

Food Security, Climate Change and Bio-Energy - A New Zealand Forestry Perspective

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Wood Products
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International Trends

Worldwide investment in bio-fuels continues to rise. Time Magazine estimates it rose from \$US5 billion (\$6.3b) in 1995 to \$US38 billion in 2005 and is expected to top \$US100 billion in 2010.

This investment has been heavily influenced by policies and associated economic incentives to develop renewable energy sources.

Wood has an important role to play in this. The FAO (FAO, UNECE 2007) noted that wood is currently the most important utilised source of energy in the UNECE region and this has been driven by renewable energy policies and that the amounts of wood required to meet energy policy targets are likely to exceed supply. It also notes that renewables policy rarely specify the share of wood in supply.

The interest in the potential for forestry to benefit from using wood fibre for bio-energy in New Zealand is increasing but currently only surplus material is currently used for bio-fuels because we don't have subsidies.

That said, New Zealand has substantial potential for production of biomass fuels from forest harvest residues. In 2005 forest harvesting produced an estimated 1.04 million tonnes of landing residues. At present less than 100,000 tonnes per annum are being utilised. Short rotation crops may provide some fuel as a supply buffer, but will be more expensive than residues due to growing costs.

Significant quantities of residues from forest harvesting are available as a source of fuel for bio-energy plants or as a feedstock to other uses (bio-refineries). Many New Zealand wood processors are fuelling boilers with the wood residues produced at their plant. However, it may also be economic to use wood residues that are a by-product of forest harvesting, and that are currently not utilised.

The common features amongst those operations currently using residues from New Zealand forests currently operating are: - mobile plant that operates from a variety of locations - multiple customers for the output - a variety of feed-stocks going into the processing equipment - a

variety of materials being produced, not limited to bio-fuels - raw material is often being obtained free of charge - none are collecting forest cutover residues.

The low cost of competing fuels such as coal and gas, have made the bio-fuel market a difficult one. This is expected to change in the next few years as the costs of and restrictions on land-filling rise and the costs of fossil fuels increase.

The processing of residues in New Zealand is not well developed, but the Scion study found that there is both sufficient wood and wood residues available in New Zealand to supply a commercial-scale ethanol refinery, and a domestic market large enough to support it. Indeed, the report concluded that purpose-grown energy forests, if planted today, could meet all of New Zealand's future transport fuel and heat energy needs without threatening the country's agricultural industry.

Development of bio-fuel products in New Zealand has been slower than expected partly because the economics of doing it have changed as the United States offers controversial subsidies in certain areas.

The impact of the increased demand for wood has already become a significant issue in places like Europe and the switch in land-use is affecting forestry. This can either be directly where land is switched from the production of timber to palm oil as is the case in Indonesia, or indirectly. In the United States, 20% of the corn crop is now used for ethanol production, a process that uses almost as much energy as is gained, and this is projected to continue to increase significantly. As corn is the primary feed for egg and dairy products this has seen an increase in dairy prices which has had a flow-on effect to NZ land prices.

Global debate about bio-fuels has shifted in recent months and in Britain - where the fuels are set to begin flowing on April 1 - a dispute is raging about whether bio-fuels will do more harm than good by leading to rainforest destruction and food shortages.

"The rush for bio-fuels is causing a crisis in global food prices, with the United Nations food agency describing bio-fuels as a 'crime against humanity' and calling for a five-year moratorium," Smith says. "The problem is the land producing bio-fuels is competing with that for food production and that there simply isn't sufficient land globally to do both. It's not a good look for New Zealanders to be filling their cars with bio-fuels while the world's poorest starve."

Use of subsidies will bio-fuels is hugely distortionary. Subsidies for American corn growers and the punitive duties the US has slapped on Brazilian ethanol imports to appease the powerful American farming lobby and protect its highly inefficient corn-based bio-fuels provide ample illustration. Nor is the US popular in Europe where, by undercutting local prices, it has destroyed the fledgling domestic bio-fuels industries in countries such as Germany. Recently the European Bio-diesel Board lodged a formal complaint with the European Commission against what it calls unfair competition from the US. Critics say that having been held to ransom

by Middle Eastern oil producers, the US seems determined to control the world bio-fuels market.

