

Let There Be Light: The Promise of Social Entrepreneurship in Bringing Electricity to Sub-Saharan Africa

Ryan Cho

Choate Rosemary Hall

Introduction

The earth's natural resources — clean water, fertile soil, and energy — are vital to ensuring human life on earth. For many environmentalists, like Tim Jackson, the core of the environmental crisis currently faced is the over-consumption of earth's available resources, namely energy resources (Jackson, 2011). There is data behind this argument. In 2009, humans were extracting and utilizing 30 percent more natural resources than they were 30 years prior (Friends of the Earth Europe; Sustainable Europe Research Institute (SERI), 2009). Consumption of the earth's natural resources is leading to species extinction, shrinking water resources, deforestation, and of course the warmer temperatures closely associated with climate change.

It is clear that a switch to carbon-neutral, sustainable and clean energy is the key to protecting all life on earth. However, deploying a global switch to clean energy at both the macro- and micro-level is not as easy as planned. One emerging commercial actor could be of help: social enterprise. Social enterprise could provide unique contributions to the development of clean and renewable energy projects by reaching areas that traditional private and public sector organizations cannot or will not touch and providing scalability that allows sustainable growth.

The following paper will demonstrate the role and power of social enterprise in the clean energy movement by exploring the work being done in rural Burundi by social enterprise among bottom of pyramid (BoP) communities as compared to the progress made by the national energy plan. In essence, while public or private organizations may do well to engage in energy programs in urban areas or wealthy nations, those models either do not impact or struggle to find sustainable impact in bottom-of-pyramid communities. Social enterprise, however, can create communal energy schemes that not only have the ability to enter into informal areas but to create sustainable change there as a means of connecting those without electricity access while they wait for national infrastructure to be built.

What is Social Enterprise?

Social enterprise is a commonly used term that describes “third sector” organizations. A third sector organization marries elements of first sector (private) and second sector (public) organizations to create a hybrid. Defining the term “social enterprise” is problematic and current definitions remain contested. However, it can be generally said to refer to organizations that operate in accordance to a social purpose but generate their income through market trading in goods or services. These may include community enterprises, trading arms of charities, social firms, employee-owned businesses, and leisure trusts.

The social economy differs from the traditional market economy because it represents a type of activity that prioritizes its company ideals above all else and tends to be more democratic. Pearce (2003) notes that this difference from private sector organizations is stark because although private organizations to measure their social and environmental progress, it does not define overall success according to those parameters. Contrarily, the success of a social enterprise is measured strictly by its impact on its given space (social, environmental, economic, or a combination of these). Although these organizations tend to be new media darlings, there is not yet enough literature to determine whether a social enterprise is better at living up to its environmental or social ideals than a strictly private or public sector organization. Instead, the bulk of the literature tends to refer to the environmental and social values and issues found in the private sector including both corporate social responsibility and the small business sector (Vickers, 2010).

Social Enterprise and Renewable Energy

Social enterprise takes on the values most commonly associated with philanthropy and applies it in a for-profit setting: it extends the social purposes otherwise found in charitable trusts, NGOs, and government bodies, and creates self-sustainable models that allow it to generate funding and continue to operate without relying solely on grants, donations, and other fickle forms of funding (Goyal, Sergi, & Kapoor, 2017). However, the question remains: why is social enterprise uniquely poised to engage in clean energy initiatives?

First, social enterprise can begin by playing an important role in raising awareness of and generating public support for renewable energy by promoting the benefit to the community first and foremost. The ability to use a specific community's enthusiasm to grow the appetite for renewable energy is critical, and research shows that when a community has a stake in the project, it is more likely to not only engage with it initially but provide the momentum required to ensure the project is a sustainable one (Walker, Hunter, Devine-Wright, Evans, & Fay, 2007).

Social enterprise is also able to provide citizens with pathways to developing projects that best suit the local community as compared to the private or public model. Organizations around the globe are using a new participatory perspective that engages with the local community from project design through to project monitoring (Enns, Bersaglio, & Kepe, 2014). The participatory approach transforms the beneficiaries of the project into its key primary stakeholders (and sometimes shareholders) of the project, which researchers believe increases project sustainability (Sheely, 2015). Indeed, surveys of communities show that local populations would like to participate in clean energy and renewable projects in their own communities. However, those communities need the appropriate infrastructure and expertise to facilitate involvement, which a social enterprise can provide at the beginning of the project (Rogers, Simmons, Convery, & Weatherall, 2008). The option of operating a project through genuine social and community power and responsibility delegation is a unique promise not offered by the private sector and largely impossible in the public sector, particularly because those projects required an investment beyond the reach of small communities and require huge amounts of reliable and robust outside financing.

