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New Zealand

Bio-Fuels

Policy, Production and Market Potential

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Report Highlights: The New Zealand Government recently announced mandatory sales targets for bio-fuels to encourage increased domestic production. Although several entities are conducting research and running trials on a variety of production methods, overall production is very low. There is potentially a small market for exports of bio-fuels to New Zealand, as well as the potential to export technology and create research joint ventures.

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Domestic Policy

The Government of New Zealand (GONZ) is actively looking for ways to increase commercial bio-fuel production. Although there are a number of entities conducting research and running trials on a variety of production methods, overall production is still very low. Increasing production of bio-fuels is seen as a means to help achieve New Zealand's obligations under the Kyoto Protocol while also increasing energy security and improving New Zealand's current account deficit.

Bio-fuels are a small part of New Zealand's National Energy Efficiency and Conservation Strategy (NEECS). The NEECS was released in 2001 with the aim of creating government programs to promote greater energy efficiency, energy conservation and the use of renewable energy. It is managed by the Energy Efficiency and Conservation Authority (EECA). The NEECS is not only a stand-alone strategy under the Energy Efficiency and Conservation Act (2000), but is also intended to be part of the National Energy Strategy, which is in the process of being developed.

The NEECS is currently being updated by EECA, which is working closely with other government departments, including the Ministries of Economic Development (MED), Environment and Transport. A draft of the updated NEECS (including proposed targets and goals) has been released for public comment until March 30, 2007. The report states that the NEECS is part of the GONZ's response to global climate change, the need for enhanced energy security, and rising energy prices. The NEECS is heavily influenced by the Kyoto Protocol, which the GONZ ratified in 2002.

As part of the NEECS, the GONZ released mandatory sales targets for the sale and use of bio-fuel blends in New Zealand on February 13, 2007. These mandatory targets are expected to become a formal part of legislation in late-2007 or early-2008. Fuel companies will be required to have sales of bio-fuel (on an energy basis) equating to 0.53 percent of all fuel sales as of April 1, 2008. This amount will increase annually, reaching 3.4 percent in 2012[1] (see table 1). These dates not only coincide with the first commitment period under the Kyoto protocol, but are also based on the expectation that second generation bio-fuels will begin entering commercial production at the end of this period. The GONZ has stated that these targets are a starting point and that it expects bio-fuels to make up an even higher proportion of total fuel sales once infrastructure is in place.

The GONZ will allow oil companies to determine which combination of bio-fuels to use and where to market them in order to reach the targets, as it is a sales quota rather than a content quota. However, bio-fuels sold at retail will be required to meet government-determined specifications. Currently, there are voluntary specifications for retail sales in place, with specified maximum blends of 10 percent for ethanol and 5 percent for biodiesel (note that these have to meet the Petroleum Products Specifications Regulations (2002)[2]). These voluntary specifications are likely to influence the mandatory retail specifications that will be part of the yet to be released legislation on bio-fuels.

According to the GONZ, if the proposed sales obligations are met, New Zealand would not need to account for over a million tons of carbon dioxide emissions under the Kyoto Protocol. This is because bio-fuels are considered carbon neutral, as they come from renewable sources. Estimates of New Zealand's liabilities under Kyoto during the first commitment period (2008 to 2012) continue to fluctuate, with estimates ranging between $0 and NZ$ 3 billion. The New Zealand Government has reduced its estimated carbon balance for the first

[1] http://www.transport.govt.nz/biofuels-sales-obligation-final-policy-questions-and-answers-1/
[2] http://www.med.govt.nz

commitment period from a 64 million ton carbon dioxide equivalent deficit to 41.2 million tons. The downward revision is mainly due to the impact of higher oil prices. The projected balance will likely be revised numerous times over the coming years.

Table 1: Mandatory Sales Targets

Year	2008[3]	2009	2010	2011	2012
Obligation percentage[4]	0.53	1.06	1.67	3.35	3.4

Potential New Zealand Production

New Zealand currently lacks commercial production capacity for bio-fuels, although there are very small amounts of private production and trials. Despite this, the GONZ claims that the quantities of feedstock currently available in New Zealand are sufficient to meet the targets and that the ambitious targets should act as a strong motivator for companies to create additional production capacity. Imported bio-fuels will make up for any production shortfalls.

