What and how much is being made in New Zealand?

New Zealand produces most biofuels from used cooking oils (biodiesel) and whey (bioethanol). The summary below sets out the various possible feedstocks and their application in New Zealand.

Biodiesel – sources, details and annual production in New Zealand

Source	Details	Quantities produced annually
Tallow	Tallow is an animal fat, which is a by-product of meat processing. Typically, tallow starts with the extraction of suet from a carcass. Suet is hard fat found in the neighbourhood of the kidneys and around some other organs. While suet can be used as-is, rendering suet removes impurities and also extends the shelf life. Once suet is rendered, it becomes tallow. As long as tallow is stored in an airtight container, in a cool environment, it can keep for an extended period of time. Further details about producing biodiesel from tallow can be found in this EECA Study "Biodiesel from Tallow", by Barry Judd, November 2002. Other details at Meat Industry Association of New Zealand.	New Zealand produces around 150,000 tonnes of tallow per year, most of which could be made into biodiesel. Of this total, 120,000 tonnes is currently exported, principally for use in animal foods and chemicals manufacture, could be used for tallow ester manufacture. 30,000 tonnes are used domestically for stock food, soap,and margarine.
Rapeseed Oil (Canola)	Canola is a genetically engineered plant developed in Canada from the Rapeseed plant, which is part of the mustard family of plants. Rapeseed oil is a penetrating oil, to be used in light industry, not for human consumption. **Process:** Chemical transesterification	Annual Production volume, 1 million litres (currently) - 4 million litres from July 2009
Jatropha	The oil yielding plant Jatropha curcas L. is a multipurpose and drought resistant large shrub, which is widely cultivated in the tropics as a live fence. It produces a non edible fruit which has a high content of oil used to provide the feed stock to produce the biofuel. It has the additional plus of being grown on marginal or arid soils, and does not compete with traditional food crops for land. The jatropha plant can reach a height up to 5m and its seed yield ranges from 7.5 to 12 tonnes per hectare per year, after five years of growth. The oil content of whole Jatropha seed is 30-35 % by weight basis. **Process:** Chemical transesterification	Early trials in Northland in NZ. 2 years before they will bear fruit.
Algae	Half of algae's composition, by weight, is lipid oil which can be converted into algae biodiesel. Various algae contain different levels of oil. Algae are easy to grow and can be manipulated to produce huge amounts without disturbing any natural habitats or food sources. All they need is water, sunlight and CO2. **Process:** Chemical transesterification	Advanced Research /trial stage. No production of fuel yet.
Used Cooking Oils	Used Cooking Oils are an excellent source of biodiesel and are otherwise a troublesome waste product. Removing contaminants such as water and managing the acidity are two key considerations. Several NZ suppliers are producing their biodiesel from used cooking fats. **Process:** Chemical transesterification	An estimated 5,000 tonnes annually of spent cooking oils is available in New Zealand.

Bioethanol – sources, details and annual production in New Zealand

Source	Details	Quantities produced annually
Whey	In New Zealand,bio-ethanol is made as a by-product of the dairy industry. Lactose is fermented in whey with yeast that converts this sugar into alcohol. The disposal of whey is a worldwide problem. Large quantities of whey are produced as a by-product during the manufacture of cheese and casein, and this must be disposed of or processed in an environmentally acceptable way. The key to the utilisation of this resource has been changing the perception of whey from a 'waste material' to an 'opportunity' for further processing. **Process:** Fermentation using yeast	Anchor Ethanol produces approx 20 million litres annually but not currently for fuel use. 60% is exported. It's hoped that within the next few years 20% of the business will be transport fuel.
Salix (Willow)	Cultivating willow for biomass is new in New Zealand, although willow is being used overseas as a dedicated energy crop, mostly to fuel municipal heating plants and to produce heat and power. In this country, short rotation willow biomass has potential using transformational technology. Willow biomass can be used for production of ethanol for fuel, lignin for the production of biopolymers and xyulose for food sweetening, with secondary uses as fuel in cogeneration plants (heat and energy generation) and stock fodder. Further details in Energy Farming with Willow in New Zealand **Process:** Hydroplysation and fermentation	Harvesting to begin in 2009/2010. Further details here
Waste Wood	Ethanol can be produced from forest wastes or purpose grown trees using enzymes and fermentation organisms. Chemical and physical treatments are often require das part of processing. **Process:** Fermentation using enzymes and microbes	Demonstration; but potential could be as much as 100 million litres annually
Straw	Thanks to advance sin biotechnology, research can now transform straw, and other plant wastes, into cellulosic ethanol. While chemically identical to ethanol produced from corn, cellulose ethanol exhibits a net energy content three times higher than corn ethanol and emits a low net level of greenhouse gases. Process: acid hydrolysis (or enzymatic hydrolysis) then fermentation using enzymes (converts cellulosic biomass to fermentable sugars), then microbial fermentation to produce ethanol and CO2.	Nothing active in New Zealand (desktop research only).
Food Waste	Putrescible food waste could be used to produce lignocellulosic ethanol for fuel. **Process:** Fermentation	Nothing active in New Zealand (desktop research only).