The use of participation, which is unique among social enterprise organizations, allows organizations to use targeted and localized problem identification to reduce project costs, improve efficiency, and encourage self-reliance (Hickey & Mohan, 2004). This aspect of participation and development theory is critical for the funding structure used by social enterprises. Social enterprise is neither beholden to public funding nor shareholders, which allows them to be nimbler when generating capital both for the initial investment and for infrastructure maintenance. Not only can they skirt around the government bureaucracy that may hold back national or transnational public bodies while also using grants or public funding only for initial start-up costs, but social enterprise can use market capital in a unique way by working explicitly and exclusively with key stakeholders (the beneficiaries) whose

participation generates a degree of autonomy that promotes sustainability (Sheely, 2015)

Finally, social enterprises are willing to target low-income people who make up the base of the pyramid (BoP) communities (Goyal, Sergi, & Kapoor, 2017). BoP is a group of four billion people worldwide who earn less than \$8 USD per day (at 2002 purchasing power). The BoP segment participates in the informal economy (not counted in the GDP) and spends the majority of their income on consumption items, such as food, kerosene, and intoxicants; they do not pay income tax, they do not save, and they are often 'unbanked' (without access to traditional banking infrastructure). This heterogeneous group is also deprived of access to the measures that allow other segments of the population to improve their life and increase their capacity: there is restricted access to education, financial inclusion (banks), preventative healthcare, or stable (much less clean) energy. Traditional institutions including private and public organizations fail to reach BoP communities in part because there is no business model aimed at the BoP and moreover, there is no model targeted to this sub-group that is both scalable and sustainable. Social enterprise, however, has emerged in this space not only to create a presence but to determine a scalable intervention approach aimed to target the other complexities associated with BoP markets including navigating informal institutions, underperformance of the government, and lack of guidelines and regulations from the public sector (Goyal, Sergi, & Kapoor, 2014). There is also a lack of infrastructure to serve the business, and because low income is prevalent in an informal economy mean, there are large household sizes, irregular cash flows, and barriers to social and economic mobility to prevent either of those issues from improving. In essence, any business that intends to enter a BoP market encounters a number of entrenched barriers that one organization cannot solve on its own (Goyal, Sergi, & Kapoor, 2017).

Social Enterprise and Clean Energy: Delivering Clean Energy Programs in Rural Africa.

In 2013, nearly two billion people across the globe did not have local access to electricity (McEachran, 2013). Around the same period, 589 million of those people were Africans, largely living in rural parts of sub-Saharan Africa (IEA, 2012). Connection to a national energy grid has been a key goal of both African states and developmental organizations working in the region, but the rates of national grid expansion have thus far failed to match the rate of population growth and energy demands. Moreover, the focus on the spread of energy tends to focus on urban centers, which generate most of each

country's economic growth. Out of 589 million Africans who do not yet have access to the electrical grid, 75 percent of those dwell in rural communities or in isolation (IEA, 2012). Lacking electricity and living in places deemed low economic priority zones damages local communities by preventing both the diversification of local livelihoods and social development. It means that people spend a disproportionate amount of income on dirty, unreliable, and expensive energy, and it prevents those who live there from engaging in simple but important activities, such as studying for school after sunset.

Burundi: How an NGO Used Social Enterprise Model to Deliver Clean Energy

The nation of Burundi is particularly energy deprived: whereas 26% of the population in sub-Saharan Africa has access to the national grid, less than 5% of Burundi's total population can say the same. (Cieslik, 2016). Burundians throughout the country rely on kerosene lanterns, candles, and wood for light, heat, and cooking. Like other energy deprived groups, those without energy access in Burundi spend a sizeable amount of household funds on energy that is hazardous, insufficient, and unhealthy.

