

CTA
Working Paper
15/04

CaribShare Biogas and Richmond Housing Development: An Innovative Collaboration in Jamaica

Mawazo M. Magesa

Series: ICTs for agriculture



CaribShare Biogas and Richmond Housing Development: An Innovative Collaboration in Jamaica

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The Technical Centre for Agricultural and Rural Cooperation (CTA) is a joint international institution of the African, Caribbean and Pacific (ACP) Group of States and the European Union (EU). Its mission is to advance food and nutritional security, increase prosperity and encourage sound natural resource management in ACP countries. It provides access to information and knowledge, facilitates policy dialogue and strengthens the capacity of agricultural and rural development institutions and communities.

CTA operates under the framework of the Cotonou Agreement and is funded by the EU.

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About the author

Carol Lue is the Executive Director and founder of CaribShare Biogas, an innovative energy-from-waste start-up enterprise serving hotels and farms in Jamaica. Carol is a social entrepreneur focused on developing innovative solutions to climate-change and sustainable-development-related issues in the Caribbean. With an entrepreneurial mindset, she has attracted funding support and other resources to develop the business and accomplish its social mission from international development donors, government agencies, academic/research institutions, and other interest groups from both the private and public sectors.

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Executive summary

Integrating sustainable renewable energy programmes into residential development and community planning is a key strategy for lowering the high energy cost and cost of living for communities in the Caribbean. CaribShare Biogas (CSB) is a social enterprise in Jamaica whose work is aligned with implementing this strategy by harnessing organic waste to supply communities with biogas for electricity generation. For its first project, CSB is collaborating with Richmond Housing Development, a residential community of 356 housing units in Priory, St. Ann, to supply enough biogas to help power their public and utility spaces using organic waste from surrounding hotels and farms. Additionally, CSB will provide these farms with cash rewards as supplementary income.

Jamaica has a high and costly dependence on petroleum imports, as 95% of energy generated in the country come from these sources. As part of the solution to Jamaica's energy problem, there is need to develop alternative models that allow for off-grid electricity supply and self-energy generators implemented at the community level. The collaboration between CSB and Richmond fulfils this need. Its model solution demonstrates how residential developers, as the ultimate implementers of sustainability planning principles, can incorporate renewable energy programmes into their plans by collaborating with local renewable energy providers to support their development. This featured collaboration resolved key start-up challenges faced by CSB, and in so doing, secured a viable business model for its growth and long-term sustainability.

Implementing such models in Jamaica and in other Caribbean countries will undoubtedly help communities to lower energy cost and build climate resilience across the region.

Introduction

Building communities with sustainability principles that reconcile social, environmental, and economic considerations is an essential prescription for securing the quality of life for present and future members. As a road map for achieving this objective, sustainability plans often recognise the high cost of fossil fuel energy, and therefore call for the implementation of renewable energy programmes to help build resilience to climate change. Fortunately, communities around the world have begun to develop community energy plans to champion for a more sustainable energy future. Municipalities who achieved success in implementing these plans have in many cases forged partnerships and collaborations with other groups, including businesses and private sector organisations, to finance the activities and to enhance their socio-economic impacts (Allman et al. 2004).

In Jamaica, 95% of energy generated in the country comes from petroleum imports, and it spent 15% of its gross domestic product (GDP) on these sources in 2011. Additionally, Jamaicans pay the hefty rate of USD 0.40 per kWh for electricity, which is amongst the highest rates globally. As a result, Jamaica has been putting the appropriate policy framework in place to support increased renewable energy adoption, in the hope of lowering its energy cost. In 2009, Jamaica established its National Energy Policy, committing to provide 20% of the country's energy from renewable resources by 2030. To date, the Jamaican Government has sought to meet this target by issuing a Request for Proposal (RFP) in late 2012 for the supply of 115 MW of electricity generation capacity from large-scale, renewable energy providers. However, the RFP evaluators only awarded 78 MW, as attracting enough capital and investors to support such large-scale projects to support the grid continues to be challenging.

Therefore, promoting alternative models that allow for off-grid electricity supply and distributed self-energy generators implemented at the community level should be also be pursued as part of the solution to Jamaica's energy problem. *Jamaica's Sustainable Energy Roadmap* (2013) argues that a distributed electricity system based on renewable energy will be more resilient than centralised fossil fuel generation to climate change impacts. However, the implementation of such programmes has been limited due to a lack of demonstrative models and innovative collaborations capable of garnering the necessary resources to foster the development of renewable energy programmes. Unfortunately, municipalities in Jamaica do not have the budget or sufficient resources to implement their own community energy plans and are often burdened with bureaucratic and administrative obstacles. One proposed model to addressing these issues is to for residential developers, as the ultimate implementers of sustainability planning principles, to incorporate renewable energy programmes into their residential community plans by collaborating with renewable energy providers, thereby supporting their development.

