

Let There Be Light!
Primary School Electrification with Jatropha Curcas Oil
Kadelso, North Kintampo, Ghana

Background

Electricity has a vast impact on economic, political, and social sectors and is thus central to human development and state stability. A lack of energy hinders the provision of basic services such as health care as well as of income-generating activities. Women, in particular, are often hindered from going to work because of time-consuming and inefficient traditional ways of energy production.¹ Children sometimes also have to assist with energy production and, without access to electricity in the first place, maintaining a school and studying in the evening becomes very difficult. Thus, electricity fundamentally empowers women and fosters long-term education.

Yet, there are also several challenges linked to energy that could harm domestic and international peace. A potential monopole in the oil industry is a clear threat to international security since it will increase economic and political dependence of several countries on only one geopolitical area. Further, the unsustainable nature of non-renewable energy largely contributes to climate change, which could lead to political conflicts and human misery. The United Nations Foundation estimates that about 2 million people die each year from smoke and pollution generated by heating devices. Further, 1.5 million people still do not have access to energy, with an additional 1 billion people only having access to unreliable energy sources.²

Rural areas in Africa are especially affected by a lack of electricity. More than 70%³ of the poorest people live in rural areas, which is often a result of the policy and institutional constraints imposed during colonization and governments' neglect to build rural capacity afterwards. Lack of access to markets decreases the incentive for small-scale enterprises to build regional capacity.

An exception is Jatropha Africa, a Ghanaian biofuel feedstock company that is supported by the EU and Clean Energy and Finance Development and was recently started to harvest Jatropha Curcas. Jatropha is a drought-resistant perennial, which grows well in poor soil and produces seeds for 40 years. Using the oil pressed from the seeds is completely CO₂ neutral; as a result, Jatropha has gained rapidly increasing attention in the renewable energy sector and could transform the lives of million of people living in rural areas.

One village that is located in one of the most rural areas of Ghana is Kadelso in the North Kintampo District. While there is a small health center and one school, the community does not have any electricity or potable water and is isolated from the rest of the country. Due to a lack of employment, especially young people have been moving to cities in order to find jobs. Electricity is highly needed to enable effective education, health services, local employment and opportunities for women, as well as to ensure and foster stability and peace.

Proposal Overview

Our goal is to assist the population of Kadelso in sustainably powering their local school with Jatropha bio fuel. Stephane is a chemical engineer major at UCSD and Christina is an Economics and Diplomacy/World Affairs major at Occidental. We are both very passionate about alternative energy sources and development in Africa so we wanted to combine our majors for an effective project around peace. Christina worked in Kenya last August around government budget transparency and Stephane is an international student from the Ivory Coast who also interned in Kenya at a Jatropha farm in 2010. Inspired by the great potential of Jatropha, we created the idea to help an African village to sustain itself with Jatropha energy. We presented our idea to the Green Africa Foundation working in Kenya who redirected us to Jatropha Africa in Ghana (due to safety issues in Kenya). Jatropha Africa greatly welcomed our idea, offered technical support and introduced us to the Kadelso village and the school, who appreciated our offer. Our local partners will thus be Jatropha Africa, with whom we are in contact, the director of the school in Kadelso, and the head of the village. We will plant one hectare of Jatropha Curcas, install an oil-pressing machine that will extract the oil from Jatropha seeds, plus a diesel generator that will be powered with the extracted oil. Women of the village will do the

¹ Oxfam. Electricity crisis brings dark times for women in Gaza. In: <http://www.oxfam.org/en/emergencies/gaza/electricity-crisis-brings-dark-times-women-gaza> (10/21/13).

² United Nations Foundation. What we Do: Universal Energy Access. In: <http://www.unfoundation.org/what-we-do/issues/energy-and-climate/clean-energy-development.html> (10/21/13).

³ Rural Poverty Portal. In: <http://www.ruralpovertyportal.org/region/huome/tags/africa> (10/21/13).

collection of the Jatropha seeds, and, with the support of Jatropha Africa, we will train a team of five local people to maintain the pressing machine and generator to power the school.

The project is targeted to build enough capacity so that, in the future, the village will be able to independently generate sustainable electricity and employment opportunities for its population. In the long run, the habitants will be able to receive seeds in exchange for their energy bills. All villagers working for the project will have free access to electricity, and will be able to sell excess seeds to gain additional income. This will establish a self-sustained energy system, which will hopefully inspire neighbor villages and villages in other countries to follow the example of Kadelso.

Action Steps

Prior Departure

- Specification of the support by Jatropha Africa, by the school and distribution of work
- Preparation of content and schedule of “Introduction to Jatropha Curcas” workshop for the school
- Preparation of content and schedule of “Sustainable Use of Energy for Kadelso school” workshop

Day 1-2

- Purchase of one single stroke liter diesel engine and a seed milling machine run by a 6 horse-power Jatropha fuelled engine
- “Introduction to Jatropha Curcas” workshop for the whole village
- Pre-survey on expectations for the project with all project participants involved

Week 1: Seed Production & Model Jatropha Demonstration Farm

- Distribution of employment, including seed collection and recruitment of a 5-member operating and maintenance staff
- Plantation of a one hectare Jatropha Curcas farm with the help of the villagers and of the school

Week 2-3: Power Generation and Human Organization

- Installation of the single stroke diesel liter engine and seed milling at the school
- Training of five villagers who will maintain the oil press - generator system
- Development of a business plan for the school
- “Sustainable use of energy for Kadelso school” workshop for the local school
- Meeting with villagers for the creation of a:
 1. Village Energy Committee (VEC) out of the existing farmer-based organization Nnoboia Fekuw at Kadelso, which will manage the project at the village level
 2. Village Finance Committee (VFC), which will collect revenue for project participants in the form of Jatropha seeds or cash or both. This committee will operate a bank account with the Kintampo Rural Bank at the nearby town
 3. Village Business Development Committee (VBDC), which will be responsible for developing business opportunities and work to replicate the project in the neighbor villages

- Mid-project review

Week 4: Making the Project Fully Sustainable

- Expansion of the school’s business plan to the health center and the private houses in the village
- Continuing Assistance in the creation of the VEC, VFC, and the VBDC, and election of leaders
- End-project review and workshop on “Steps Towards The Sustainable Use of Jatropha”

Short-Term Outcomes	Long-Term Outcomes
Electricity provision to the only school in Kadelso;	Enabling long-term education, which leads out of poverty and crime and towards opportunities for a stable life; raising a generation that is aware of sustainable energy use;
Creation of employment in Kadelso and establishment of structured committees to overview the Jatropha process;	Adding economic value through profit sharing agreements with village councils; provision of independence and self governance to several rural areas in Africa;
Switch from dangerous energy sources to a CO2 neutral energy source;	Inspiring neighboring communities to use Jatropha, thus contributing to a broader use of renewable energy in Africa and fighting against conflict that is caused by environmental pollution and climate change;
Shorter energy generation process; women can work in the Jatropha fields and in the maintenance team, and be paid by seeds, cash or both.	Gender equality that leads to economic growth and raises families’ awareness for sustainable energy use.