UNICEF Burundi Innovation Lab partnered with Amade, a local NGO, to target a long list of problems faced by three individual rural communities in the country. A needs assessment found that energy deprivation was one of the most significant issues facing all three communities; each of these communities was then provided with a NuruEnergy generator (a green-energy generator), which the community would pay for via interest-free micro-loans. (Cieslik, 2016). The communities were also given rechargeable lamps along with a bicycle to use to generate power, which community leaders could then sell to community members (both the lamp and subsequent recharges), which would allow the groups to be self-sustainable. Communities would then use the profits to benefit the orphan children in the community or other designated social projects. Additionally, communities benefitted from energy access by reducing energy expenditure, saving on opportunity costs, fewer health hazards, using clean, reliable, and renewable energy, and studying after dark (for children) (Cieslik, 2016).

The project was a pilot project, which resulted in the use of three pricing plans for the communities involved. The generator cost was \$275 USD, and the NGO required the communities to pay \$58 USD upfront and repay the balance over two years through monthly installments. Communities also received 116 lamps, which they could sell at prices below or at the real price of \$6.50 USD. (Cieslik, 2016). Lamps were

charged with bicycles, which limits the cost to that of operator opportunity cost. Five minutes on the bicycle charged five lamps, which provide 28 hours (one week) of light. In order for the community to pay back the monthly installment, it needed to distribute 300 lamps and have local households pay for a once weekly recharge.

The project describes a social enterprise model characterized by strong local participation; all pilot communities were semi-autonomous and became holistically responsible for the project after training. Project Lumiere was well-received by all nine groups, and after three months, Cieslik (2016) found that the groups had success in distributing the lamps with differences occurring when economic development varied (the poorest provinces struggled the most). Although the project was first deployed by a public organization, it took on the form of a community-managed micro social enterprise that used a market-based approach to help communities semi-autonomously pursue funding for social objectives while also providing clean energy to the community and reducing the reliance on oil and kerosene. The market forces should have then driven behavioral changes by relying on the rechargeable man-generated electricity, which remains cheaper than the oil and kerosene. However, the changes in the field differed to projections for a very significant reason: financial dealings were regulated by local hierarchies and interdependences with the potential to over-ride traditional market efficiencies.

Additionally, there were issues of long-term behavior, which still need to be studied. The three-month timeframe was used because research in BoP groups finds that even though behavioral changes require time to take hold, innovation dissemination occurs rapidly among BoP communities thanks to market readiness and word-of-mouth recommendations (Pansera & Owen, 2015).

A Lack of Data: State Attempts at Providing Public Power in Burundi

It is difficult to dismiss the dismal track record offered by Africa, and Sub-Saharan Africa's power sector. The region's entire installed energy capacity is around 80 gigawatts, which is the same capacity of the Republic of Korea (Eberhard, Gratwick, Morella, & Antmann, 2016). If one removes South Africa from the equation, the region's energy capacity drops to 40 gigawatts. The World Bank estimated that Sub-Saharan Africa must add 8 gigawatts of new energy capacity each year to meet demand, support further electrification, and keep up with economic growth. In the prior decade, the region added only 1-2 gigawatts per year. The use of state-owned energy suffers from a multitude of problems that also prevent energy

from making significant gains. Issues such as infrastructure problems pose a huge drain on national utility providers and make up 30-60 percent of all productivity problems. Other issues include corruption and red tape (Eberhard, Gratwick, Morella, & Antmann, 2016).

Burundi struggles with many of the same issues described above. All generation capacities in the country are owned/operated by Regideso, which held a monopoly on the energy market until market liberalization of the sector in 2000 (Karangwa, 2017). Much of the equipment dates to the years before Burundi's independence in 1962 and the age of the infrastructure means that adding capacity results in outages and causes harm to the existing grid. Even among its gas-fired plants and generators, Burundi still struggles as a result of currency issues impacting its ability to import oil (Clyde & Co LLP, 2018).

