

## FONDS SUEZ ENVIRONNEMENT Initiatives – Institut de France Awards

Winner of the category "**Social entrepreneurship**"

2011-2012 Edition

### "Transformation of waste into charcoal briquettes"

#### Structure

Created in 2010, **Green Bio Energy Ltd. (GBE Ltd.)** is the first social enterprise to manufacture and sell charcoal briquettes in **Uganda**.



In addition to its work transforming charcoal dust into carbonised briquettes, GBE has organised a network of producers of "green charcoal" that collects organic waste and transforms it into charcoal. These green charcoal producers are independent from GBE and sell their products to the company, which then transforms them into carbonised briquettes that are sold as an environmentally-friendly product aimed at replacing traditional wood charcoal.

#### Context

Waste management, in particular organic waste management which forms over 80% of all waste, is one of the major problems that the urban population of Kampala (the capital city of Uganda) must tackle. The companies paid by Kumpala city council are currently able to process only a fraction of all of the waste produced. The remaining waste is either burnt in the road, or piled up in illegal dumps, with all the risks to public health that this entails.

Furthermore, the vast majority of households in Kampala use wood charcoal for cooking. In recent years, the price of charcoal has risen regularly. Therefore, this outlay accounts for an ever greater proportion of the budget of the poor households in Kampala. Coupled with this financial aspect is an environmental problem, as this high level of urban charcoal consumption goes hand in hand with massive deforestation (it is estimated that 3% of the Ugandan forest area disappears each year). GBE Ltd has developed an original response to this threefold economic, environmental and public health-related problem.

#### Aims

1. **To raise awareness** amongst the inhabitants of the shantytowns with regard to waste management and protection of the environment.
2. **To (partially) clean up** ten underprivileged neighbourhoods in Kampala by collecting and processing the organic waste generated by households and local markets.
3. **To transform** this waste into charcoal dust as a basis for an income-generating activity for vulnerable people, as Green Bio Energy vouches for the outlets for this valuable resource.
4. **To promote** the use of renewable energy, which would make it possible to reduce deforestation and the energy expenses of the poorest households by involving stakeholders in the distribution of the charcoal briquettes.



## Description of the project

The project consists of training the inhabitants of the poor neighbourhoods of Kampala in the transformation of organic waste into charcoal dust. This charcoal dust will then be purchased by GBE in order to produce briquettes that can be used as a replacement for traditional wood charcoal. Eventually, the network formed by GBE in the various neighbourhoods of Kampala will make it possible to collect 10 tonnes of organic waste (humid waste) per day and to then transform it into 500 kg of "green charcoal". Green Bio Energy develops the machinery (carbonisers, presses, dryers and grinders) and the process (organisation of the work, strong social culture, transparency, etc.), which are required for the production of the briquettes, locally.



The key stages in the production method for the briquettes are as follows: collection of solid organic waste, sorting and drying of solid organic waste, carbonisation of the waste, transformation of the green charcoal obtained into dust, production of a binder and blending of the binder with the dust, production of the charcoal briquettes, drying of the charcoal briquettes, packaging and distribution of the charcoal briquettes.

The formula for the binder, together with all other information relating to the materials and the technique used to develop this project are available from Green Bio Energy.

## Description of the innovation

Green Bio Energy is offering a viable, sustainable alternative to traditional fuel sources. This project puts forward a technical, financial and organisational solution:

1. **Technical:** the operational production units for the green charcoal are created, which then benefit from sufficient monitoring and the transfer of a sufficient amount of competences to enable them to operate independently. Furthermore, workers in the local workshops have been trained in the production of the machinery required for the production of the briquettes.
2. **Financial:** the inhabitants of the underprivileged neighbourhoods participating in the project benefit from elementary management training, which instructs them in the fundamentals of entrepreneurship. They are then fully integrated into the Green Bio Energy value chain and receive a stable wage for their activity.
3. **Organisational:** the production processes, the efficiency of which has been tested, are taught to the participants, in particular human resource management, the organisation of work and the respect of the basic rules of health and safety.

By associating a business activity with a genuine social and industrial project, the inhabitants of the underprivileged neighbourhoods participating in the project are guaranteed that they will be paid for their efforts, and the hope of future earnings is the primary reason behind them joining the project. Therefore, the participants are no longer mere "beneficiaries" of a development project, but they are fully-fledged economic stakeholders who are integrated into the production process of the green charcoal briquettes ("inclusive business" model).

## Results

- The launch of pilot sites in Kampala: the project has been developed and tested in nine areas with a high population density (shantytowns). It will be developed and extended so that 500 kg of green charcoal can be produced daily.
- The GBE procedure (from collection to distribution), its protocols (quality, health and safety) and its business model (social and environmental) are sustainable.
- GBE currently employs 21 people, added to whom are the green charcoal producers.
- The machines used in all stages of production are produced locally and they are maintained on site.
- The green charcoal briquettes are sold on the local market at a competitive price (10 to 40% cheaper than traditional fuel).
- GBE currently has around 2,000 clients, who buy the briquettes either from the Kampala markets or from the GBE offices directly.
- The reduction of the energy expenses for 850 to 1,000 households.



## Reproducibility

The technique for producing green charcoal is simple and, therefore, easy to reproduce. First and foremost, the reproducibility of the project relies on the existence of a small-scale production industry capable of transforming the green charcoal into briquettes. There are three other factors that are equally essential:

- **Management:** a human factor, the ability to organise and create a network of producers of green charcoal.
- **The climate:** the higher the humidity in the target area, the longer the drying time required for the organic waste.
- **The economic background:** the price of charcoal must be high enough to ensure that the production of briquettes is economically viable.

## Conditions relating to replicability

- **Location:** all medium and large African towns and cities.
- **The socio-economic background:** the fuel market must consist primarily of wood charcoal and wood fuel.
- **Geographical positioning:** it must be close enough for sourcing the required materials (organic waste) and in the vicinity of the market for commercial outlets and it must also have a plot of land that is large enough for drying the waste and charcoal briquettes.
- **Local resources:** the existence of a network of metal-working workshops producing tools / machines for the agricultural sector, for the production of all of the machinery and the existence of a small local industry capable of transforming the green charcoal into charcoal briquettes.
- **Potential population that would benefit:** for 500 kg of charcoal briquettes produced, between 20 and 40 people are employed directly and up to 10 times more people (for collection, sorting

and distribution) benefit indirectly from the value chain. As for consumption, a production of 500 kg of briquettes daily enables 170 households (around 1,000 people) to use renewable, clean fuel, reducing household expenditure by 10 to 40%.

- **The equipment** used for the carbonisation is not difficult to manufacture. However, a large plot of land is required for drying the organic waste. The daily production capacity will always be limited by drying in the event that there is insufficient space.
- **Training**, of between 3 and 6 days, is required in advance in order to acquire the basic technical and commercial knowledge required for start-up.
- The necessity of **Personal protective equipment (PPE)**: masks, gloves and boots for the handling of the charcoal dust.



## Contact

Ronan Le Moguen, Chief Executive Officer

[ronan.lemoguen@greenbioenergy.org](mailto:ronan.lemoguen@greenbioenergy.org)

## Websites

- ❑ FONDS SUEZ ENVIRONNEMENT Initiatives – Institut de France Awards: [www.prix-initiatives.com](http://www.prix-initiatives.com)
- ❑ Green Bio Energy: [www.greenbioenergy.org](http://www.greenbioenergy.org)