

General Biofuels Questions and Answers

As at 13 February 2007

What is biofuel?

Biofuel is a generic term for fuels that can be produced from or are made up of a renewable material of plant or animal origin. Often they are substitutes or partial substitutes for fossil (or mineral) fuels. Biofuels used in transport are typically bioethanol which is used as a petrol substitute and biodiesel which is used as a diesel substitute. These are the biofuels that are most likely to be used in New Zealand in the medium term. Biofuels have the major advantage of not contributing to overall greenhouse gas emissions.

What is biodiesel?

Biodiesel can be produced from any vegetable oil or animal fat and used as a substitute or partial substitute for mineral diesel. To produce biodiesel, these fats or oils are chemically converted to esters that have properties similar to mineral diesel. Biodiesel is often blended with mineral diesel and blends of up to 5 percent in mineral diesel are suitable for use in diesel engines without modification. Higher blends may be used in dedicated fleets.

What is bioethanol?

Bioethanol is an alcohol made from sugar, starch and products containing sugars and starches, through a process of fermentation and distilling, and used as a substitute or partial substitute for petrol. Bioethanol has properties that are similar to petrol and is often blended with petrol. Bioethanol is likely to be introduced as a low level blend (likely 3 to 5 percent) in some petrol, although the current maximum allowed level is 10 percent. Higher blends may be used in dedicated fleets.

What is the difference between first and second generation biofuels?

First generation biofuels are produced from sugars, starches, vegetable oils or animal fats from proven technology. Examples include bioethanol from whey and biodiesel from tallow.

'Second generation' biofuels generally refer to new methods of producing biofuels. They are not yet ready for commercial development but are the subject of extensive research and development internationally. Examples include the conversion of plant lignin and cellulose into fuels by enzymes and the gasification of biomass material followed by a "gas to liquid" Fischer-Tropsch process. Biomass that could be used includes all types of trees, grasses, agricultural plant wastes, straw and algae.

Can biodiesel and bioethanol be made in New Zealand?

Yes. New Zealand produces sufficient tallow, a by-product of the meat industry, which would, if converted to biodiesel, produce around 5 percent of our diesel fuel needs. New Zealand currently produces sufficient bioethanol from whey, a by-product of the dairy industry, to meet around 0.3 percent of our petrol needs. More bioethanol could be produced from whey or other waste and by-product sources. Maize is also a possible feedstock for bioethanol production in New Zealand.

What is the government proposing regarding biofuels?

The government is developing and introducing a biofuels sales obligation for the sale and use of biofuel blends in New Zealand. The aim is to ensure that oil companies selling petrol or diesel must also sell a small amount of biofuels. It would be up to the oil companies to determine which combination of biofuels and which blend levels to use, and where to market them.

Why is the government considering a biofuels sales obligation?

The government is committed to the use of renewable transport fuels to reduce environmental impacts of the use of fossil fuels, and to reduce New Zealand's dependence on imported transport fuels.

The National Energy Efficiency and Conservation Strategy's Renewable Energy Target, released in October 2002, included an indicative target for renewable energy for the transport sector of 2 petajoules, equivalent to about one percent of current transport energy use. Despite having had an indicative renewable transport fuel target for three years, and the price of oil currently being high enough for biofuels to be cost competitive, there are still no transport biofuels being used in commercial quantities in New Zealand.

It is clear that market forces alone are not enough to encourage the supply and use of renewable transport fuels.

Will new legislation be required?

Yes. Existing legislation is not suitable for a biofuels sales obligation, nor for imposing mandatory quality specifications for biofuels or blends. Therefore the Ministry of Economic Development will be developing new legislation during 2007 that will implement the Biofuels Sales Obligation and provide for the regulation of biofuel quality.

Amendments will also be needed to the Petroleum Products Specifications Regulations 2002 (PPSR), to allow for ethanol blends of above 1% and up to 10%.

The current diesel specifications in the PPSR do not constrain the supply of biodiesel blends in New Zealand so no amendment will be needed for biodiesel at this time.

How can the public have their say?

Any resulting new legislation will attract scrutiny through the Parliamentary process.

What are the benefits of biofuels?

Using a biodiesel blend has a number of benefits, which are reduced net carbon dioxide emissions, reduced emissions of concern to air quality and human health, better fuel lubrication and reduced deposits in your diesel engine. Biodiesel is also non-toxic, biodegradable and speeds up the breakdown of any spills of diesel that it is blended with.

Using a bioethanol-petrol blend reduces net emissions of carbon dioxide and provides some air quality benefits. Bioethanol is also a relatively high octane fuel.

What countries currently use biofuels?

Biofuel blends are widely used around the world. The USA, Brazil, Canada, most European countries, Australia, China, India and Thailand all use biofuel blends.

Does the use of biofuels affect vehicles?