One of the most common problems lies in the state energy sector's inability to reach those away from the existing grid. The growth in the supply-demand gap as the capital city Bujumbura demands increasing amounts of power, which is densely populated compared to other cities in neighboring countries such as Kenya or Tanzania, only serves to exacerbate this problem. In Burundi, the Agency for Rural Electrification bears the responsibility for the development and implementation of projects targeting rural electrification including renewable energy. As of 2013, Burundi relied on biomass for 95% of its energy with electricity making up 1.3% and petroleum a further 2.5% (Minister for Energy and Mines, 2012). The electricity it does receive is purchased from an aging cross-border power complex within the Democratic Republic of Congo, which shares 70 megawatts of capacity between Burundi, the Democratic Republic of Congo, and Rwanda. In 2013, 95% of Burundi went without electricity with those who had access seeing rates of 2.8% in urban areas and 2% in rural areas. The growth to 5% occurred over eight years from 2005 and the nation has added two or three-tenths of a percent to its electrified areas per year (Karangwa, 2017). The national goal is to provide 25% of the nation with electricity by 2025. At present, it has 55 megawatts of currently installed generation capacity.

Burundi is looking towards two goals at present: the first is a general African energy production goal and the second is the Vision Burundi 2025 program, an international UN program. In order for Burundi to keep up with African and global goals for energy production and clean energy production that matches economic growth, Burundi's government needs to present a full-scale commitment to renewable energy on a national scale and match its commitment with spending. A

lack of both action items plagues all of Africa: estimates of annual investments across Africa required an investment between \$33 billion to \$63 billion between 2015 and 2040; the average annual spending is only \$12 billion (USD), which results in the low access and high prices that continue to occur today (The World Bank).

In 2009, the Ministry of Energy and Mining and the Directorate General of Energy and Water proposed a policy that would bring electricity to a greater (but non-descript) population in Burundi through three phases. First, it required a recovery phase that would repair and modernize existing infrastructure, reduce the demand, and take measures to limit the impact of energy shortages. Then, it would move into a second equipment phase which would require a concentration on the development of national and regional hydropower, a highly interconnected transmission system, and the resumption of electrification in peri-urban and rural areas. Finally, the expansion phase would bring 300 megawatts (up from 55 megawatts) to the country by 2020. Doing so would require new and existing metal extraction industries to be established. The plan formally focused on hydropower and renewable resources (Ministry of Energy and Mining; Directorate General of Energy and Water, 2009). It is worth noting that Burundi's hydro-electric resources have the potential to reach 1,700 megawatts (Ministry of Planning and Communal Development/Forecasting Unit; United Nations Development Programme in Burundi, 2011). The government's plans to exploit its hydroelectric resources also has support from the World Bank, Africa Development Bank, European Investment Bank as well as governments and industry sectors from Japan, China, Germany and others (Karangwa, 2017). The government also has regional and national power plants under construction that could aid in its goals (Clyde & Co LLP, 2018).

Additionally, the government presented two strategies dedicated to developing solar and wind energy in Burundi. First, the government requested providing priority to social infrastructure in remote areas (schools, health centers, pumping stations, hospitals, and local government offices) with the aim of eventually connecting solar power stations to the main grid. Secondly, Burundi proposed the development of a wind atlas as well as wind-powered water pumps in rural, isolated areas, and the development of utility-scale wind parks to eventually connect to the grid (Ministry of Energy and Mining; Directorate General of Energy and Water, 2009). No timeline was presented with these plans.

Indeed, Burundi has significant plans for national electrification, but it remains difficult to assess those plans

as several of the largest infrastructure projects expect to be commissioned in 2019-2020. A full list of the current indicative list of energy projects is found in figure 1

Name	Installed Power Capacity	Financing	Expected Date of Commissioning
Hydro-Electric Plant Mpanda	10,4 MW	Burundian Government	2018
Hydro-Electric Plant Kabu 16	20 MW	Credit from the Indian Government	2018
Hydro-Electric Plant Jiji-Mulembwe	49 MW	World Bank, AfDB, UE, EIB	2020
Hydro-Electric Plant Rusumo falls (Burundi-Rwanda-Tanzania, 80 MW)	26,6 MW (Burundi Part)	World Bank, AfDB	2020
Kagu Project	8 MW	PPP Swedenergy	2019
Solar PV Project (two units)	20 MW	PPP Gpt Sarako-Tauber	2017
Solar PV Project	7,5 MW	PPP Gigawatt Global	2018
Biomass Project	30 MW	PPP Global Synergy Solutions Ltd	2017
Importation from Ethiopia	200 MW	Burundian Government: MoU signed.	2020
Rehabilitation Hydro-Electric Plant of Ruvyironza	22,5 MW	World Bank	2020
Gas-fired Plant	30 MW	PPP Interpetrol	2017
Peat Power Project	15 MW	PPP with BUCECO	2019
Ruzizi III	70 MW (Burundi Part)	World Bank, AfDB, EIB, UE	2020
Solar PV Project	11 MW	PPP CRD Holding	2017
Rehabilitation Hydro-Electric Plant in Kirasa-Karonge	27 MW	Credit from Chinese Government	2019

