This is the energetix Biodiesel (a division of the Victor Smorgon Group) submission to Diesel/Biodiesel Blends discussion paper for the Department of the Environment and Heritage, Fuel and Used Oil Policy Section.

We currently manufacture Biodiesel and Biodiesel / Diesel blends in Laverton North, Victoria. Energetix has identified a number of issues with the Standardising of Diesel / Biodiesel blends:

The introduction of diesel/biodiesel blend standards as proposed in the discussion paper will have a negative effect on the development of the Australian biodiesel industry. Further, this would limit our ability to contribute to the environmental benefits of blended fuels.

The environmental and safety benefits of biodiesel and biodiesel/automotive diesel blends have been well documented. A summary of the results is included in Attachment A (Our submission to the Inquiry into the production and or use of Biofuels in Victoria, 2006).

Energetix fuel (comprised of Biodiesel / Diesel Blends) meets the automotive diesel standard and qualifies for fuel tax credits under the Fuel Tax Act 2006 and should continue to do so. We are concerned that creating blend standards (B5, B10, B20…) would cause market confusion. Further, this situation is made worse by the phasing out of Energy Grants Credit Scheme (EGCS).

Energetix Biodiesel has demonstrated that we have been able to provide automotive diesel/biodiesel blends at 30% biodiesel that readily meet the automotive diesel standard. We believe that in future, even higher blends may be developed that can meet the automotive diesel standard and provide the required fuel quality for motorists.

The automotive diesel standard is a performance standard which when met deems a fuel fit for use in diesel engines. It even allows for differences in the nature of crude oils used by refineries to produce automotive diesel and hydrocarbon diesel producers often seek density waivers for their products.

We maintain that biodiesel could be considered as no more than a different feedstock used in the manufacture of a fuel that meets all the requirements of the automotive diesel standard. It is however imperative that the biodiesel used in any blend comply with the Australian biodiesel standard for B100 - Fuel Standard (Biodiesel) Determination 2003.

The guarantee of this fuel standard, will ensure that Australian biodiesel producers who qualify for the producer grant of 38.143 cents per litre when the fuel they manufacture complies with the B100 standard. In addition, an excise manufacturer's licence must be held to produce biodiesel or biodiesel blends.

We propose that an industry assured Quality Management System be set up that ensure full traceability of raw material inputs, processing, QC, packaging and labelling from suppliers to retail outlets. Quality endorsed suppliers would assure compliance to these standards and ensure that only fuel complying with the B100 Australian Biodiesel Standard be fit for conversion into blended diesel fuels. A joint government / industry working group could then review the operation of this scheme.

With regard to test methods, we believe some test methods are inappropriate for diesel blends and others should be strengthened. Please refer to Attachment B.

In relation to the specific options raised in the discussion paper:

Our view is entirely consistent with that of the Biodiesel Association of Australia who state that:

(1) We consider that there is no need for mandatory labelling of any biodiesel – hydrocarbon diesel blend containing up to 5% biodiesel as it can be considered merely as an additive.

(2) For blends containing in excess of 5% biodiesel, and that meet the automotive diesel standard, the following labelling should be MANDATORY.

THIS FUEL CONTAINS A BLEND OF AUTOMOTIVE DIESEL AND BIODIESEL AND COMPLIES WITH THE AUSTRALIAN DIESEL FUEL STANDARD - Fuel Quality Standards Act 2000 (as amended).

This labelling should be prominently displayed at the point of sale.

(3) The industry can see no logical reason for the introduction of B5, B20 or any other blend standard when what is of concern to the motorist is that the fuel they is buying is suitable for use (fit for purpose) in their diesel engine.

Logically it follows that there is no need for development of test methods for B5 or B20 blends.

Compliance with the Australian automotive diesel standard ensures this and it also locks in Original Equipment Manufacturers (OEM's) who have already accepted diesel fuel that complies with the Australian automotive diesel standard.

There may be incidences where, for various safety or environmental reasons, users may wish to use higher blends which do not meet the automotive diesel standard. Blends that do not meet the diesel standard cannot be marketed as Diesel and if retailed, signboards, pumps and price boards must clearly indicate that it is a Diesel/Biodiesel Blend or B100. The label suggested in (2) above cannot be applied to fuels in this category.