The mandatory sales target for 2012 is based on an expectation that, on a volume basis, 4.5 percent of diesel sales will be produced from biodiesel and 3 percent of petrol sales will be produced from ethanol. This will equate to the 3.4 percent total sales target, which is on an energy basis. It is thought that New Zealand currently produces enough tallow from it's meat industry that, if converted to biodiesel, it would account for more than 5 percent of New Zealand's diesel needs. At least one company has publicly announced its intentions to locate a suitable site for such production and there are a number of other parties who have expressed interest. At present there is only a small pilot plant converting tallow to biodiesel.

The potential for domestic ethanol production is less clear. In earlier government reports it was felt unlikely that in the short- to medium-term New Zealand would grow crops to use as feedstock. New Zealand would instead rely on readily available by-products from other industries. The increased bio-fuels targets, however, reflects more recent thinking that there is potential for a privately owned ethanol plant using maize (corn) feedstock that is capable of producing 95 million liters of ethanol annually[5]. At full capacity, this would produce 3 percent of New Zealand's estimated petrol needs in 2012. If this plant is not built, and production capacity using other feedstock is not created, ethanol will probably be imported to meet New Zealand's sales obligations. There will be no penalties for using imported bio-fuels to meet mandatory obligations.

New Zealand already produces a very small volume of ethanol from whey (use is mainly restricted to a small number of commercial vehicle fleets) that accounts for 0.3 percent of New Zealand's petrol needs. There are additional whey and other potential feedstock materials produced in New Zealand that could also be used. There are challenges, however, such as the competing uses for these products and the tendency of tallow to begin solidifying below temperatures of 20 degrees Celsius (68 degrees Fahrenheit).

There are several organizations presently conducting research and trials on producing 'second generation' bio-fuels from a variety of different feedstocks. Most of these organizations are in the early stages of research. One joint venture is testing technology that ferments the by-products from forestry harvesting to produce ethanol. Another company is testing technology to extract chemicals from shrubby willow (silax) saplings,

[3] 2008 is expected to be a partial year: April 2008 to December 2008. All other years are calendar years
[4] This is a percentage of the previous year's fuel sales
[5] http://www.eeca.govt.nz/eeca-library/renewable-energy/biofuels/report/maize-ethanol-in-nz-07.pdf

which can be grown on marginal land in temperate regions. The process uses every part of the plant, with extracts able to be converted into ethanol, lignin for plastics and xylose used as a sweetener. Another company is conducting trials using technology it has developed to harvest algae grown in sewage ponds and process it into biodiesel. This process potentially has the advantage of helping clean up sewage ponds and waterways high in nitrates. Another group is running trials of biodiesel produced from oilseed rape (canola). With the current lack of bio-fuel production infrastructure there is potential for exporting technology to New Zealand and/or the formation of research joint ventures.

Market Potential

There is a potential export market in New Zealand for bio-fuels, particularly ethanol. Ethanol has no excise tax when imported, unlike mineral fuels, which are taxed at 42 NZ cents per liter. Demand for imports will vary greatly, depending on the volumes that can be produced domestically. Although the mandatory sales targets are likely to motivate the creation of domestic production, it is likely that imports of biofuels will be needed to meet these obligations. Construction of commercial plants has not yet begun, despite the implementation of these sales targets beginning in April 2008 (although the target begins at only 0.53 percent of fuel sales). If an ethanol plant is not built by 2012, there is likely to be a major shortfall in ethanol production.

With mandatory sales levels due to begin in April 2008, there is potential demand for imported bio-fuels to meet sales levels, due to domestic production capacity shortfall. New Zealand's market size is limited, however, with New Zealand currently consuming approximately 6.3 billion liters of transport fuel annually. Of this, 94 percent is imported. The transport fuel used consists of 3.4 billion liters of petrol and 2.9 billion liters of diesel. The GONZ estimates ongoing gradual increases in transport fuel consumption, from 150 petajoules of energy in 2005, to approximately 180 petajoules in 2030, with a slight increase in the ratio of diesel to petrol[6]. The number of vehicles licensed in 2005 (private and commercial) is 3.15 million and New Zealand's population in 2005 is estimated at 4.1 million people.

Further Information

Energy Efficiency Conservation Authority
http://www.eeca.govt.nz/renewable-energy/biofuels/index.html

Ministry of Economic Development
http://www.med.govt.nz/

Ministry of Transport
http://www.transport.govt.nz/

Statistics New Zealand
http://www.stats.govt.nz/

[6] http://www.med.govt.nz/upload/38641/eo-2006-final.pdf