For a total installed power capacity of 591 MW

Figure 1 Indicative list of energy projects in Burundi (Clyde & Co LLP, 2018)

Additionally, political instability, incomplete or illiberal power generation legislation, and a lack of existing renewable energy products makes the project challenging. The government's progress remains unknown as the ministry body associated with rural electrification does not run a functional website with recent progress reports. Even if Burundi reaches its goals, it is unclear if and when its rural population and BoP communities will have electricity access. From a desk-based research point-of-view, it appears that most of Burundi's rural residents remain on an indefinite "wait-and-see" program.

Discussion

National governments have a critical role to play in the development of the national grid and working with neighboring nations to drum up energy plans that provide sustainable, inexpensive, and clean energy to its citizens. Burundi, the world's third least connected country with 5% electrification, has these dreams, too. It also has incredible hydro-electric potential and the support of international governments, funding bodies, and private sector operators who have an interest in supporting the government's dreams. However, the plans remain relatively non-descript and require the prioritization of community buildings over communities as a whole. The Burundi government may one day provide a strong national grid, but until then, it is clear that the people of Burundi will continue burning unsafe fossil fuels because the alternative is waiting in the dark – unless another body steps in.

While national governments work towards committing to, financing, setting up, implementing, and maintaining large-scale national renewable energy plans, social enterprise models delivered both by social enterprises and through NGOs have seen tangible success in delivering clean energy to local communities in Burundi. These social systems relieve the huge costs of purchasing, installing, and updating massive systems, negotiate around the political commitment and red tape and corruption, and directly target those without energy access as opposed to those who live in closest proximity to utilities or spaces who have the greatest need. More importantly, they provide energy directly to the people and allow them control of their energy consumption.

As a result, it is possible to argue that social enterprise models have the potential to deliver clean energy solutions designed for short- and medium-term use and with more sustainability and reliability than the national and public energy system. This is not to say that social enterprise is a long-term replacement for the energy system in terms of its cost-effectiveness and ensuring energy equity among all citizens of a nation; there is not enough long-term data available both from the social enterprise and public side of the energy industry that would support this conclusion. However, in the short-to-medium term, while governments squabble over the direction of the national energy policy, look for ways to finance, and begin building infrastructure, social enterprise can deliver renewable energy to communities in a short period of time while allowing citizens to concentrate and providing their own reach.

Limitations of Social Enterprise in Clean Energy

As demonstrated by the deployment of clean energy through the social enterprise model in Burundi, social enterprise has the option of delivering energy to sub-Saharan rural African communities within a very short timeframe and on a self-sustainable basis as compared to the delivery of clean energy through the national grid network, where electrification creeps along according to proximity and the government's ability to believe in, fund, and complete a project. However, just as the government programs suffer from limitations, it must be said that so too do social enterprises and social enterprise models.

It may be reasonable to assume that social enterprises struggle to get off the ground through initial funding. While it is never easy to find seed capital to begin operations, the limitation is not start-up capital, but the capital needed for sustainable growth. Social enterprises tend to lack the necessary mechanisms to continue after initial funding (Bornstein & Davis, 2010).

Whereas private businesses have the option to use stock issues, debt, and access well-established capital markets and governments can lobby for funding from international banks and schemes, social enterprise frameworks particularly among BoP communities tend to access capital through relatively short-term mechanisms. Some gather funds from impact investors, but access to capital outside of the established market remains in its earliest stages and is far from reliable, particularly for these communities and for social enterprises as impact investors tend to favor established projects (Smith & Darko, 2014). Additionally, those social enterprises that do rely on government funding struggle to continually qualify for the capital because government reporting requirements are both strict and opaque. What is more, government reporting requirements tend to use standardized guidelines best built for the non-profit sector, which requires social enterprises to contort themselves to fit neatly within the box. There is also the issue of social issues remaining political, and a change in politics, rather than performance, can yield funding unpredictable (Bornstein & Davis, 2010).