Attachment A

Biodiesel demand is driven by the need to:

- Reduce fuel costs for the transport industry.
- Reduce the cost to Industry in general.
- To support the growing domestic use of family diesel driven vehicles.
- The need to reduce the amount of pollutants into our environment that are released by the use of fossil fuel which has a wide range of community and health concerns.

Biodiesel is a substitute or extender for traditional petroleum diesel it can be used in conventional diesel engines, so special vehicles or engines to run biodiesel do not need to be purchased.

Since biodiesel can be used in conventional diesel engines, the renewable fuel can directly replace petroleum products; reducing Victoria's dependence on imported diesel.

Biodiesel offers safety benefits over petroleum diesel because it is much less combustible, with a flash point greater than 150°C, compared to 77°C for petroleum diesel. It is safer to handle, store, and transport.

Transport and economic benefits

We are of the view that biodiesel will provide the state of Victoria a great opportunity to develop an industry with economic benefits in a wide range of areas. The first direct benefit is the reduction in the running costs to the transport industry. This comes in the form of reduced cost of the fuel itself and the increased efficiency of using biodiesel. We expect as running costs are reduced that the flow on effect to industry in general would help keep costs from increasing.

Information from the US Department of energy indicates that vehicles that operate on 20 percent blends of biodiesel blended with 80 percent conventional diesel (B20) will, on average, displace more than twice as much petroleum as conventional light-duty passenger vehicles already covered under the Energy Policy Act (EPACT).

Diesel engines used by medium and heavy duty government fleets consume significantly greater quantities of fuel than the light duty passenger vehicles that comprise the majority of the current EPACT fleets. The diesel engine vehicle portion of these fleets will be the primary market for B20.

The chart below illustrates the displacement potential of B20. All of the figures on vehicle miles travelled, miles per gallon, and total fuel usage are provided by the US Department of Energy's Energy Information Administration publication: *Alternatives to Traditional Transportation Fuels*.

Vehicle/Fleet Type	VMT	MPG	Total Fuel Use	Percent (%) Petroleum Displaced by Alt. Fuel	Total Gallons Petroleum Displaced by Alt. Fuel
Light-Duty Passenger Vehicle (E85)	8000	24	334 Gal.	85%	283 Gal.
Light-Duty Truck (B20)	16400	16	1025 Gal.	20%	205 Gal.
Medium-Duty Truck (B20)	16400	8	2050 Gal.	20%	410 Gal.
Heavy-Duty Truck (B20)	16400	6	2734 Gal.	20%	547 Gal.
School Bus (B20)	8000	8	1000 Gal.	20%	200 Gal.
Transit Bus (B20)	33200	4	8300 Gal.	20%	1660 Gal.

VMT = Vehicle Miles Travelled MPG = Miles Per Gallon

As the chart shows, the key to total displacement is not the percentage blend level of the fuel; rather it is a function of the fuel blend level, fuel economy of the vehicles and the annual use of that vehicle by the fleet.

On average, B20 vehicles will displace more petroleum than existing light-duty EPACT passenger vehicles operating on higher blend levels because medium and heavy duty diesel engine vehicles consume substantially greater volumes of fuel than light-duty passenger vehicles.

Successful alternative fuels fulfil environmental and energy security needs without sacrificing operating performance. A tallow based fuel has a cetane index of 65 + compared to mineral diesel of 46. This increases the power of a vehicle and improves fuel efficiency. One of the major advantages of biodiesel is the fact that it can be used in existing engines and fuel injection equipment with little impact to operating performance.

Biodiesel provides significant lubricity improvement over petroleum diesel fuel. Lubricity results of biodiesel and petroleum diesel using industry test methods indicate that there is a marked improvement in lubricity when biodiesel is added to conventional diesel fuel. Even biodiesel levels below 1 percent can provide up to a 30 percent increase in lubricity.

Cold weather can cloud and even gel any diesel fuel, including biodiesel. Neat (100 percent) biodiesel will gel faster than petrodiesel in cold weather operations. Users of a 20 percent biodiesel blend will experience a decrease of the cold flow properties (cold filter plugging point, cloud point, pour point). Opportunities exist for Victorian biodiesel producers and farmers to utilise canola for the production of biodiesel with cold temperature properties suitable for colder climates including export sales to the Northern Hemisphere.