The featured collaboration between the Richmond Housing Development and CSB, a renewable energy start-up and social enterprise, is an excellent demonstration of this model. Developed by the Richmond Development Company Limited, the community currently consists of 356 housing units. Phases 2 and 3 will add an extra 600 units within 5 years. Marketed as a model for sustainable living due to its use of renewable energy and energy conservation efforts, Richmond Estates has received numerous awards, including the 2010 International Renewable Energy Project of the Year Award given by the US Association of Energy Engineers. All the units boast thermo bars on the roof to reduce heat penetration,

thereby reducing the necessity to use cooling systems such as air-conditioning units or fans. Water heaters and street-lights in the community are also run by solar energy. The development has an eco-friendly sewage disposal facility and also provides an option of rainwater harvesting. At Richmond's launch in 2011, the Chairman of Richmond Development Company, Lee Issa, stated that Richmond marks a new approach to housing development in Jamaica which sees the implementation of "a green community concept" and represents the fulfilment of a dream to provide a wide cross section of Jamaican families with top-quality living at an affordable price (Edwards, 2011).

At the same time, CSB was established in 2012 to help stimulate the use of waste for energy generation in Jamaica. Its mission is to enable Jamaican farms and hotels to strengthen rural livelihoods and to reduce climate change through sustainable waste management and clean energy generation. Starting in St. Ann, CSB will collect and convert organic waste from hotels and dairy cattle/pig farms into biogas – a renewable energy source. The biogas will then be sold to residential communities and entities, such as Richmond, who want to reduce their energy cost by generating their own electricity.

How did CaribShare Biogas develop?

Many model solutions for addressing climate change and renewable energy development already exist globally. However, what is often lacking is the entrepreneurial ingenuity and innovation to adapt a particular model to a certain circumstance or local setting as well as the right opportunity to implement it. For example, ZooShare, a cooperative in Toronto, Canada intends to convert supermarket food waste and animal manure from the Toronto Zoo to produce biogas and electricity for sale to the national grid. Its innovative model for fostering community engagement and investment in renewable energy development is the issue of community bonds as a mechanism for funding the project. The founder and executive director of CaribShare Biogas, Carol Lue, was inspired by this model, and felt that it could be adapted to the Jamaican context by engaging the tourism and agricultural sectors and targeting food waste from hotels and animal manure from farms.

As a major tourist destination, Jamaica's 63 all-inclusive resorts generate tremendous quantities of food waste on a daily basis. A quarter of these resorts can be found in the parish of St. Ann where CSB and Richmond are located. St. Ann also has a significant farming sector with over 150 cattle/pig farms. Collectively, these waste sources can produce enough biogas to generate up to 1 MW of electricity. Additionally, engaging the community could be achieved by helping beneficiaries, such as residential developers to reduce their dependence on the grid by generating their own electricity at a lower cost. Furthermore, by collecting food waste from hotels for free and offering farming beneficiaries a cash reward for supplying their organic waste, the business will attract and retain the huge quantities of organic waste needed to produce enough biogas to ensure its financial viability.

Fortunately, the opportunity to implement this business model came from the 2012 Inter-American Development Bank's IDEAS Energy Innovation Contest for the Caribbean. The competition was seeking proposals for self-sustaining renewable energy programmes that could be replicated across the region. As one of the winners, CSB was awarded a USD 200,000 grant to help implement the business model with the expectation that plant and business operations would begin by July 2014.

From concept to implementation

Securing the waste suppliers

Since the onset of developing the business, the response from the hotel and farming beneficiaries has been tremendous. As an attractive proposition, hotels can reduce their waste disposal cost and farmers can earn supplementary income. To date, three all-inclusive resorts and two dairy farms have committed to providing the required quantities of organic waste for generating the initial 50 kWh target. However, CSB has faced some significant start-up challenges.