Capital is just one reason that social enterprises need to be resilient to survive in sub-Saharan Africa, but there are also hundreds more. From natural disaster to political instability to a lack of private and public options to wild currency fluctuations, even ideas that work in other areas of the world require an extra push in Africa. Data from Littlewood and Holt's (2017) study on the resilience required of those in sub-Saharan Africa shows the need for this:

"So there's always going to be challenges. We're in Africa. I mean next it will be the rains or floods or you know there will be a natural disaster or something will happen." (p. 6)

Social enterprises run by local communities need to be able to face reality, bounce back from adversity, and be inventive to deal with the inevitable challenges that come their way. According to Littlewood and Halt, these social enterprises need these five characteristics to survive including: "(i) combining passion and vision with realism (ii) finding meaning through shared values and belief in the mission (iii) improvisation, inventiveness, and "making do." Indeed, there remains a lack of literature on the resilience of social enterprise, which means those looking to enter from another market have little to rely on, which in turn presents a new challenge.

There are also issues specific to the deployment of clean energy within a social enterprise context. First, there are difficulties with dealing with appropriate legal structures and testing from a social enterprise perspective (Doyle, 2015).

This is particularly important in a country like Burundi where there are new laws on electricity and public-private partnership (based on French law), but those laws are described as being incomplete and insufficient, which not only presents challenges to business structures but could also result in rapidly changing laws if and when the framework is modified (Clyde & Co LLP, 2018; Law No. 1/13 dated 23 April 2015 for the re-organisation of the electricity sector in Burundi). Additionally, for enterprises that wish to go further than lanterns and generators and install solar panels or wind farms, there are subsequent issues connecting to the national grid, particularly as the grid remains under development and the specifications remain unknown (Doyle, 2015). Finally, because social enterprise tends to be small scale with contributing to the overarching energy project (either through lobbying or funding), social enterprises face a failure of local authorities to help promote or support the project as well as a lack of state incentives for small scale energy production (Walker, What are the Barriers and Incentives for Community-owned Means of Energy Production and Use). These are barriers not usually faced by private sector energy companies that operate on a multinational scale.

Finally, social enterprise working within a BoP community in a local context also needs to consider the hyper-local conditions, particularly when the project hinges on a participatory model to take-off. This appears in the Project Lumiere data where the local hierarchical forces overrode the traditional market forces the project relied on in a rather unexpected way (Cieslik, 2016). Each social enterprise will need to have strong working knowledge of the market it wishes to enter while also recognizing that two markets in the same area may react differently. In this regard, there will need to be resilience on the part of the project initiator as well as on the participants as a learning curve takes place and the project requires re-tooling.

Conclusion

Sub-Saharan Africa presents unique challenges to both the clean energy campaign and the concept of social enterprise. However, it also presents unique opportunities. In areas that are unlikely to remain unconnected for years – if not decades – social enterprise has the ability to target hyper-local markets to connect them to clean, reliable energy and help local communities achieve economic goals in sustainable ways. Social enterprise is particularly well suited to BoP communities, such as rural communities in Burundi, where not only is there no local infrastructure but the national infrastructure is still years away from providing them any service.

By using the participatory approach, social enterprise turns beneficiaries into key stakeholders (or shareholders), which not only increases the sustainability of the project but also prepares local communities for future commitment to not only accepting clean energy but promoting it through local involvement. These are options not widely disseminated or available to either the private sector or the state because they take place on a hyper-local scale where the investment costs outweigh the benefits for the actors. In essence, social enterprise empowers those whose economic position makes them an afterthought and instead places them in charge of their own story, their own energy, and their own communities.

As the case studies in Burundi show, creating a national grid is cumbersome even for a national government, and it requires that those who benefit from it wait along a timeline they have little control of. By using social enterprise, it is possible to place those people at the heart of the energy project. While it is by no means a long-term solution, it does provide people with agency during the short- and medium-terms with the potential of encouraging their involvement on the national scale over time. Further research on long-term behaviors and the development of national power systems in Africa will be required over the next ten to twenty years.

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