Africa*, 251-253.

³¹ BBC, "World Bank postpones \$90m Uganda loan over anti-gay law," Feb. 28, 2014, <http://www.bbc.com/news/world-africa-26378230>.

³² James Kyngye, "Uganda turns east: Chinese money will build infrastructure says Museveni."

³³ Eberhard et al., *Independent Power Projects in Sub-Saharan Africa*, 25-26.

³⁴ Jyhjong Hwang, Deborah Brautigam and Nancy Wang, "Chinese Engagement in Hydropower Infrastructure in Sub-Saharan Africa," SAIS China Africa Research Initiative Working Paper Series, Dec. 2015; Deborah Brautigam, Jyhjong Hwang and Lu Wang, "Chinese-Financed Hydropower Projects in Sub-Saharan Africa," The SAIS China Africa Research Initiative Policy Brief, No.08/2015.

³⁵ Hwang, Brautigam and Wang, "Chinese Engagement in Hydropower Infrastructure in Sub-Saharan Africa."

³⁶ Eberhard et al., *Independent Power Projects in Sub-Saharan Africa*, 253.

³⁷ Mark Keith Muhumuza, "Debt: Has Uganda mortgaged its oil with increased borrowing?" June 28, 2016, *Daily Monitor*, <http://www.monitor.co.ug/Business/Prosper/Debt-Uganda-mortgaged-oil-increased-borrowing/-/688616/3270086/-/11hrw5s/-/index.html>.

³⁸ According to Kasingye Kyamugambi, the project coordinator of SGR in Uganda, a loan agreement with China Eximbank is likely to be reached by October 2016. The rail line will be constructed by China Harbour Engineering Company Limited (CHEC). The Malaba-Kampala section will connect to Rwanda through the Mirama hills. The line will also connect to the DRC through the Kasese and Arua districts. The estimated cost of the Uganda line was initially set at US\$8 billion dollars but a later parliamentary committee investigation brought the amount down to US\$3.2 billion. Now the estimated completion date for the Malaba-Kampala section is around 2020. It is reported that the Chinese government is concerned about Uganda's ability to pay back the loan. Alon Mwesigwa, "Uganda: Govt to Complete Signing of Railway Loan in October," June 29, 2016, <http://allafrica.com/stories/201606290730.html>; Dicta Asiimwe, "China Exim sets terms for financing Uganda's standard gauge railway," May 28, 2016, <http://www.theeastafrican.co.ke/business/China-Exim-sets-terms-for-financing-Uganda-SGR/2560-3223214-esac0v/index.html>.

³⁹ Muhumuza, "Debt: Has Uganda mortgaged its oil with increased borrowing?"

⁴⁰ Uganda's oil reserve is estimated to be over 2.5 billion barrels. Ministry of Commerce of the People's Republic of China, "Wuganda shiyou chuliang chaoguo 25 yi tong" (Uganda's oil reserve exceeds 2.5 billion barrels), 24 November 2011, <http://www.mofcom.gov.cn/aarticle/i/jyj/k/201111/20111107845120.html>.

⁴¹ <http://blogs.wsj.com/frontiers/2015/02/24/uganda-offers-oil-blocks-ending-nine-year-licensing-freeze/>

⁴² Muhumuza, "Debt: Has Uganda mortgaged its oil with increased borrowing?"

⁴³ Muhumuza, "Debt: Has Uganda mortgaged its oil with increased borrowing?"

⁴⁴ Other PPA models used in IPP based projects are BOO (build-own-operate) and BOT (build-operate-transfer).

Rachael Nsaira, Benon C. Basheka and Pross. N. Oluka, "Public Private Partnership (PPPs) and Enhanced Service Delivery in Uganda: Implications from the Energy Sector," *International Journal of Business Administration*, Vol. 4 No. 3, 2013, 48-60.

⁴⁵ Interview with Sinohydro staff.

⁴⁶ Interview with Sinohydro staff.

