Biofuels: your first step to kicking the fossil fuel habit

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Introduction
Smart Transport vision: By 2050 Aotearoa New Zealand is self-sufficient with all energy derived from renewable sources.

New Zealand leads globally in renewable energy sources for electricity use. There is plenty of potential for solar, wind and hydro energy to get us to 100 per cent. Our biggest challenge is transport, which accounts for about 20 per cent of our greenhouse gas emissions. Almost all of our transport energy is non-renewable and we are dependent on imported fossil fuels to keep our current system running, which is a major issue for New Zealand’s future energy security and supply.

According to a PWC report, Auckland ranks near the bottom of international cities for transportation and infrastructure. We have both public health and environmental problems as a result and, along with increased costs of fossil fuels, our economic wellbeing is threatened. We need to get New Zealand transport off our fossil addiction.
On a positive note, the growth of more active modes of transport (walking and cycling) and public transport, together with emerging sectors of car-pooling, car-sharing and technology, provide significant opportunities. They can help grow our economy, reduce our reliance on foreign energy imports, improve movement efficiency, and clean the air in our towns and cities, as well as reduce carbon emissions. The Sustainable Business Network is collaborating with our members to speed and scale a range of these solutions here in New Zealand.

The way in which we power our motor vehicles is also changing and in the longer term, electric, hybrid and hydrogen vehicles are now becoming more viable. Along with this shift biofuels also offer an opportunity to replace fossil fuels.

Biofuels present an immediate means of reducing the environmental impact of vehicle emissions, particularly heavy vehicles (like buses, trucks and campervans), as we continue to transition to an electric vehicle future. You can already buy biofuel (bioethanol or biodiesel) at the pump in a blend of up to 10 per cent and it doesn’t require any conversion of your engine to use it safely in your vehicle. Although biofuels have been available in New Zealand for many years (Gull has been selling ethanol blended fuels since 2007), some barriers still exist to their more widespread use.

The vision of the Sustainable Business Network’s Biofuels project is to increase the use of biofuels in New Zealand by 20 per cent by 2017.

This Guide has been created to help you play an active role in achieving that vision by increasing your use of biofuels.

**Biofuel – the facts**

**What is biofuel?**

Biofuel is a fuel that is produced from renewable resources, especially plants, vegetable oils, or treated municipal and industrial wastes.

Biofuel is a non-mineral based fuel, so it’s something that’s not extracted from the ground. It is made from many different sources. Currently available sources are divided into biodiesel (for vehicles that normally run on diesel) and bioethanol (for
vehicles that normally run on petrol). Biomethane is an additional fuel source in small volumes at the time of writing.

The majority of biofuel available for retail sale in service stations in New Zealand comes from waste by-products of industry. This means that something that previously didn’t have a high value usage is now being converted into a fuel supply for our transportation needs.

In the early 2000s there was a heated debate over the sustainability of specific types of feedstocks used to create biofuels, such as food crops being grown to produce energy rather than food. There are now a number of very good third party labels: the best label for biofuels is the Roundtable on Sustainable Biofuels certification, which is an independent, global, multi-stakeholder coalition that works to promote the sustainability of biofuels. It has a certification scheme which verifies that biofuels are ethical, sustainable and credibly-sourced.

Scientists are constantly experimenting with new sources and new processes with which to make biofuels. In New Zealand, work on second generation biofuels is underway with research groups investigating exciting new options for making biofuels, such as from wood waste and algae. These options stand to be more sustainable due to their abundance globally, their low impact and embedded emissions (i.e. the emissions created during extraction, transportation and manufacture).

**How do I know that the biofuel I buy is safe?**

All biofuel blends available for retail sale in New Zealand must meet Government-regulated fuel specifications. These are the same specifications that diesel and petrol must meet. Biodiesel and bioethanol specifications are administered by the **Engine Fuel Specification Regulations** (Ministry of Business, Innovation and Employment).

All retailers are subject to the **Fair Trading Act and Consumer Guarantees Act**, so as long as you’re purchasing from a service station you know the retailer has to follow the laws that protect the user in respect to fuel quality. **Avoid ‘backyard biodiesel’**: In the past, a number of people sold biodiesel that did not meet Government specifications and as a result caused problems with engines. These are to be avoided.

**How do I know if I can put biofuel in my car?**

Biofuels are commonly in use overseas and vehicle manufacturers have aligned the design of their vehicles accordingly. In New Zealand, we mostly receive vehicles built to the same general engine specifications allowing us to use biofuels in blends up to those sold in New Zealand service stations.
If you want to double check if your vehicle is able to use low blends click [here](#) to visit the AA website which has a list of vehicles that are compatible with bioethanol 3-10 per cent blends. Alternatively, consult with your vehicle manufacturer before use if you are still uncertain.