Challenge 1: Securing the energy buyer

CSB's original business model was to produce biogas to generate electricity to sell directly to the grid. However, the Jamaican Government introduced a new RFP process unexpectedly in late 2012 for renewable energy providers to obtain a license to sell to the grid. As the RFP requirements were geared to large-scale projects of USD 1 million and above, CSB as a SME would not be able to secure the license, and as a result had to pursue an alternative business model. CSB could now only sell biogas and had to quickly find a viable buyer so as to avoid losing the IDEAS grant. Without CSB having the legal right to generate electricity for sale, such a buyer would also have to commit to purchasing, owning and maintaining their own generator for converting the biogas into electricity.

Biogas projects in Jamaica to date have only been geared towards treating waste and/or producing fertiliser as an output. No facility producing biogas for electricity generation on a consistent basis currently exists in Jamaica and given that the practice of purchasing biofuels to generate electricity is quite uncommon, potential buyers, ready to commit to generating their own electricity in this manner, and to collaborate on developing such a "new" venture in a short time period would be few.

Challenge 2: Securing a project site

CSB will collect waste from the hotels and farms for free. Therefore, to minimise its transportation cost and enhance its financial viability, the biogas facility, had to be sited in close proximity to the hotels and farms as well as the biogas end user/buyer. Finding 2 acres of land with these criteria was, however, a surprising challenge. Most of the land available is government owned, highly contested and zoned for other purposes. Other available land is held by large estates owners who are not interested in leasing or in selling just a few acres.

Challenge 3: Securing project funds

CSB needed an additional USD 100,000 to supplement the IDEAS grant to implement the business, but unfortunately, most banks and lending agencies do not fund start-ups.

Fortunately, CSB's plans to produce biogas for electricity generation were received with great enthusiasm by the Richmond Housing Development, as one of the few developers advocating for renewable energy in Jamaica. As a progressive residential developer intent on implementing sustainability principles, Richmond plans to use renewable energy to power all its public spaces, representing a demand of up to 100 kW. As much as 80% of that energy requirement is expected to be met by solar sources, with the remaining 20% coming from wind and biogas. Supporting and collaborating with CSB will help to bring this plan to fruition. Richmond will purchase all the biogas produced from CSB's pilot plant, which will be sufficient to support a 50 kWh generator initially with the potential to increase generating

capacity to at least 300 kWh within a year. And, CSB will sell the biogas at a rate to allow Richmond to make over 25% in energy cost savings.

In so doing, the collaboration alleviated CSB's key start-up challenges. By siting the biogas facility at Richmond at Priory, St. Ann, CSB secured prime and scarce real estate at a location within 10 minutes of the participating hotels and farms. By Richmond undertaking the cost of purchasing and maintaining the generator, CSB was also able to lower its development cost and to sell green energy, while avoiding the issue of selling electricity without the required license. The biogas will be directly piped from the CSB facility to Richmond's generator, which will be housed adjacent to CSB. And, by securing long-term land lease and biogas sale agreements of 20 years with Richmond, CSB strengthened its bank loan application and secured the additional USD 100,000 to fund its development. This collaboration garnered the necessary resources i.e. prime real estate to site the facility, a viable buyer for the biofuel and project financing, needed to develop CSB.

Conclusion

Through this collaboration, CSB can implement a successful demonstration and pilot that will undoubtedly attract the necessary resources to ensure its growth and long-term sustainability. At the same time, Richmond can support its brand for sustainable living, realise its renewable energy targets, and incorporate energy from waste programmes into its community plan, which will ultimately result in lower energy cost for customers and residents.

With Jamaican residents paying amongst the highest rates in the world for electricity, implementing models similar to CSB are needed to help communities lower their energy cost. These alternative models that allow for off-grid electricity supply and self-energy generators developed at the community level should ultimately be pursued as part of the solution to the energy problem in Jamaica and the Caribbean. In addition, as sustainability planning cuts across economic, environmental and social considerations, obstacles to their successful implementation cannot be solved in isolation. Therefore, to develop sustainable communities, a culture of innovation and entrepreneurial ingenuity that seeks and nurtures smart collaborations amongst vested stakeholders, such as developers and renewable energy providers, should in turn be fostered to ensure their successful adoption across the region.

References

- Allman, L., Fleming, P. and Wallace, A. 2004. 'The progress of English and Welsh local authorities in addressing climate change'. *Local Environment* 9 (3): 271–283.
- Edwards, A. 2011. Lee Issa's The Palms at Richmond revolutionises private sector housing in Ja[maica]. *Jamaica Observer* (online). Available at: http://www.jamaicaobserver.com/business/Lee-Issa-s-The-Palms-at-Richmond-revolutionises-private-sector-housing-in-Ja_9763308#ixzz2kufayqWY

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