⁴⁷ Hu Jianlong, "Zhongguo qiye zai feizhou da da chu shou", 15 September 2014

⁴⁸ Sinohydro employees noted in the interview that one major difference between CWE and Sinohydro is that the latter has real construction capacity while the former does not. That might explain why after securing the Isimba contract CWE subcontracted the construction work to Sinohydro. (See Appendix B)

⁴⁹ Ivan Okuda, “Uganda: Energy Officials Ignore Warning On Karuma,” April 2, 2016, <http://www.theeastafrican.co.ke/news/Uganda-energy-officials-trade-blame-over-Karuma-Isimba-dams/-/2558/3152542/-/1nt98hz/-/index.html>; Wang Xinjun, “Dongfei zuida shuidian gongcheng zhangxian zhongguo qiye jianshe shili he shehui zeren” (The largest hydropower project in Eastern Africa showcasing Chinese enterprises’ construction capability and social responsibility), China Radio International, June 29, 2015, <http://gb.cri.cn/42071/2015/06/29/5311s5012036.htm>.

⁵⁰ “Fu shengzhang Li Dachang de luoma yiyun” (Mysterious downfall of the deputy provincial governor Li Dachang), Jan. 27, 2005, <http://politics.people.com.cn/GB/8198/41975/41982/3149755.html>.

⁵¹ <http://news.sina.com.cn/c/nd/2016-08-23/doc-ixvcsrn9001213.shtml>.

⁵² “Liang da shiyou jutou haiwai da xiang zaoyu zhan, jing xiang yajia liang bai ju shang” (The two oil magnates clashing head-on abroad amid internecine underbidding), June 28, 2004, http://www.chinadaily.com.cn/gb/doc/2004-06/28/content_343378.htm.

⁵³ Hu Jianlong, “Zhongguo qiye zai feizhou da da chu shou.”

⁵⁴ Hu Jianlong, “Zhongguo qiye zai feizhou da da chu shou.”

⁵⁵ Interview with The Independent reporter Haggai.

⁵⁶ The World Bank, “Bujagali Indemnity Agreement with the Government of Ugandan and the Proposed Isimba Hydropower Project - Fact Sheet,” July 15, 2015, <http://www.worldbank.org/en/country/uganda/brief/bujagali-indemnity-agreement-with-the-government-of-uganda-and-the-proposed-isimba-hydropower-project-fact-sheet>.

⁵⁷ Kimberly Adams, “Ecotourism or hydroelectricity in Uganda?” May 5, 2015, <http://www.dw.com/en/ecotourism-or-hydroelectricity-in-uganda/a-18427271>.

⁵⁸ Nelson Wesonga, “Uganda: Will World Bank Concerns On Isimba Be Addressed?” Sept. 1, 2015, <http://allafrica.com/stories/201509010666.html>.

⁵⁹ Hwang, Brautigam and Wang, “Chinese Engagement in Hydropower Infrastructure in Sub-Saharan Africa.”

⁶⁰ The World Bank approved funding for the Bujagali project dam over the objections of the National Association of Professional Environmentalists, the Save Bujagali Crusade and other organizations, despite corruption allegations. Kapika and Eberhard, *Power-Sector Reform and Regulation in Africa*, 94-95.

Appendix A - Karuma HPP Data

General Information

Location	At the Karuma Falls along the Nile river in the Districts of Kiryadongo and Oyam 15 km downstream
Project Type	Public Investment
Capacity	600 Megawatt
Estimated Cost	US\$1.7 Billion
Engineering, Procurement and Construction (EPC) Contractor	Sinohydro
Expected Commission Date	2019
Project Timeline	EPC Contract was awarded in August 2013. Preliminary works started in September 2013. Uganda Parliament approved the loan of \$1.435 billion from China Eximbank in March 2015.