**What is biodiesel?**

In New Zealand, biodiesel usually comes from tallow (a by-product of meat processing), used cooking oil or rapeseed. When pure biodiesel is mixed with ordinary diesel, it makes a biodiesel blend with varying proportions of biofuel, e.g. B5 (biodiesel 5%), B20 (biodiesel 20%) or others.

Adding biodiesel to diesel even in small amounts can increase the lubricity of the diesel which is better for the fuel system.

**Where can I buy biodiesel in New Zealand?**

**Gull:** Diesel Max (using biodiesel predominantly made from used cooking oil) is an ultra-low sulphur diesel (with up to 5 per cent biodiesel blend depending on availability of biofuel supply). See Gull's [biofuel infographics](#) for more information on where the biofuel comes from.

It is available at Gull Albany, Gull Kingsland (Central Auckland), Gull Sel Peacock (West Auckland), Gull Te Ngae (Rotorua) and Gull Melville (Hamilton).

Gull can supply commercial customers bulk orders of biodiesel at any blend ratio required, e.g. B5, B20, B100, provided customers have a certified storage tank. Please contact Gull for further information.

**Green Fuels NZ:** Biofuel from used cooking oil can be blended or used up to 100 per cent depending on customer requirements. See [here](#) for more information.

Greenfuels NZ sells biodiesel direct from its manufacturing plant in Christchurch. If you’re a large fuel user you can get it delivered and stored in a tank on-site. If you’re storing on-site, make sure you are following all the fuel storage recommendations and talk to your fuel provider about this if you’re unsure.

**Z Energy:** A manufacturing plant for tallow-derived biodiesel is currently under construction. Construction is to be completed by 2016 with biodiesel available for
commercial clients from April 2016 and at retail sites from June 2016. This will be available for customers in Auckland, Waikato and the Bay of Plenty at this stage, however if you are outside of these regions talk to their customer service team to see what they can do to help you.

*Please note, information about retailers is subject to change depending on availability, so please check with your retailer for the most up to date information.*

**What is bioethanol?**

The bioethanol available in New Zealand is produced as a by-product of the dairy industry, from sugar (imported from Brazil) or even beer. The bioethanol that you buy at the pump is a blend with petrol and is sometimes referred to as E10, E85, etc., where it contains 10 per cent and 85 per cent bioethanol respectively.

**Where can I buy bioethanol?**

**Gull:** Bioethanol is produced from repurposing waste products from the dairy industry. It is blended with petrol to produce Gull Force 10 (10 per cent bioethanol content mixed with premium 98 octane petrol) and Gull Force Pro (85 per cent bioethanol content mixed with premium petrol).

![](image)

**Gull Force 10** (E10) is a premium (98 octane) fuel, which emits up to 8 per cent less carbon dioxide than other high performance fuels and has been endorsed by
EECA as an environmentally better fuel option. **Gull Force 10** is available at all Gull sites except Gisborne.

**Gull Force Pro** (E85) is an extreme octane (110 plus) bioethanol blended fuel. ‘Extreme Octane’ has a higher octane rating which brings better performance from the engine. Gull Force Pro is, however, designed for use in certain vehicles only (called flex-fuel). These vehicles are able to run on any blend level of bioethanol up to 85 per cent, as well as normal petrol. Gull Force Pro can also be used in specifically-designed high performance motor racing engines, such as motor sports and rally cars. It is not suitable for standard vehicle engines or fuel systems not specifically designed for biofuel as it may cause serious damage. Consult with your vehicle manufacturer before use. For information on how to have your car modified to run on Gull Force Pro, talk to E&H Motors.

Gull Force Pro is available at Gull Forrest Hill (North Shore, Auckland), Gull Hampton Downs (Waikato), Gull Melville (Hamilton), Gull Pukenekohe and Taupiri Autostore (Waikato).

**Mobil Oil New Zealand Limited**: Mobil has been selling ethanol-blended petrol at selected service stations in the greater Wellington region since mid-2008. This includes E10 or E3 but varies depending on service station. Ask your Mobil retailer for specific information.

*Please note, information about retailers is subject to change depending on availability, so please check with your retailer for the most up to date information.*

**What is biomethane?**

Biomethane is a naturally occurring gas which is produced by anaerobic digestion of organic matter such as dead animal or plant material, manure, sewage and organic waste. Chemically, it is similar to natural gas and can be used for much the same applications as natural gas.

In New Zealand biomethane is used for electricity generation (at landfill sites), for heating and as a vehicle fuel, but in small amounts. It is currently not sold commercially in New Zealand yet.

**Tips on using biofuels**

**How can my business go about bulk buying biofuels?**

Biofuel providers can provide pricing for bulk delivery of biofuel blends and speciality blends. As for other fuels, these need to be stored on-site in HASNO (Hazardous Substances and New Organisms) approved and certified storage tanks. Prices will differ from those at the pump. Transport/logistics costs are a key component that impacts the final fuel price.
Can biofuels be used in non-vehicle engines?

