



ASX CODE (GPP)
ABN 22 000 002 111

ABOUT GREENPOWER

Greenpower Energy is a clean energy technology developer progressing the development of 'zero carbon' processes for converting coal to transport fuels, which it can then apply to the company's own sizeable inferred resource of Victorian brown coal. Go to greenpowerenergy.com.au

CAPITAL STRUCTURE

- Shares on issue	92,466k
- Unlisted options	0.7m
As at 30 Jun 2015:	
- Cash	0.86m
- Shares in listed co	0.3m
- Exploration assets	1.3m

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Greenpower and Monash University receive funding to investigate brown coal conversion into agriculture and bio-diesel products

18 August 2015: A joint Greenpower Energy Limited (ASX: GPP)/Monash University research and development project has received funding support from the Commonwealth Government's Research Connections initiative. This GPP/Monash program is focusing on enabling the conversion of carbonaceous products, including coal, to be used as:

1. An agricultural biostimulant
2. A source of carbon for soil, and
3. A related program as a source of lipids for bio-diesel production.

The OHD process converts Victorian Brown Coal (VBC) into a range of low molecular weight organic compounds. Greenpower has the exclusive Australian rights to this revolutionary eco-friendly process. When VBC is used as the feedstock the primary output from the Oxidative Hydrothermal Dissolution (OHD) reactor is an orange fluid 1.5% organic compounds: 98.5% water-called Primary Feed 1 (PF1)(Fig. 1). By way of a straight forward reverse osmosis process the fluid is concentrated to 5% organic compounds: 95% water-called PF2.

The company is pleased to announce that researchers from Monash University have begun programs to develop commercial utilisation of both PF1 and PF2 and it is this work that has received Commonwealth Government support.

PF2 is potentially comparable to fulvic acid products used for agricultural purposes. The Monash program over a 12 month period is designed to develop PF2 as a plant biostimulant and source for soil carbon.

The relatively simple OHD process when used to process VBC has the potential to be an economic game changer for the production of fulvic acid type plant biostimulants.



PF1 is the basic 1.5wt% OHD fluid (see Fig 1). It has been noted that when allowed unfettered contact with the atmosphere the OHD compounds will convert to mould and the mould contains lipids. This process has not yet been subjected to controlled investigation and the Monash research team has started a structured investigation. For this work a successful outcome will be lipid yields from the mould at a level to enable economic bio-diesel production.

About the OHD process:

The OHD process converts carbonaceous material into organic compounds. The scientific basis of the process is described and elaborated in USA Patent PCT/210/0233886, dated August 19, 2010.

When applied to VBC the relative simplicity of the process in combination with the highly reactive coal enables organic compounds to be made on an economically favourable basis. Processing of 1 tonne of VBC will yield ~400kg of organic compounds. On a per tonne of ROM VBC basis the input costs are less than \$100 (coal, oxygen, electricity & labour). The OHD process does not require complex machinery and for a small plant of 20 tonnes/day the capital intensity is less than \$1 million per daily tonne of product.

About biodiesel:

Biodiesel is made by chemically reacting lipids with an alcohol (ethyl alcohol or methyl alcohol). This product can be used in standard diesel engines—modifications are not required and it can be used alone or blended with petro diesel in any proportions. Biodiesel should not be confused with the usage of vegetable and waste oils that require modification to standard diesel engines. Wikipedia on line encyclopaedia contains a good article (22 pages) on biodiesel that is easy to understand for the general reader.

About plant biostimulants:

The accelerated use of biostimulants in agriculture is a recent phenomenon. In a major study Calvo, Nelson & Kloepper [<http://link.springer.com/article/10.1007%2FS11104-014-2131-8#page-1>] conclude: "Plant biostimulants are diverse substances and microorganisms used to enhance plant growth. The global market for biostimulants is projected to increase 12% per year and reach \$2200 million by 2018." Biostimulants are a varied group and one major group is "humic substances" of which fulvic acid is itself a major component. Humic substances comprise a contiguous family of substances ranging from humic acid (high molecular weight and brown) to fulvic acid (low molecular weight and yellow). Figure 2 below shows this relationship.