Modifications are not necessary for petrol or diesel vehicles using low level biofuel blends. Petrol engines tuned correctly for use on ordinary petrol would normally not exhibit any problems with using bioethanol-petrol blends of up to 3% ethanol. Diesel engines tuned correctly and regularly serviced would not normally exhibit any problems with using bio-diesel blends of up to 5% biodiesel. Most modern vehicles are compatible with higher biofuel blend levels.

For petrol vehicles, the sales obligation could result in firms choosing to sell bioethanol-petrol blends higher than 3% bioethanol at some distribution points or for specific uses. There is the possibility of some petrol vehicles being affected by bioethanol at levels above 3%, but the concerns are unqualified and may be unfounded. Blends of 3% and lower will not cause a problem, but above 3% there is a perception of risk. If a vehicle is affected by higher blend levels, the parts of the engine that could be affected are the fuel filter, fuel pump and fuel line. However, once a fuel filter is replaced, this will provide longer term benefits through a cleaner fuel system.

In addition, fuel systems in both petrol and diesel vehicles, which are older and poorly maintained, may become clogged when biofuel blends (ethanol and biodiesel) are first used. This would require new fuel filters at costs as described above.

For more information on the extent of any risk to older vehicles of using bioethanol-petrol blends, see the Vehicle and Engine Risks report (PDF, 396kb).

Will biofuel blends cost more?

The relative price of biofuel blends and ordinary petrol and diesel will vary depending on the price of oil, the price of production of biofuels, and the tax regime applied to them. It will be up to fuel producers and retailers to set the price. Biodiesel and bioethanol-petrol blends are unlikely to cost users any more than ordinary diesel and petrol at the pump. It will be up to fuel producers and retailers to set the price. It is possible that the price of all fuels will increase slightly once sales obligation levels mean that both biodiesel and bioethanol blends need to be sold by oil companies, in order to off-set some of the initial costs of getting both fuels to the market. This is likely to occur from 2010.

Would biofuels be exempt from a carbon or other greenhouse gas oriented tax?

Yes. Biofuels are regarded as carbon neutral because they are made from renewable sources. Therefore the biofuel component of any fuel would be exempt from a carbon tax or similar tax.

Will the use of biofuels help New Zealand meet its Kyoto Protocol obligations?

Yes. If biofuels replace mineral fuels then their use will assist New Zealand in meeting its Kyoto Protocol obligations because emissions from the use of biofuels are not counted as greenhouse gas emissions under the Kyoto Protocol, whereas emissions from the use of mineral fuels are.

Will users have a choice between biofuel blends and ordinary fuel?

Bioethanol-petrol blends would likely replace either regular or premium petrol, and biodiesel diesel blends would likely replace diesel at service stations, but this is a decision for producers and retailers to make. Setting a biofuels sales obligation gives producers and retailers the flexibility to meet the obligation within a competitive commercial environment.

Labelling of Biodiesel blends of five percent or less will not be required (because there is no risk for any use), but labelling of ethanol-petrol blends above one percent will be required (some risks exist especially for marine and recreational air craft). This is consistent with with international trends.

Will you be able to change between biofuel blend fuel and ordinary fuel?

Yes. You can have both bioethanol-petrol blends and petrol, or biodiesel-diesel blends and diesel in your tank at the same time and there should be no noticeable effect changing between renewable biofuel blends and conventional fuels.

Will there be controls on the quality of biofuel blends?

Yes. The new legislation to be developed by the Ministry of Economic Development will enable fuel quality standards for biofuels to be set or prescribed.

Until this new legislation to further control biofuel quality is completed, the Energy Efficiency and Conservation Authority (EECA) has developed a label for biofuels which meet the biofuel quality standard. Only buy biofuels with this EECA biofuel label.

Is bioethanol unsuitable for marine and aviation applications?

The use of ethanol-petrol blends are discouraged in marine and strongly discouraged in aviation applications. This is because of the presence of water. The bioethanol can separate out of the fuel into a bioethanol water layer which could cause an engine to stop. In aviation use, cold temperatures at altitude can result in easier bioethanol separation with any water from the air condensed in the fuel tank. Bioethanol blends are specifically excluded by the Federal Aviation Authority which sets the standards for aviation safety in the USA.

The situation with respect to marine applications is less clear. Marine use increases the risk of the presence of water in the fuel tank. However, many of the major outboard motor manufacturers accept the use of ethanol blends up to 10% with their engines and in a number of states in the USA the marine use of ethanol blends is encouraged because fuel spills are less environmentally damaging with these fuels.

Are biofuels suitable for motorcycles, and small engines like lawn mowers and chain saws?

Bioethanol-petrol blend fuel can generally be used in both 4-stroke and 2-stroke engines used in land-based applications. It is best to check with the equipment manufacturer first.