Bioethanol-blended petrol can be used in almost any petrol engine - from lawn mowers to generators. As with all petrol, don't leave it in the tank for longer than two months, or it might absorb moisture from the air and then separate. Bioethanol-blended petrol **should not** be used in marine or aviation applications.

You can use biodiesel blends in almost any diesel engine - including earth moving equipment, tractors, generators or boats.

**Before using biodiesel**

- **Check your fuel system** - if it's old or in poor condition, it may be worth flushing it first. A mechanic can easily do this for you.
- **Change your fuel filter** - biodiesel blends can loosen dirt and carry it through to the fuel filter. If your fuel filter hasn’t been changed recently, change it after the first few fills of biodiesel blend.

**Before using bioethanol**

- **Be sure to fill your tank on the first use of bioethanol** - this will make sure you absorb any existing water in your tank.
- **Change your fuel filter** - bioethanol-blended petrol can loosen dirt and carry it through to the fuel filter so changing the filter will help remove any debris that has been dislodged.

Note: it’s important to keep water out of ANY fuel to ensure the best performance of your vehicle. Make sure your vehicle is in good condition and the fuel cap keeps water out.

**The benefits**

**Why do biofuels benefit New Zealand?**

Sustainably produced biofuels have many benefits for New Zealand and for your organisation. By using a renewable alternative to fossil fuels we can:

- **Reduce carbon emissions**: arguably there is potential for net zero carbon emissions associated with biofuels. Of course this depends on where you get your biofuels from, so check with your fuel supplier for exact data. Official figures show that for biofuels from whey products carbon emissions are as little as 25 per cent...
and from inedible tallow they are around 50 per cent\(^1\) that of emissions from fossil fuels. Emissions reduction figures are given on [EECA’s website](https://www.eeca.gov.au/).

- **Improve air quality:** according to a report given to Auckland Council (2012), air pollution is responsible for 200 premature deaths a year and exposure to transport emissions has a social cost of $273m. In July 2014 a Council report estimated that air pollution kills 700 Aucklanders annually. The main problem comes from particulates released from mineral-based fuels. Biofuels are expected to produce less particulate emissions.

- **Ensure certainty of supply:** biofuels can be produced locally, so by increasing our usage of biofuels we can reduce our dependency on volatile international markets to fuel the country.

**How can biofuels benefit my organisation?**

- **Enhance your brand** – using biofuels demonstrably shows you are doing something very practical to reduce your company’s carbon emissions (which can have a direct financial impact if you are offsetting your emissions through carbon credits).

- **Appeal to staff:** educating your staff about the reasons behind your use of biofuels can result in (anecdotally) reduced fuel consumption as staff are more consciously thinking about their impact of fuel usage. It will also help engage staff in your sustainability strategy.

**Dispelling the myths**

“**I heard using biofuels will void my vehicle’s warranty**”

As long as you are buying biofuels from a retailer that meets the Government-regulated fuel specifications then you are covered. If you are using a blend that has only 5 per cent biodiesel (possibly increasing to 7 per cent) this shouldn’t affect your warranty. However, if you are unsure we recommend you check with your vehicle manufacturer.

“**Doesn’t bioethanol use more fuel than mineral based fuels?**”

You might see a slight increase in fuel consumption (between one and three per cent) as ethanol fuels contain less energy per litre than petrol. However, this can be offset by focusing on efficient driving – things like driving smoothly, correct tyre pressure, and the removal of excess weight or taking roof racks off when not needed. These actions can account for between a 10-40 per cent decrease in fuel

\(^{1}\) “Some Biofuels are better than others: thinking strategically about biofuels”, Parliamentary Commissioner for the Environment, 2010
consumption. In addition, some biofuels, like Gull’s Force 10, are cheaper than other premium fossil fuels.

“I’ve heard bioethanol can be diluted with water, is this true?”

Whilst this is true for straight bioethanol it is neither desirable nor applicable to the use of blends containing bioethanol. Even small amounts of water in bioethanol blends can cause the bioethanol to separate from the petrol and sink to the bottom of the tank and normal cars cannot run on this. This is why it is important to only store fuels in tanks that are in good condition and that are dry. If you are unsure, get your fuel supplier to check.

“Are there any truths to the rumours that bioethanol causes corrosion issues with motors?”

Retailers like Gull mix in anti-corrosion inhibitors (or additives) with their bioethanol blends.

“Will my engine clog up when it gets cold if I use biodiesel?”

No. If you are buying from a retailer which is Government-regulated (see the suppliers listed on page 3), there shouldn’t be issues. The early versions of biodiesel (or ‘homebrews’ or ‘backyard’ fuels) did not meet the regulated standard and they did create problems, for example when the fuel or engines were cold.

Make a difference now: USE BIOFUELS

Biofuel blends are readily available now – so start using them. It’s a quick and easy way in which we can all reduce the impact of our transportation on New Zealand’s carbon emissions.

For more information check out EECA, who helped provide the great information in this resource sheet.

https://www.energywise.govt.nz/on-the-road/biofuels/

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