The resulting imbalance in world food supplies, marked by a dramatic shortage of rice and rapidly escalating prices, has led to food riots in Haiti, Egypt, Burkina Faso, Cameroon, Indonesia, Ivory Coast, Mauritania, Mozambique, Bolivia, Uzbekistan and elsewhere.

World Bank Managing Director Juan Jose Daboub says 100 million people have been pushed back in to poverty because of rising food prices over the last 2 years and the effect of food prices doubling for 3 years was equivalent to losing 7 years progress in the battle against poverty.

NZ Government Policy

NZ government policies will influence supply and demand. The government has also committed to increased use of bio-fuels by introducing a Bio-Fuels bill. The Bill has gone through a select committee and was to report back to government on 4 June. It proposes to make oil companies begin selling a small but progressively higher amount of bio-fuels each year from 1 July this year. The Bill implements the mandatory use of bio-fuels by introducing a bio-fuels sales obligation (BSO) policy and by regulating engine fuel, including bio-fuels and blends. The Biofuel Bill requires oil companies to sell a minimum percentage of bio-fuels (calculated on energy content) from 1 July this year. The mandate increases from 0.53% in 2008 to 3.4% in 2012..

The government has provided a modest amount of money for research into the potential for forest bio-energy in New Zealand. Further information is available at: <http://www.fida-bioenergy.org.nz/index.html>

In addition the NZ forest research agency 'Scion' and US based 'ArborGen' have agreed a multi-million dollar partnership to focus on gene discovery and molecular breeding for forest trees. The research is aimed at improving tree growth and quality, which are key components of cultivating trees for renewable energy and bio-fuels, through faster identification of genes.¹

However, growing unease about whether the biofuel is coming from sustainable sources is starting to have an impact politically and the government has conceded it may need to be delayed. While a headline in the NZ Herald on 28 May sums up the situation – “Government Faces Defeat on Biofuels bill”.

Submissions on the bill closed on 31 January but the following examples illustrate the concerns:

- Catholic social justice agency Caritas Aotearoa New Zealand has drawn a link with the impact on local communities overseas and stated “If New Zealand

¹ **Biofuel Bill** - http://www.parliament.nz/en-NZ/PB/Legislation/Bills/4/c/9/00DBHOH_BILL8317_1-Biofuel-Bill.htm

seeks bio-fuel from sources in developing countries - such as the growing industries in Malaysia, the Philippines, Laos, Papua New Guinea and Indonesia - we are inevitably asking local people to make sacrifices to meet our demand for fuel." In contrast Caritas does support the development of fuel from New Zealand waste products such as from agriculture.

- ECO welcomes the requirement in proposed new section 34G that bio-fuels:

"meeting specified environmental or sustainability standards or specifications (for example, specifications providing that qualifying bio-fuels must be produced from biomass grown without causing undue environmental harm and without unduly impinging on food production);

Such requirements should include the specification that biofuel production does not effect indigenous biodiversity or further exacerbate threatened species.

It is essential that bio-fuels are produced in a truly sustainable manner and do not actually add to global warming and environmental degradation. ECO notes that the European Union has announced that it may ban imports of certain bio-fuels that are produced unsustainably.

For example much of the palm oil used for bio-fuels has been associated with the destruction of rainforests in Malaysia and Indonesia and could result in more greenhouse gas emissions than saved from fossils. While palm oil productions can be environmentally sustainable it is essential that New Zealand does not accept bio-fuels from sources which exacerbate the destruction of rainforests or result in a net increase in greenhouse gas emissions.

- A particularly influential voice has been the NZ Parliamentary Commissioner for the Environment - Dr Jan Wright, who has said the Bill should not proceed. Dr Wright is not convinced the mechanisms allowed for in the Bill will deliver either lower CO₂ emissions or energy security.

