THE BEEMA BAMBOO TO ENERGY PROJECT

The project scope entails the cultivation of 500 hectares of beema bamboo, in the Ilembe District, the setup of a laboratory and nursery at the Dube Trade Port and a power plant (3.6MWe) in Isithebe. The project kick of date is November 2013, with planting of the bamboo shoots starting in Decembe2013/ January 2014.

This initiative in South Africa is a national demonstration project that will enhance the use of the beema bamboo biomass feedstock for the generation of electricity. The growing of bamboo will assist Eskom in acquiring much needed sustainable biomass feedstock for the co-firing of their power stations. Eskom has to reduce its reliance on fossil fuels by 10%, and replace it with a sustainable biomass feedstock by 2026. This translates to 120 million tons of biomass feedstock per annum, hence the strategic nature of the project, to this extent Green Grid has signed a Non - Disclosure Agreement with Eskom with regards the research and development of the project.

The District Council of Ilembe pledged its support for the project and has the facilitated 500 hectares of land in the Local Municipality of Mandeni for this project and has favoured Green Grid with a letter of support for the implementation of national demonstration project. The District Council has in addition, committed to providing assistance in ensuring that all the legal requirements are met for the establishment of the project.

BACKGROUND

South Africa needs a Sustainable Biomass Feed stock for energy generation.

To provide a product that can create a sustainable supply of BIOMASS FEEDSTOCK by establishing, a tissue culture laboratory for the propagation of the bamboo shoots, a bamboo energy plantation and a power plant that will use the bamboo as a feedstock to generate electricity.

“Beema” is a specially bred variety by Dr. N. Barathi of Growmore Biotech Ltd., which has a potential to grow very fast and yields very high biomass due to the fact that the wall thickness of “Beema” Bamboo is 3 times more than other bamboo. The carbon content of “Beema” Bamboo is between 46 to 48%.

The dry matter production of “Beema” Bamboo under optimum condition reaches 40 to 50 tons per acre or 100 to 125 tons per hectare. The total carbon accumulation every year, after 5 years of growth is from 18 tons to 23 tons per acre, which is equivalent to 69 tons to 80 tons per hectare respectively.

Due to this fact, “Beema” Bamboo acts as a “Carbon Sink”. When “Beema” Bamboo is grown individually in the gardens and parks, it sequesters 400 to 500 kg. Of carbon di-oxide every year, thereby reduces the Carbon di-oxide in the surrounding places. “Beema” Bamboo generates 70 to 80 CER per acre / year, which is equivalent to 175 to 200 CER per hectare every year.

SUPPLY OF SUSTAINABLE BIOMASS FEEDSTOCK

South Africa needs a sustainable source of woody biomass which includes natural and managed forests, dedicated energy crops and non-forest trees. By-products and wood waste from the forest industry may be another sustainable source of woody biomass for energy (FAO 2010, Lunnan et al. 2008). The ability to grow successive rotations of timber without productivity losses contributes to the profitability of forestry and sustainability (Freer-Smith 2007). Sustainable forest management is a pivotal element of sustainable energy production and it is critical that possible adverse effects, such as biodiversity losses do not outweigh the benefits of the bioenergy production and use.

Bioenergy production is considered sustainable if biomass utilization levels do not exceed growth over time. The Beema Bamboo once planted can grow for 100 years and can be harvested annually.

The Council for Scientific and Industrial Research has developed an analytical framework and decision-support tools to assist in assessing, managing and monitoring the sustainability of bio- energy. This work mapped the woody biomass distribution in South Africa. The outcome of the work was a national resource map for the woody biomass, projecting the growth and estimates of potential quantities. Resources such as invasive alien plants and bush encroachment, presenting the highest potential, are only available for a defined period, estimated to be 20 years. Agricultural and forest residues could be considered as well.

Our engagement with the Geosciences Council indicates that South Africa has six thousand disused mines which can potentially become a viable option for rehabilitation and remediation thus providing the necessary supply of biomass to Eskom.

Whilst woody bioenergy feedstock’s can be collected from a wide range of forestry production Systems ranging from extensive gathering of small amounts of fuel wood to highly intensive Energy cropping systems with frequent interventions and total utilization of roots and tops, BEEMA Bamboo is best for Agro-forestry and high Carbon Sequestration.

ADVANTAGES OF BEEMA BAMBOO

- Fast Growing
- High Biomass
- Thorn-less
- Thick Walled
- Sterile Plant

Bamboo is the best solution for containing global warming in many ways:

- Bamboo absorbs Carbon dioxide and releases oxygen into the atmosphere 3 to 4 times higher than many other trees.
- One bamboo tree generates plenty of natural oxygen sufficient for more than one human being's daily requirement
- Grows more than one foot a day and covers with good canopy faster than any other tree and cooling the surroundings.
- Carbon dioxide absorption of bamboo remains same, since Bamboo keeps growing every year while other trees reach maturity after a fixed period.
- Every part of the bamboo is used to make varieties of products.
- Bamboo can replace the wood for all applications such as paper, flooring, furniture, charcoal, etc.
- Recently developed cotton from bamboo will replace regular cotton, with a productivity of over 10 times from the same land.
- Bamboo has replaced 50% of plastic.
- Bamboo co-polymer plastic replaces 50% of plastic which is essential but not eco-friendly.
- Bamboo effectively cleans the water pollution of the septic tank discharge and factories effluent by its natural affinity for nitrogen, phosphorus and heavy metals.
- Bamboo enriches the soil naturally and prevents soil erosion.

From research conducted, for a place in India to become CARBON NEUTRAL, one should plant only 3 BEEMA BAMBOO per person to take care of one's emissions in one's life time. India's annual per capita carbon dioxide emission is 1,300 Kgs. When one takes as much CO2 out of the atmosphere as you put in, you are "carbon-neutral" – you are leaving no CARBON footprint! If everyone leaves no footprint, we don't have to worry about global warming. We can reduce the carbon footprint by planting the right variety of bamboo that grows 1.5 feet a day & removes over 400 Kgs of CO2 every year to "offset" the carbon emissions.

One fully grown Beema bamboo would sequester above 400 Kgs. of Carbon dioxide from our surrounding every year for the next 100 years - at least for the next few generations.

One family of four including a dog or a cat would essentially require 1100 to 1250 kg of oxygen every year for breathing which is made available by 3 bamboo plants organically.

ENVIRONMENTAL IMPACT ASSESSMENT

Environmental Impact Assessment has been complied with, for the bamboo plantation and the power plant. We have presented to the Provincial Department of Agriculture and Environmental Affairs, in January 2013. The department, having been made aware of the project and the economic spin offs it will have for the province, were prepared to prioritise the project. . In fact, the growing of Beema Bamboo counters soil erosion and promotes the phyto-remediation of polluted soil and water and is the fastest growing plant in the world.