Waste Not Wood: Liberia

Gbarnga, LiberiaAnn Arbor, United States
Anisha Gupta
Project Stage:
Idea
Budget:
$10,000 - $50,000
Website:
http://bluelab.engin.umich.edu/projects/biogas

- Energy
- Health education
- Sustainable development
- Waste

Project Summary

Elevator Pitch

Concise Summary: Help us pitch this solution! Provide an explanation within 3-4 short sentences.

Our project focuses on utilizing anaerobic biogas digestion technology to provide an accessible, renewable energy source that will counteract negative respiratory effects from coal and wood burning stoves to women and children in rural farming communities in Liberia, West Africa.

About Project

Problem: What problem is this project trying to address?

In most developing nations, especially those in Africa and Asia, coal or wood burning stoves are used as the primary energy source for cooking. These stoves emit particulates that cause negative respiratory effects to women and children who gather around the poorly ventilated stoves to help prepare meals. Additionally, the use of coal and wood as cooking fuels is not sustainable due to finite resources and deforestation.

Solution: What is the proposed solution? Please be specific!

Our team proposes the use of anaerobic biogas digestion systems to be implemented in rural farming communities. Biogas, one of the two main outputs of the system, can be utilized as a renewable fuel source, as it is comprised of 60-70% methane depending on the inputs. The other output is a slurry that is high in nitrogen content and can thus be used as a fertilizer for farmers to increase their crop yield. Though many biogas digestion projects have been implemented globally, ours is different, as we are developing a biogas compression system that will allow canisters of biogas to be transported to individual homes to be used by families, rather than having a communal stove needing to be shared by an entire community.

Impact: How does it Work

Example: Walk us through a specific example(s) of how this solution makes a difference; include its primary activities.

Once or twice a week someone can go to the biogas digester with a canister to compress the gas into order to take it back to their home. The gas compression process should not take very long and the walk back to their home within one mile in distance. The amount of time that is spent gathering wood or coal for their stoves now far outweighs the time it would take to compress and carry the gas. Once the biogas is at their home, it can be hooked up to the stove in the same way as a natural gas stove. The communities we have surveyed in Liberia understand the effects that wood burning stove has on their eyes and their respiratory system and they made it very clear that they want to use the biogas in order to cook.

Sustainability

Marketplace: Who else is addressing the problem outlined here? How does the proposed project differ from these approaches?

Biogas digestion technology has been implemented all over the world, both in rural, small scale applications and in large scale agricultural applications. There are not currently biogas digesters in the part of Liberia that we are working with. What would really differentiate our solution from others is the compression system. For most digesters, stoves must connect directly to the digester in order to use the energy from the gas. The compression system would allow us to implement a business model in which gas can be transported to consumers to enforce accountability to the community.

About You

Organization:
University of Michigan BLUElab Biogas Team

About You

First Name

Anisha

Last Name

Gupta

Twitter URL

https://twitter.com/BLUElabBiogas

Facebook URL

https://www.facebook.com/BLUElabBiogas

About Your Project

Organization Name

University of Michigan BLUElab Biogas Team

Organization Country

, MI, Ann Arbor, Washtenaw County

Country where this project is creating social impact

, BG, Gbarnga

How long has your organization been operating?

More than 5 years

The information you provide here will be used to fill in any parts of your profile that have been left blank, such as interests, organization information, and website. No contact information will be made public. Please uncheck here if you do not want this to happen..

Your Solution

Founding Story: Share a story about the "Aha!" moment that led you to get started and/or to see the potential for this to succeed.

Our team was established 7 years ago and we have worked on several different projects relating to biogas in different regions. Last year, we began working on this project in Liberia. We discovered that the communities are quite spread out and there is definite need for a renewable cooking fuel source present in the communities. However, we discovered that individual families cook on different schedules and require different amounts of fuel. We began working with the University of Cuttington this summer, having implemented our second digester in country on their campus, and realized that transportation of biogas was crucial to the market to compete with coal, the primary fuel source in these communities.

Select Sector(s): To which of Unilever's categories of sustainability does your solution apply?

Greenhouse Gases, Waste, Smallholder Farmers, Supply Chain Micro-entrepreneurs.

Measurable Impact

Audience: Who have you identified as your customers/recipients and why? How will you get your solution to them or engage them in your initiative?

Our current customers are the people surrounding the university in Liberia. Since we have already built the biogas digester there and know what materials they have, we will use that knowledge to design a compression system and canister that will also be able to be construction or bought in Liberia. We have done preliminary surveying that it seems that the people that live in these villages are very interested in using biogas in order to cook and they are very open to the change in their lifestyle.

Impact: What is the impact of the work to date and expected impact in the future?

Right now there is a 3m^3 biogas digester implemented at University of Cuttington in Liberia. The biogas digester is in the start up stage, during which the methanogenic bacteria that creates the biogas is cultivated. This process generally takes 1-3 months. In the future, we expect to fully implement a compression system in order to make the biogas transportable to peoples homes so they will no longer have to use wood burning stoves. We have partnered with another university group on campus in Liberia who will be working on monitoring the operations of the digester and the implementation of the compressor. The dean of the university has shown interest in helping us to cultivate a model to sell the biogas to the surrounding community either through selling of the full canisters or on a Pay As You Go model in which gas can be metered and paid for on a volume basis.

Growth, Finance & Leadership

Scaling the Solution: How do you intend to scale your activities over the next two years (e.g., reach new markets, diversify solutions, etc.)? What will make this possible?

We intend to create a functional prototype starting in January and then implement the compression system in Liberia next summer. We will be conducting further market research after concluding our design process to figure out the optimal distribution method for the canisters as well as the release model for the gas itself. Once we establish a functional model, we plan to move towards a system of microcredits, where we would be able to expand the technology to new market and farmers would be able to implement a new digester and compression system and start a business within their community to sell biogas in the same model. After we feel comfortable with the model implemented in Liberian communities, we plan to shift our focus to a new region.

Financial Sustainability: What is your business model to ensure financial sustainability?

In order to ensure financial sustainability, we will need to implement a robust distribution plan that will allow us to address the need of the community

we are working with but also help us to meet our goals. We will additionally need to continue to perform surveying and market research to make sure that our product continues to exceed the work of our competitors and continues to improve with growing knowledge of the technology and communities.

Experience: Please provide examples of any previous entrepreneurial initiatives you have pioneered.

Our team has not previously worked on implementing any entrepreneurial initiatives, but we have several business students on our team and have resources with the Center for Entrepreneurship at the University of Michigan, who will help us to develop and implement our plan.