Funding

Export-Import Bank of China	85% of total cost
Government of Uganda	15% of total cost
Loan Terms	<p>45% of the loan:</p> <ul style="list-style-type: none"> • In the form of an export buyers' credit at an annual interest rate equal to the London Interbank Offered Rate (LIBOR) plus 3.5 percent, with a repayment period of 15 years and a five-year grace period • A one-time management fee of 0.75 percent and a commitment fee of 0.5 percent of the loan amount • Cost of loan insurance included <p>55% of the loan:</p> <ul style="list-style-type: none"> • In the form of a "preferential export-based" credit at an annual interest rate of 2 percent per year, with a repayment period of 20 years and a 5-year grace period • A one-time management fee of 1 percent and a commitment fee of 0.75 percent of the loan amount

Source:

- 1) Uganda Electricity Generation Company Limited (UEGCL) website
- 2) Uganda Ministry of Finance, Planning and Economic Development, *Energy Sector Annual Monitoring Report* (Financial Year 2014/15), October 2015
- 3) Anton Eberhard, Katharine Gratwick, Elvira Morella, and Pedro Antmann, *Independent Power Projects in Sub-Saharan Africa: Lessons from Five Key Countries* (Washington DC: International Bank for Reconstruction and Development/The World Bank, 2016)

Appendix B - Isimba HPP Data

General Information

Location	At the village of Isimba on the Victoria Nile, in Kamuli District, approximately 44 kilometers north of the Bujagali HPP
Project Type	Public Investment
Capacity	183 Megawatt
Estimated Cost	USD \$589.5 million
Engineering, Procurement and Construction (EPC) Contractor	China International Water and Electric Corporation (subcontracting to Sinohydro)
Expected Commission Date	2018
Project Timeline	EPC Contract was signed in September 2013. Groundbreaking ceremony was held in October 2013. Uganda Parliament approved the loan of \$482.5 million from China Eximbank in March 2015.

Funding

Export-Import Bank of China	85% of total cost
Government of Uganda	15% of total cost
Loan Terms	In the form of preferential export buyers' credit at an annual interest rate of 2 percent, with a repayment period of 20 years and a 5-year grace period

Source:

- 1) Uganda Electricity Generation Company Limited (UEGCL) website
- 2) Uganda Ministry of Finance, Planning and Economic Development, *Energy Sector Annual Monitoring Report* (Financial Year 2014/15), October 2015
- 3) Anton Eberhard, Katharine Gratwick, Elvira Morella, and Pedro Antmann, *Independent Power Projects in Sub-Saharan Africa: Lessons from Five Key Countries* (Washington DC: International Bank for Reconstruction and Development/The World Bank, 2016)