Environment and safety

Scientists believe carbon dioxide is one of the main greenhouse gases contributing to global warming. Neat biodiesel (100% biodiesel) reduces carbon dioxide emissions by more than 75% over petroleum diesel. Using a blend of 20% biodiesel reduces carbon dioxide emissions by 15%. Biodiesel also produces fewer particulate matter, carbon monoxide, and sulphur dioxide emissions (all air pollutants under the Clean Air Act).

The use of biodiesel has significant benefit when it comes to supporting the environment. Biodiesel is the first and only alternative fuel to have a complete evaluation of emission results and potential health effects submitted to the U.S. Environmental Protection Agency (EPA) under the Clean Air Act Section 211(b). These programs include the most stringent emissions testing protocols ever required by EPA for certification of fuels or fuel additives in the US. The data gathered through these tests complete the most thorough inventory of the environmental and human health effects attributes that current technology will allow. A survey of these results is provided in the table below.

BIODIESEL EMISSIONS COMPARED TO CONVENTIONAL DIESEL		
Emission Type	B100	B20
Regulated		
Total Unburned Hydrocarbons	-93%	-30%
Carbon Monoxide	-50%	-20%
Particulate Matter	-30%	-22%
NOx	+13%	+2%
Non-Regulated		
Sulfates	-100%	-20%*
PAH (Polycyclic Aromatic Hydrocarbons)**	-80%	-13%
nPAH (nitrated PAH's)**	-90%	-50%***
Ozone potential of speciated HC	-50%	-10%
* Estimated from B100 result		
** Average reduction across all compounds measured		
*** 2-nitroflourine results were within test method variability		

The overall ozone (smog) forming potential of biodiesel is less than diesel fuel. The ozone forming potential of the speciated hydrocarbon emissions was nearly 50 percent less than that measured for diesel fuel.

Sulphur emissions are essentially eliminated with pure biodiesel. The exhaust emissions of sulphur oxides and sulfates (major components of acid rain) from biodiesel were essentially eliminated compared to sulphur oxides and sulphates from diesel.

Criteria pollutants are reduced with biodiesel use. The use of biodiesel in an unmodified Cummins N14 diesel engine resulted in substantial reductions of unburned hydrocarbons, carbon monoxide, and particulate matter. Emissions of nitrogen oxides were slightly increased.

Carbon Monoxide -- The exhaust emissions of carbon monoxide (a poisonous gas) from biodiesel were 50 percent lower than carbon monoxide emissions from diesel.

Particulate Matter -- Breathing particulate has been shown to be a human health hazard. The exhaust emissions of particulate matter from biodiesel were 30 percent lower than overall particulate matter emissions from diesel.

Hydrocarbons -- The exhaust emissions of total hydrocarbons (a contributing factor in the localized formation of smog and ozone) were 93 percent lower for biodiesel than diesel fuel.

Nitrogen Oxides -- NOx emissions from biodiesel increase or decrease depending on the engine family and testing procedures. NOx emissions (a contributing factor in the localized formation of smog and ozone) from pure (100%) biodiesel increased in this test by 13 percent. However, biodiesel’s lack of sulphur allows the use of NOx control technologies that cannot be used with conventional diesel. So, biodiesel NOx emissions can be effectively managed and efficiently eliminated as a concern of the fuel’s use.

Biodiesel reduces the health risks associated with petroleum diesel. Biodiesel emissions showed decreased levels of PAH and nitrited PAH compounds which have been identified as potential cancer causing compounds. In the recent testing, PAH compounds were reduced by 75 to 85 percent, with the exception of benzo(a)anthracene, which was reduced by roughly 50 percent. Targeted nPAH compounds were also reduced dramatically with biodiesel fuel, with 2-nitrofluorene and 1-nitropyrene

reduced by 90 percent, and the rest of the nPAH compounds reduced to only trace levels.

