

Profile of City of Ballarat's Introduction & Conversion to Bio-diesel

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Fleet Administration Officer



EPA Grant



- An opportunity arose to participate in a Diesel Vehicle Emissions Reduction Project through the EPA.
- The Bio-diesel Trial Group was formed and consisted of 2 Victorian Metro Councils and City of Ballarat

Bio-diesel Tank



- Transtank 68,000 litre Self bunded Tank
- 17m x 12m Canopy. Rain Water harvested and used for roadworks.
- Smart-fill Fuel dispenser to record fuel usage

Fleet Profile

- Light Commercial 59
- Passenger (incl. 22 Leased) 51
- Trucks 36
- Operated Plant 74
 - Including: Graders, Backhoes, Waste and Recycling Trucks, Vibrating Rollers, Sweepers, Tractors, Mowers and Minor Plant.

– 99 Items Plant operating on Bio-diesel Blend B20

Fuel Specifications



Blended Diesel Test Certificate

Customer: **City of Ballarat**
 Product Description: **B20**
 Batch No: **1**
 Date: **11/01/2018**

Test	Method	Unit	Report Result	Acceptance/ Diesel Specifications
Colour	ASTM D1555	mg/kg	0"	0"
Ash & Suspended Solids	ASTM D482	mg/kg	0"	100 max
Carbon Residue (10% distillation)	ASTM D482	% mass	0.01"	0.2 max
Carbon Residue (50% distillation)	ASTM D2112	% mass	0.01"	0.05 max
Cloud Point	ASTM D2582	°C	-20"	0 max
Filter Blocking Capacity	4" 302	µm	5.0"	2.2 max
Water	ASTM D1555	mg/kg	0.01"	0 max
Water	IP 450	mm	0.10"	0.450 max
Polysulfur	IP 381	% Mass	0.11"	1.1 max
Viscosity @ 40°C	ASTM D445	mm ² /s	0.04"	0.05 to 0.09
Viscosity @ 100°C	ASTM D445	mm ² /s	0.04"	0.04 max
Viscosity @ 150°C	ASTM D445	mm ² /s	0.04"	0.04 to 0.3
Flash Point	ASTM D93	°C	54"	61.5
Propan-2-yl Content (2 hrs @ 20°C)	ASTM D130	%	0"	100.1 max
Carbon Sulfur (Propanoic A)	ASTM D4132	mm ² /s	0"	0.05 max
Sulfur Content	ASTM D664	% Mass	0.001"	0.02 max
Cold Filter Plug Point	IP359	°C	-4"	None
Cloud Point	ASTM D2582	°C	-4"	None
Oxidation Stability	ASTM D2274	mg/g	0.0"	0.0 max

None Referenced (ASTM D2274)
 Technical Manager
 Smorgon Fuels Pty Ltd
 40/41 St Albans Rd, St Albans
 3011 Victoria Australia
 03 9471 1000

* Fuel Standard (Australian Standard) Minimums 2011

BioMax is manufactured by Smorgon Fuels Pty Ltd

- We developed strict specifications for the Bio-diesel accompanied by a comprehensive assessment.
- Our choice of fuel is B20 from BioMax.
- An additional factor in choosing this fuel source was the ability of the company to guarantee no use of palm oil in the Bio-diesel blend



Emission Testing



- **Vehicles selected for testing:**
- Isuzu NPR400 7.5 tonne.
- Compactor Hino Ranger Pro 14 26 tonne
- Nissan ZD30 2.9 tonne
- **Pollutants that were measured:**
 - Particulate Matter
 - Oxides of Nitrogen (NOx)
 - Smoke opacity
 - Total Hydrocarbons (THC)
 - Carbon Dioxide (CO₂)
- Average of 44% reduction of Particulate Matter

Strategy of Implementing Vehicles and Plant onto Bio-diesel

- **Selection sequence**
- Emission tested vehicles initially
- Vehicles & plant under 2 years of age initially to be transferred over to Bio-diesel
- For initial period one waste & one recycling unit was introduced to Bio-diesel and then second unit of each vehicle type after completion of trial period of initial vehicles.
- Limited number of Fleet transferred per user group initially

Conditioning of vehicles & plant to operate on Bio-diesel

- Diesel level in Vehicle tank was run very low prior to initial fill with Bio-diesel.
- At 100 hr or 1000 km the primary & secondary fuel filters were removed and inspected for any abnormalities and replaced.
- Fuel Filter changes then fell back into scheduled service timeframes.
- In cases where an item of plant or truck was due for replacement, these may not been changed over to Bio-diesel. This also occurred for reasons such as the age and condition of an item.



City of Ballarat Bio-diesel Emission Savings Calculator

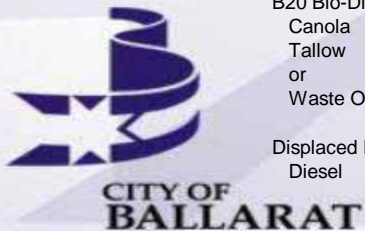
Month: Date Range:

Biofuel Information	Biofuel	Displaced Diesel	Measure
Total litres of biofuel for the period	<input type="text" value="1089168.77"/>	1003390 ltrs	
Full Fuel Cycle CO ₂ e	2853.62	2909.83 tCO ₂ e	
Full Fuel Cycle CO₂e savings for the period		56.21	tonnes

Assumptions

	Energy Content of fuel	Full Fuel Cycle Emission Factor
B20 Bio-Diesel created from Canola Tallow or Waste Oil	35.56 GJ/kL*	2.62 tCO ₂ e/kL
Displaced Fossil Fuel Diesel	38.6 GJ/kL*	2.9 tCO ₂ e/kL

*In effect 100 Lts of B20 Bio-diesel for every 92 Lts of diesel



Challenges Encountered



- Relatively simple and painless process.
- No down time Mechanically for any Plant using Bio-diesel
- Weather colder than expected earlier in the year caused Bowser filters to become blocked.
 - Rectified by installing a Heat Trace and converting to Winter Fuel Blend

Fleet Downsize

- 15 - ULP to LPG
- 17 - 6 Cylinder to 4 Cylinder
- 20 - 6 Cylinder vehicles not replaced.
- *“45% of medium size fleet cars have been changed over from 6 cylinders to 4 cylinders. CO2 annual saving 9 tonnes/ annum”*
- *“Where ever possible the balance of the 6 cylinder vehicles have been changed over to LPG. CO2 annual saving 10 tonnes / annum”*

Conclusion

- City of Ballarat will continue to use Bio-diesel
- Investigate alternative fuel technologies as they arise
- Continue to reduce our Greenhouse gases through total Fleet Management



Discussion Points

- Bio-diesel **NOT** to be derived from Palm Oil Base
- Fuel Rebate – ATO Private Ruling
- Fuel Price – Biomax 1 to 2 cpl cheaper
- Average 1 litre per 100km extra consumption
- Media – Local Paper, Local TV and Fleet using Bio-diesel fitted with logos

Our Environment – Too good to spoil





POWERED BY

BioDiesel

WORKING TOWARDS SUSTAINABILITY



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BALLARAT



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come to life
BALLARAT