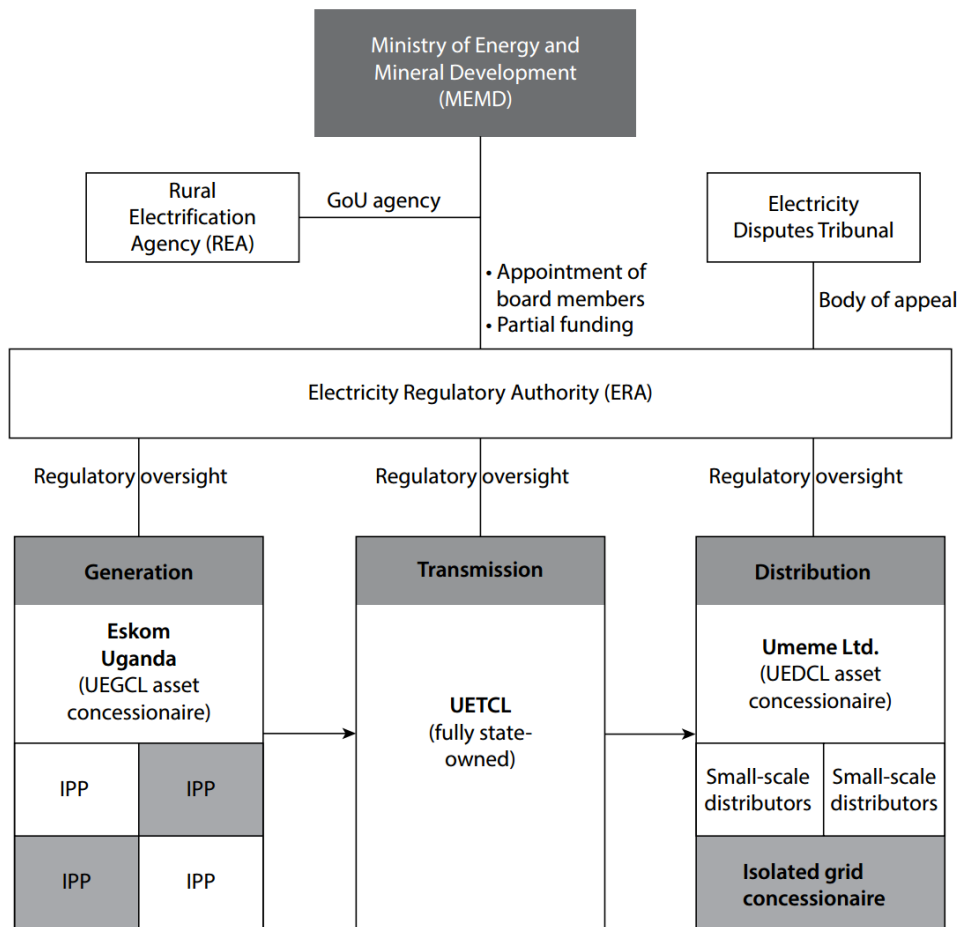
Appendix C - Bujagali HPP Data

Commission Date	2012
Project Type	IPP (Independent Power Producer)
Contract Type	BOOT (Build-Own-Operate-Transfer)
Capacity	250 Megawatt
Shareholder Equity	US\$ 151 million
Funding from Development Finance Institutions and Participating Institutions	US\$ 512 million, coming from <ul style="list-style-type: none"> • International Finance Corporation • European Investment Bank • Proparco • Kreditanstalt für Wiederaufbau • African Development Bank • Netherlands Development Finance Company • German Investment and Development Corporation • Agence Francaise de Development
Commercial Lending	US\$ 115 million, coming from Standard Chartered South African commercial bank
Engineering, Procurement and Construction (EPC) Contractor	Salini
Equipment Supplier	Alstom/Sinohydro

Source:

Anton Eberhard, Katharine Gratwick, Elvira Morella, and Pedro Antmann, *Independent Power Projects in Sub-Saharan Africa: Lessons from Five Key Countries* (Washington DC: International Bank for Reconstruction and Development/The World Bank, 2016).

Appendix D - Structure of Uganda's Power Sector



Source: Compiled by the authors, based on various primary and secondary source data.

Note: GoU = Government of Uganda; IPP = independent power project; UEDCL = Uganda Electricity Distribution Company Ltd.; UEGCL = Uganda Electricity Generation Company Ltd.; UETCL = Uganda Electricity Transmission Company Ltd.

Source: Anton Eberhard, Katharine Gratwick, Elvira Morella, and Pedro Antmann, *Independent Power Projects in Sub-Saharan Africa: Lessons from Five Key Countries* (Washington DC: International Bank for Reconstruction and Development/The World Bank, 2016), 228.