Environmental & Safety Information

Acute Oral Toxicity/Rates	Biodiesel is nontoxic. The acute oral LD50 (lethal dose) is greater than 17.4 g/Kg body weight. By comparison, table salt (NaCL) is nearly 10 times more toxic.
Skin Irritation - Humans	A 24-hr. human patch test indicated that undiluted biodiesel produced very mild irritation. The irritation was less than the result produced by a 4 percent soap and water solution.
Aquatic Toxicity	A 96-hr. lethal concentration for bluegill of biodiesel grade methyl esters was greater than 1000 mg/L. Lethal concentrations at these levels are generally deemed "insignificant" according to NIOSH (National Institute for Occupational Safety and Health) guidelines in its Registry of the Toxic Effects of Chemical Substances.
Biodegradability	Biodiesel degrades about four times faster than petroleum diesel. Within 28 days, pure biodiesel degrades 85 to 88 percent in water. Dextrose (a test sugar used as the positive control when testing biodegradability) degraded at the same rate. Blending biodiesel with diesel fuel accelerates its biodegradability. For example, blends of 20 percent biodiesel and 80 percent diesel fuel degrade twice as fast as #2 diesel alone.
Flash Point	The flash point of a fuel is defined as the temperature at which it will ignite when exposed to a spark or flame. Biodiesel’s flash point is over 125° Celsius, well above petroleum based diesel fuel’s flash point of around 58° Celsius. Testing has shown the flash point of biodiesel blends increases as the percentage of biodiesel increases. Therefore, biodiesel and blends of biodiesel

	with petroleum diesel are safer to store, handle, and use than conventional diesel fuel.

Economic benefits

The following information from the US on how biodiesel usage will advantage the agriculture sector may well be a very good indicator for the effect of biodiesel production on Australian farmers.

National Impacts from Increased Biodiesel Usage:

A 1998 biodiesel lifecycle study jointly sponsored by the U.S. Department of Energy and the U.S. Department of Agriculture concluded that increased use of biodiesel would benefit the national economy. Increased biodiesel production would also result in significant economic benefits to state economies as well as agricultural producers.

According to economic modelling conducted by the Food and Agricultural Policy Research Institute, (FAPRI), 70 million gallons of annual demand for biodiesel could add $0.10 to $0.18 per bushel to the price of soybeans.

Similar price responses may well be expected for Australian canola farmers and tallow suppliers. Opportunities exist for value adding Australian canola seed for use in Biodiesel. This includes local seed crushing for canola oil, and canola meal production. This is feasible given that a significant percentage of the annual domestic canola crop is historically exported as seed.

This would be expected to have a multiplier effect in rural and regional areas. For example: local employment, investment in crushing capacity and additional biodiesel production capacity. This would then lead to the export of value added biodiesel as opposed to canola seed as is currently the case.

The utilization of biodiesel could have immediate impacts on the economy that would lead to increased farm income, increased economic activity and corresponding increases to the local tax base, and utilization of surplus feedstock oil.

Information from ABS indicates that Australia is a net importer of diesel fuel (3.374 billion litres in 2003-04). Increased biodiesel production in Victoria will potentially help offset part of this import requirement. This

will help the Current Account (Balance of Trade) and create employment opportunities and improve fuel emissions (refer appendix 1)

Issues of concern for the Victorian biodiesel industry include the supply and high prices demanded for biodiesel feedstock. The biodiesel industry competes with the food industry for feedstock. Research and development is currently underway to identify alternative (non food grade) feedstocks as a substitute for traditional supplies including canola and soy oil. These include the use of Jatropha and Algae as a source of lipids to be used as a feedstock. This now creates the opportunity for the Victorian government to support this R & D and create industry and tertiary links which would have great potential to create and develop world leading technologies for feedstock to overcome the cloud point issues and price.

Information from the US indicates that the tax incentives provided to the ethanol industry are a fraction of those provided to the petroleum industry. Ethanol's favourable tax treatment has been critical in the development of ethanol into a two billion gallon per year industry. To date, the biodiesel industry has never received any favourable tax or subsidy treatment, and is at a significant disadvantage relative to petroleum.

Although the federal government has provided an off-set for producers of biodiesel; this tax incentive reduces progressively from 2011. We believe that the long term benefits to the economy and the environment issues may not have been fully considered at this point in time by the federal government.

Standards:

One of the major barriers as we see it is the federal government's ruling that biodiesel producers are required to meet the mineral diesel standards. The off road and heavy haulage rebates are linked to the diesel standard which has created an unfair barrier for the biodiesel industry. We see this as unreasonable because the whole of benefit to the economy and the environment has not been considered.

