

MILE Symposium 2019

Submission of a Project-Based Descriptive Summary for the Bridging Worlds Project

The submission deadline is May 10, 2019, at 12:30pm.

Submission by:

Paul Jones (Lumec)

paul@lumec.co.za

0837750864

On behalf of:

Bridging Worlds

Tjibbe Winkler & Gary Cullen

tjibbe@prm-international.org

gary.cullen@durban.gov.za

Project Title and Author information

The title of the project is “**Bridging Worlds**”, a partnership between PRM International and the Green Corridors NPC. Given the nature of this partnership, the authorship is shared between these organisations and represented by Gary Cullen and Tjibbe Winkler.

Introduction

The concept of the *circular economy* is increasingly becoming international best practice for sustainable manufacturing and production. The principle of the circular economy is that “nothing is waste”, instead all “waste” by-products can be treated as residual streams that can become input resources for further value adding processes. PRM International (PRM), a Dutch social enterprise consortium, is at the leading edge of innovation in the bio-based sector within the Netherlands. PRM is involved with the innovation and commercialisation of a number of products based on plant-based raw materials (i.e. plant fibres) in the Netherlands, such as bio-based packaging, plant pots, concrete and bricks, and composite planks which can be used to make street furniture, signage, etc.

In 2017 PRM secured a soft loan from the Dutch enterprise development agency (RVO) to engage in an initiative in South Africa and approached eThekweni’s Economic Development Unit (EDU) for assistance. PRM has since formed ‘**Bridging Worlds**’ with the Green Corridors NPC. The involvement of Green Corridors NPC, which is an eThekweni Municipality funded Special Purpose Vehicle, offers the potential that this initiative will contribute to the self-funding of its long term sustainability. Intellectual property of the Dutch partners will be used to develop new South African-owned intellectual property related to products developed with local plant feedstock such as sugarcane waste and alien invasive plants.

Project Description

The Bridging Worlds project proposes to stimulate the development of a bio-technology manufacturing sector in eThekweni and KwaZulu-Natal based on processing residual, green waste streams as feedstocks for the manufacturing of industrial raw materials which can be further absorbed into various manufacturing value chains. The catalytic intervention to initiate

this project is establishment of a Biomass Application Centre (BAC) in KwaMashu. The objectives of this facility are to:

- Process plant feedstocks into fibres, proteins and other industrial raw materials as inputs into various manufacturing processes to produce products such as paper, packaging, bio-composite planks, and various other applications;
- Utilise municipal and other green and organic waste to create Bokashi, an anaerobic fermentation composting method to create a high-value compost;
- Beneficiate plastics that are cleaned out of the rivers by the Sihlanzimvelo programme and blended with crushed building rubble from cleaning up dumping sites to make paving slabs and other moulded products;
- Collect coffee grind waste from coffee shops to grow mushrooms on this coffee waste inside containers - the mushrooms are sold back to the coffee shops and other outlets.
- Serve as a research and innovation catalyst, working with relevant institutions to develop new products applications;
- Work with manufacturers and innovators to commercialise new product applications and to give rise to new manufacturing ventures;
- Operate as a type of incubator which will allow for school education on the circular economy and create opportunities for SMME development and grassroot innovation within the local community.

The main intended feedstocks for the BAC will be from sugarcane and wood bark. The uptake of sugarcane leaves and bagasse, and wattle and pine bagasse from the timber mills, will create new demand especially by increasing the value addition for residual (waste) streams. This has the prospect that other BAC's can be established around existing sugar and timber mills, thus supporting these local economies through secondary manufacturing and job creation.

Alien invasive plants (AIPs) will be another important feedstock. The focus on AIPs is motivated by the objective of creating a sustainable commercial demand for these plant species that will support sustainability in managing this environmental threat, both on land and in our rivers and dams. These feedstocks are only secondary because the cost and consistency of supply due to harvesting from widespread locations will require alignment with public sector-funded alien control programmes, and volumes will be uncertain. Nevertheless, the proof of concept for the project in The Netherlands has been based on using invasive water plants.