Appendix E - Power Plants in Uganda

<i>Owner/operation</i>	<i>Plant</i>	<i>Ownership (public, PPP, or IPP)</i>	<i>Type</i>	<i>Installed MW (noncaptive)</i>	<i>Peak (and average) capacity to grid</i>	<i>Comment</i>
UEGCL/Eskom Uganda	Nalubaale	Public	Hydro	180	220 (140)	Capacity shown is for both projects
	Kiira			200		
BEL Ltd.	Bujagali	IPP	Hydro	250	170	
Jacobsen	Namanve	IPP	Thermal (diesel/ HFO)	50	50	Emergency plants (2013)
Electro-Maxx	Tororo	IPP		50	50	
SAEMS	Mpanga	IPP	Small hydro	18	9	
TrønderEnergi	Bugoye	IPP		13	9	
Hydromax	Buseruka	IPP		9.0	4	
Eco Power	Ishasha	IPP		6.4	3	
Mubuku III	KCCL	IPP		10.5 (7.5)	3	
Mubuku I	Kilembe Mines	IPP		5.4	2	
Kakira Sugar Works	Kakira	IPP		Cogeneration (bagasse)	52 (32)	32
Kinyara Sugar Ltd.	Kinyara Cogen	IPP	14.5 (7.5)		3	
West Nile Rural Electrification Company	Nyagak I	IPP	Small hydro	3.4	n.a.	Isolated grid
Oil Palm Uganda		PPP/ ODA	Solar/thermal hybrid	1.6	n.a.	
Total MW				858.4		

Source: Compiled by the authors, based on various primary and secondary source data.

Note: HFO = heavy fuel oil; IPP = independent power project; KCCL = Kasese Cobalt Company Ltd.; MW = megawatt; ODA = official development assistance (concessional aid); PPP = public-private partnership; SAEMS = South Asia Energy Management Systems; UEGCL = Uganda Electricity Generation Company Ltd.; n.a. = not applicable.

Source: Anton Eberhard, Katharine Gratwick, Elvira Morella, and Pedro Antmann, *Independent Power Projects in Sub-Saharan Africa: Lessons from Five Key Countries* (Washington DC: International Bank for Reconstruction and Development/The World Bank, 2016), 228.