The major constraints for blending B100 Biodiesel with Petrochemical Diesel are the limitations imposed by having to simultaneously comply with two different standards:

Australian Automotive Diesel Fuel Standard and the Biodiesel Standard PREN 14214

Examples are:

Test	Diesel	B100	example B20	example B30	example B100
Colour	2.0 Max	n/a	2.0	> 2.0	> 2.0
Density 15 °C	820 – 850	860 – 890	838	850	878
Viscosity 40 °C	2.0 – 4.5	3.5 – 5.0	3.3	3.5	4.6

The difficulty is to firstly comply with the Biodiesel Standard followed by blending with Petrochemical Diesel to then also comply with the Diesel Standard.

Canola oil produces an excellent biodiesel with very low cloud point and CFPP (cold filter plugging point). However the colour is considerably darker than the maximum allowed in the diesel standard. This means that in the winter months or colder climates where canola bio diesel is preferred, we are unable to comply due to an unreasonable and archaic colour limitation.

Further, the density ranges of diesel versus biodiesel do not sufficiently overlap to permit blending in all proportions. The limitation is maximum at about a B30 blend.

Similarly viscosity limitations prevent the blending of higher proportions of biodiesel.

We believe that colour; density and viscosity specifications should be reviewed to permit the blending of diesel and biodiesel in all proportions. Today there is no viable reason for the exclusion of biodiesel as a blend with diesel in any proportions based on colour, density and viscosity as we believe that the performance in diesel engines is in no way compromised by accommodating an unrestricted blend ratio.

In the current circumstances it is not possible to produce a Blend of greater than 30% Biodiesel.

Appendix 1

EPA VICTORIA

Information Bulletin

DIESEL EXHAUST, AIR QUALITY AND HEALTH

Publication 849

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WHAT IS DIESEL EXHAUST AND HOW ARE WE EXPOSED TO IT?

Diesel exhaust is a complex mixture of thousands of gases and fine particles that contains more than 40 air contaminants. These include many known or suspected cancer-causing substances, such as benzene, arsenic and formaldehyde. It also contains other harmful pollutants, including nitrogen oxides (a component of urban smog).

Diesel exhaust is produced when an engine burns diesel fuel, suspending particles and gases in the air that are inhaled when we breathe.

WHAT ARE THE HEALTH EFFECTS OF DIESEL EXHAUST?

The microscopic particles in diesel exhaust are less than one-fifth the thickness of a human hair and are small enough to penetrate deep into the lungs, where they can contribute to a range of health problems.

Diesel exhaust and many individual substances contained in it (including arsenic, benzene, formaldehyde and nickel) have the potential to contribute to mutations in cells that can lead to cancer. These changes can occur at very low levels and have led to the belief that there is 'no safe level' of exposure to diesel exhaust (or many other carcinogens).

Exposure to diesel exhaust can have immediate health effects. Diesel exhaust can irritate the eyes, nose, throat and lungs, and it can cause coughs, headaches, light headedness and nausea. In studies with human volunteers, diesel exhaust particles made people with allergies more susceptible to the materials to which they are allergic, such as dust and pollen. Exposure to diesel exhaust also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks. There is also strong evidence that people who are exposed to high levels of diesel exhaust in a work environment (much higher than that experienced in ambient air) have an increased risk of developing lung cancer. Based on this evidence the United States Environment Protection Agency and International Agency for Research into Cancer have classified diesel exhaust as a probable human carcinogen.

Diesel engines are a major source of fine-particle pollution. The elderly and people with emphysema, asthma, and chronic heart and lung disease are especially sensitive to fine-particle pollution. Numerous studies have linked elevated particle levels in the air to increased hospital admissions, emergency room visits, asthma attacks and premature deaths among those suffering from heart and respiratory problems. Because children's lungs and respiratory systems are still developing, they are also more susceptible than healthy adults to fine particles. Exposure to fine particles is associated

because this is our home

Note: this document was obtained from EPA's internet site (www.epa.vic.gov.au)

Attachment B

Energetix Biodiesel response to "Setting National Fuel Quality Standards, November 2006

(Standardising Biodiesel Blends, Dr. Duncan Seddon).

Issues with Blending:

Composition: The discussion paper strongly suggests an upper limit of B20. Our view is that the current position should be maintained i.e. that the Bxx value is irrelevant provided that in the first instance the B100 meets all of the relevant standard AND that the subsequent blend with petrochemical diesel fully meets the diesel standard (other than the distillation range which is not pertinent).