The pilot BAC facility in KwaMashu, will serve as a model for regional replication, with the potential to create new manufacturing business and jobs in rural areas, in particular around locations of sugar and timber mills in KwaZulu-Natal, the Eastern Cape and Mpumalanga. By helping to sustain these local economies, eThekwini will be alleviating the pressure that arises from poverty-driven economic migration into the city. Furthermore, the absorption of “green waste” into bio-economy manufacturing reduces the volume of organic matter going to DSW landfills, thus extending the life of these facilities and reducing transport costs.

Project partners and progress

Bridging Worlds is a South African registered private company whose memorandum of incorporation is in the process of being finalised. Shareholders include:

- PRM International (40%)
- Green Corridors NPC (40%)
- Local community partner/s to be determined (10%)

PRM International bring experience and intellectual property to Bridging Worlds, while Green Corridors is the implementation arm, with access to local communities, sites and organic feedstocks e.g. alien invasive species. eThekwini EDU has supported the development of the initiative since November 2017 from the perspective of building a new bio-economy manufacturing sector that relates to the existing Chemicals and Materials Recovery sector development programme. Engagements have been facilitated with a broad range of stakeholders throughout the proposed value chain, including government agencies, research bodies, industry associations and manufacturers, with the aim of creating new manufacturing opportunities in and around eThekwini.

A business case study was completed in July 2018 and outlines the value chains and economic development opportunities for eThekwini. The report has been positively received by the stakeholders, in particular, the Department of Science and Technology (DST), the Technology Innovation Agency (TIA), Trade and Investment KZN (TIKZN) and the SA Sugar Association (SASA). A number of manufacturers have become involved in discussions with Bridging Worlds, and these are expected to lead to off-take agreements for fibres and other industrial raw materials. Currently, two manufacturers are in the processes of undertaking trials with fibres from sugarcane and AIPs (Syringa and Spanish Reed), and within the next month, are expected

to have completed a prototype for a fibre-based shoe sole and food tray (i.e: such as an egg box).

The SA Sugar Research Institute has assisted with the analysis of the fibre and chemical composition of 16 plant species including sugar, timber and a number of priority invasive alien plants. Bridging Worlds is currently undertaking research with the CSIR Bio-refinery in Durban to analyse the fibre, cellulose, protein and lignin characteristics of various plant feedstocks to understand their product application potential. At the same time, the business case study is being developed into a detailed feasibility study for commercialisation of bio-concrete, bio-packaging and bio-composite (moulded or extruded items such as building materials and outdoor furniture) products.

The KwaMashu facility is currently being developed, machinery is in the process of being procured, and it is expected that the facility will be producing its first bio-based fibres by September 2019.

Relevance and Impact to eThekweni Municipality

A significant number of new manufacturing businesses and direct and indirect jobs are expected to be created in the following stages of the value chain:

- Feedstock supply, especially in harvesting and collection of AIPs and other types;
- Raw materials manufacturing, in processing the plants into fibres, proteins and other chemicals for industrial applications, and the replication of the BAC model;
- Application development, by working with manufacturers to identify the application of fibre types to the development of commercially viable products.
- Biotechnology product manufacturing including;
 - Green concrete with a fibre content;
 - Bio-composite products, such as building materials and outdoor furniture;
 - Bio-plastic composite materials;
 - Paper and packaging;
 - Animal feed;
 - Industrial chemicals for fertiliser and other industrial uses.

In addition, other potential impacts include:

- Opportunity to broker partnerships and projects that support the black industrialist programme and economic transformation;

- Environmental benefits including co-funding of AIP control programmes, diversion of municipal and residential green waste from landfill, diversion of plastic waste from rivers, and the potential to reduce the burning of green cane.

Conclusion

Bridging Worlds stimulates the green economy by seeing organic waste as a raw material to create bio-based products. Bridging Worlds organises new value chains to upcycle plant fibres, protein, organic materials and nutrients into sustainable products and goods. These new value chains create jobs, support community and rural development, and reduce the environmental and social problems associated with alien plants and other organic waste streams. Bridging Worlds is not just a project - it's a process of implementing the circular economy through collaboration along the entire value chain. It is an innovation hub, a factory, stimulator of employment opportunities, and a showroom for the local and sustainable economy.