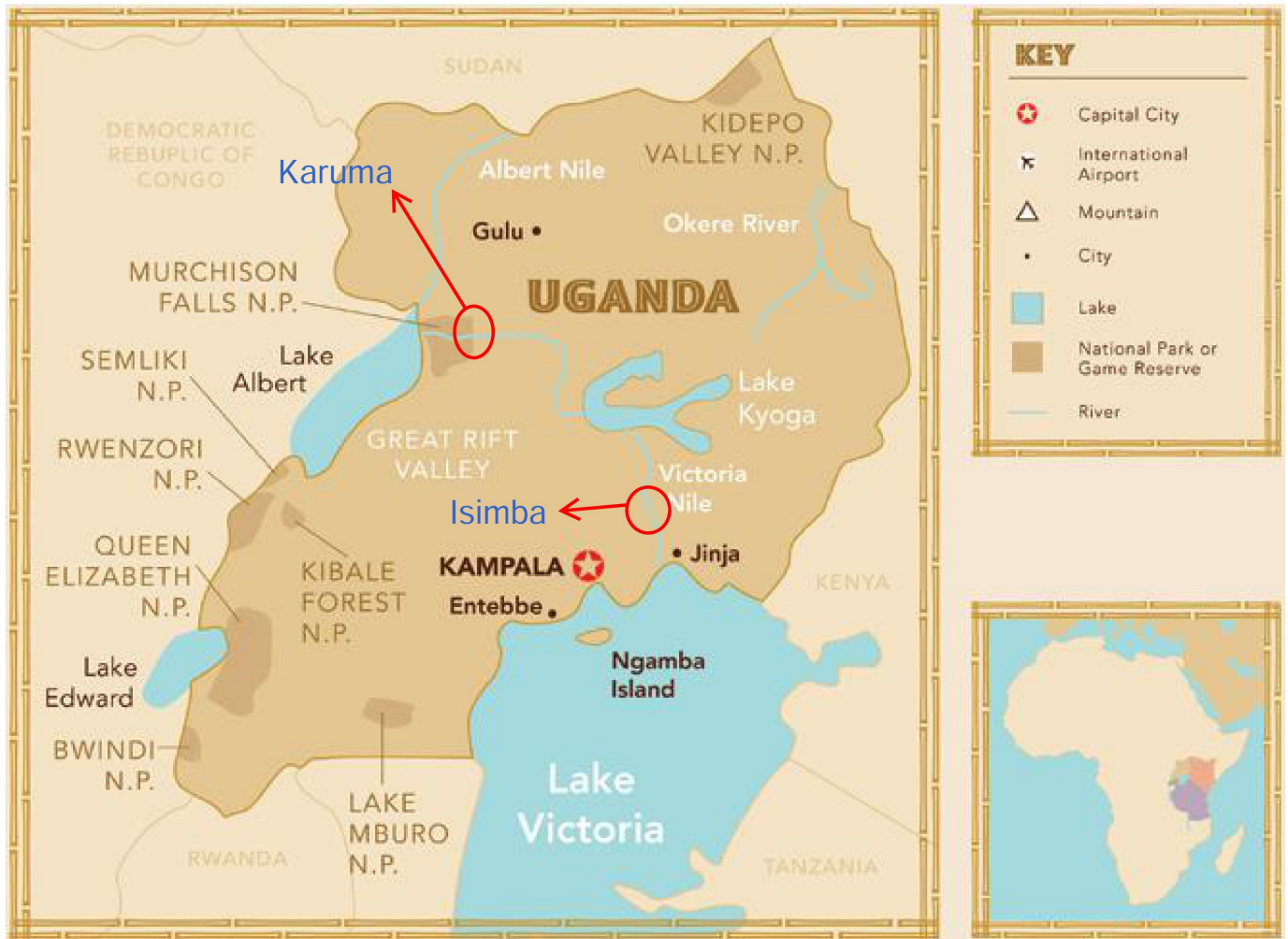
Appendix F

Electricity Generation Projections (NDP Targets 2010/11- 2014/15 and VISION 2040)

Year	2010	2015	2020	2025	2030	2035	2040
Consumption (kWh/Capita)	75	674	1,273	1,872	2,470	3,069	3668
Capacity (MW)	425	3,885	8,601	14,670	22,222	31,252	41,738

Source: UEGCL NEW VISION AND STRATEGIC DIRECTION 2015-2017

Appendix G - Geographical Location of Karuma and Isimba HPPs



Appendix H - How to Get a China Eximbank Loan and How is it Used?

Source: Deborah Brautigam. 2009. *The Dragon's Gift: The Real Story of China in Africa*. New York: Oxford University Press, 143.