Density: European and US diesel blends ranging from B05 to B80 and sometimes B100 have not reported any adverse engine or performance outcomes with density ranges from 800 to 890 kg / m^3. We request that the range be reviewed at least upward to 890 kg / m^3 to permit otherwise fully compliant product to be manufactured and distributed.

Viscosity: Similarly, no adverse results have been reported with the viscosity issues of using high levels of Biodiesel in diesel blends up to B100 that meets the Biodiesel Standard. Our view is that the upper limit of the viscosity range for a diesel blend should meet but not exceed that for B100 i.e. 5.0 cSt @ 40 °C.

Colour: The diesel standard for Colour ASTM D1500 (16-10-02) sets a limit of 2 max. This has had no comment made in the report. If this is still pertinent, then Biodiesel blends derived from Canola Oil or Used Cooking Oil are severely limited due to this restriction, as they are deeper in colour than Palm Oil or Tallow – based Biodiesel blends. Our view is that either the colour level needs to be reviewed to accommodate these otherwise fully compliant feedstocks or dropped from the standard altogether. Rather, the issue is that the product be clear and free from haze. Moreover, the current practice of some petrochemical suppliers is to artificially colour their product – typically bright yellow, thus severely limiting any reasonable blending.

Acid Value: This value is currently set at 0.80 mg KOH / g max for B100 in Australia. In light of the issues regarding corrosion and long-term stability, the EU has reviewed this limit downward to 0.50 and is now the limit for compliance to sell B100 into Europe. Our view is that if this reduces the levels of concern of blending higher ratios of Biodiesel in diesel blends and relaxes the implied constraints of supplying these blends, we would be happy to meet the new EU requirements as those fit for Australian use.

Oxidation Stability: This is currently set both by EU and Australian Standards for B100 (prEN 14112) at 6 hours @ 110 °C minimum. In light of potential long-term stability issues, our recent study of European importers' preferred positions is that a value of 9 to 10 hours would be the preferred practice. Again, our view is that if this value were increased in order to provide a higher level of confidence that stability is assured at high B levels, we would be happy to comply. Indeed we can accept somewhat higher levels, given that no adverse effects are observed. Indeed the additives used to achieve this have a further beneficial effect of reducing the NOx levels as stated in the discussion paper.

CFPP: Our view is that CFPP is a far better indicator of Cold Flow Behaviour than Cloud Point. EU purchasing specifications require CFPP compliance. We note however that the table 6 (p55) of the report refers to the 1988 version of the standard and specifically that the CFPP for "Summer" in the South, should be -7 °C. Currently the petrochemical companies are supplying "Summer Grade" diesel in Melbourne, with a CFPP of + 6 °C. Clearly, if a CFPP Standard is to be proposed, as is the local case in most of the European countries, then the limits set should be relevant to the region and time of year.

Current experience: Our Company has been running its fleet of trucks and cars on both B30 and B100 for the last eight months. Our customers have used a range of blends from B05 to B100 for the last twelve months. We have not experienced or have had reported any adverse effects of engine or related components during this time. The only problems have been those as outlined in the report, namely those of the need to ensure that fuel tanks are clean and that fuel filters are replaced prior to introduction of Biodiesel blends.

Summary

As a biodiesel producer we have a self interest in promoting the industry and seeing the use of biodiesel increase. From the point of view of the Federal government, the use of biodiesel provides an opportunity to support the economy and make a significant step towards cleaning up the environment concerns that are created by mineral diesel. The opportunity to link new research and involve government and tertiary education to creating new feed stocks or improve the efficiency of current feed stocks will be a significant step forward.

The Governments support of the industry by taking up biodiesel for its own use would provide a level of confidence to the general public. The governments strict quality standards would ensure only quality producers and product would be supplied adding a further level of confidence in the biodiesel industry and for the end users.

With the diminishing reserves of fossil fuels and the dependants in our economy for such energy, Biodiesel is one small step in the right direction. Biofuels in the long run will ensure that Australia will be prepared for the changes required to keep the economy and our way of life on track.

Mile Soda
Managing Director
Vilo Assets Management Pty Ltd. (energetix Bio Diesel)