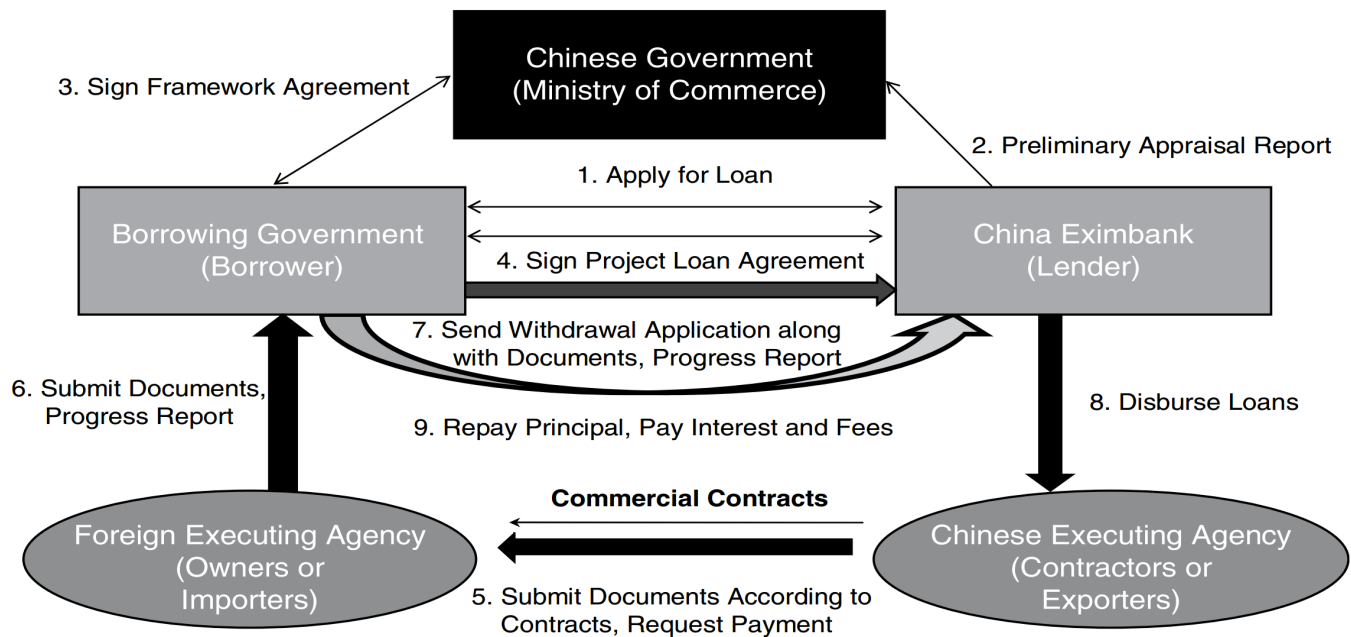


Fig. 5.1. China Eximbank concessional loan cycle

Additional Notes: (Based on interviews with Sinohydro employees)

Step 1: Chinese SOEs are on their own to look for projects overseas. If a project has an open and competitive bidding process, China's Ministry of Commerce has the right to decide who will be allowed to participate in the bidding.

Step 2: If applying for a commercial loan, the applicant usually has to first go to Sinosure, a state-owned policy insurance company, and have the project checked before an insurance contract can be signed. The insurance contract is required to be submitted together with a loan application to the Eximbank, which maintains an internal blacklist of counties that have a bad credit record. Blacklisted countries are unlikely to get a loan.

Step 4: Approval by the Ministry of Commerce is required before the company can submit the loan application to China's Eximbank. Chinese SOEs will present different loan options to the borrowing government and let the latter make the final decision. In general, a commercial loan has a higher interest rate but it is easy to get approved; a concession loan has a much lower interest rate but it is hard to get approved.

Step 7-8: In the Karuma case, the Eximbank disburses money to the Ugandan government rather than directly to Sinohydro. This is different from other cases where "They (China Eximbank) give aid, grants, loans, but you never see that money," as Deborah Brautigam noted.

Appendix I - Costs and the Cracks on the Dam: Different Views

	Sinohydro	Local Media in Uganda
Cost	<ol style="list-style-type: none"> 1. If compared horizontally, e.g., with Bujagali, Karuma's unit cost is still reasonable. The construction of Karuma dam requires much underground work, which explains why it is not cheap. 2. The story that Sinohydro spent millions of US dollars on lobbyists is really ridiculous. 	<ol style="list-style-type: none"> 1. Sinohydro paid US\$ 40-50 million to lobbyists who helped them get the contract. 2. To cut costs, Sinohydro never used the big trucks shipped to the construction site from China. They are merely decoration. 3. The real cost of building Karuma is estimated to be just US\$ 800 million. But Sinohydro has to pay kickbacks to "grease the wheel" when dealing with the Ugandan government. This is the "hidden cost."
Cracks	<ol style="list-style-type: none"> 1. The cracks problem was enlarged by one party (UEGCL), which is engaged in a political struggle with the Ministry of Energy inside the Ugandan government. But Sinohydro had no idea why UEGCL and the Energy Ministry were at each other's throats. 2. UEGCL was not given project administration power because it was considered relatively inexperienced in supervising large public projects. 3. Irresponsible media reporting aggravated the problem and caused damage to Sinohydro's image. Sinohydro currently has decided not to launch a PR campaign to counter the media muckraking for fear that it would be counter-productive, as it runs the risk of "adding oil to the fire." 4. Sinohydro, like other Chinese SOEs, should improve its CSR work. 5. The "local government" (referring to UEGCL) should "rectify their attitudes," engage in constructive communication with Sinohydro, and focus on solving the problems, rather than keep arguing just for the sake of discrediting Sinohydro. Using the media to expose the issue would not help expedite the construction progress. Delay means higher costs. Karuma operating at its full capacity can generate US\$ 600,000 profit per day. 6. The consulting companies hired by UEGCL are not results-oriented; UEGCL does not respect the fact that different companies have their own ways of completing the project, and simply set its own experience as the standard. The newly established steering committee is meant to serve as a platform for coordination. 	<p>To cut costs, Sinohydro did not follow the initial plan to construct a cooling plant, which was priced US\$ 20 million in the bid. The plant is supposed to be used to process a certain kind of cement before it is used to construct the dam. Due to the lack of this necessary technical process, cracks appeared on the part of dam where this kind of cement was used.</p>

Source: 1) Interview with the Sinohydro representative based in Kampala, Uganda 2) Interview with the investigative journalist who reported the Karuma case for *The Independent*, a local news magazine

Appendix J - Problems and Challenges Facing Chinese Enterprises in Africa

Zhang Hongming and Li Zhibiao edited. 2016. *Yellow Book of Africa--Chinese enterprises' Performance in Africa: Achievements, Challenge and the Way Out*. Social Scientific Literature Press

“First, a variety of unfavorable factors are present in the African investment environment, including regional wars and conflicts, terrorism, political coups, administrative inefficiency, underdeveloped legal system, foreign exchange control, high and excessive taxation and rising labor costs, etc.

Second, Chinese companies have their own problems, including a lack of understanding of the country in which they are investing, insufficient initial investment in large projects, the absence of investment in related service industries, vicious competition among companies, and non-compliance with local laws and regulations etc.

Third, the economic slowdown in Africa has negative consequences, including a sharp drop in commodity prices, delays in infrastructure construction, and a decrease in African countries' demand that has had negative impacts on the development of China's mining, infrastructure, and manufacturing companies in Africa.

Fourth, western companies have intensified competition and caused some trouble. This point is especially obvious in two specific cases: 1) they set up hindrances to exclude Chinese companies in the energy and mining industries and 2) they fabricate the “China Threat” and “Neo-colonialism” theories, which hurt Chinese companies in Africa.

Fifth, there are difficulties in developing China-Africa trade and economic cooperation zones. On one hand, African countries have provided insufficient policy support and investment in infrastructure. On the other hand, companies that have settled down in the economic zones have little access to financial sources, which has inhibited the development of these zones and negatively influenced the prospect of future investment by other companies.”

Source: Xin Wen, “Feizhou fazhan baogao: zhongguo qiye zai fei cunzai e xing jingzheng” (The report on African development: Chinese companies involved in vicious competition), 23 August 2016, http://news.china.com.cn/txt/2016-08/23/content_39147536.htm

Appendix K - Electricity consumption per capita (kWh per person) 2012

Country	Electricity Consumption Per Capita (2012)	Country	Electricity Consumption Per Capita (2012)
Uganda	80	China	3475
Tanzania	95	United Kingdom	5449
Kenya	157	Japan	8003
South Africa	4393	United States	12955

Source: World Bank Open Data, <http://data.worldbank.org/indicator/EG.USE.ELEC.KH.PC>. The data of Uganda's electricity consumption comes from Joseph Maweje and Dorothy N. Maweje. 2016. "Electricity consumption and sectoral output in Uganda: an empirical investigation." *Journal of Economic Structures* 5:21.