The key issue is that the CO₂ emitted during cultivation and processing into fuel during cultivation and processing into fuel is not taken into account. The variation between bio-fuels in this area, based on life cycle assessment studies of a wide range of bio-fuels, is quite pronounced. Ethanol from corn in the US is cited as a particularly poor performer with total emissions close to those of diesel.

The New Zealand Biofuel Bill has no inbuilt mechanism for ensuring that bio-fuels used in New Zealand would emit significantly less CO₂ over their lifecycle than fossil fuels. By contrast the European Commission is considering a bio-fuel

CO₂ emission reduction of 35% over fossil fuels as a standard that it would require.

The problem is that internationally there is no standard for sustainability although the UK, NZ and Switzerland are attempting to develop protocols.

Concern centres on some of the overseas bio-fuel products that major oil companies could import here in order to fulfill their bio-fuel obligations.

The Environmental Party have already insisted that a sustainability clause be added to local legislation so that those fuels cannot be used, but officials have not yet worked out an environmental standard by which the fuels can be judged.

New Zealand officials have been looking overseas to examine other countries' environmental standards but have discovered they are at the forefront of developing something that isn't yet common internationally.

"New Zealand is a country with a low population density and an economy largely based on biological production. It would be unfortunate if, rather than developing our own bio-fuels the most practical way to meet regulatory obligations was to import Brazilian ethanol.

As an alternative we need to focus on our ever-increasing consumption of transport energy. Curbing its rate of growth needs to be done with at least as much enthusiasm as the production of alternative fuels."

"Demand reduction is a difficult area; aspirations are easy, but results require more."

- One of the oil companies – BP – has noted that “While on the face of it 3.4% does not sound like a very high target, the way in which it is calculated and must be implemented means that over 90% of petrol and 30% of diesel will need to contain a bio content in order to meet the mandate. In order to meet the mandate, BP believes a 10% ethanol blend will be required in most of New Zealand’s petrol and this would be one of the highest bio-fuels targets in the world and cannot physically be delivered at the moment.”

Trouble is, says Smith, our timing's awful. He finds it "bizarre" that New Zealand is leaping on the bio-fuels bandwagon just as the wheels are falling off internationally, and the bill itself is "a dog".

Not all bio-fuels are made in an unsustainable way, and Gull has been quick to defend the ethanol product made in New Zealand that it is already selling at its service stations.

Recommendations

1. Policies to promote renewable energy should have a holistic approach between sectors, and balancing potential of new markets with existing markets, and be targeted at national and sub-national levels in relation to both resources and needs.
2. The concept and level of sustainable wood supply needs re-examination. Net annual increment, although vitally important, is not a sufficient indicator by itself of what is a sustainable level of supply; age structure, ownership, location and infrastructure, biodiversity conservation and protection needs, quality aspects, employment and other features must all be considered.
3. A level playing field between agricultural and forest biomass has to be assured, as well as between imported and domestic biomass.
4. Decisions on future land use will be crucial for food supply, supply of wood and non-woody biomass and nature conservation.

Thirty-fourth Session of the FAO Conference

Report of the High- Level Special Event

Forests and Energy

Tuesday, 20 November 2007, 14:00 to 17:00

The High-Level Special Event recognised that:

1. bio-energy has become a global strategic issue which increasingly affects economic, social and environmental conditions and has a potential to mitigate climate change;
2. wood is the most important bio-fuel and an economically and environmentally efficient substitute for fossil fuels;
3. there is, particularly in developing countries, a lack of information on wood used for fuel, which hampers countries' decision-making on the sustainable use of this resource, and thus hinders an opportunity to mitigate climate change and strengthen their energy mix;
4. with growing population and increasing land allocation for the use of energy, trade-offs between forest, energy and agricultural use of land need to be carefully examined.

To cope with the current and future challenges there is a need to:

1. assist FAO Members to develop and integrate bio-energy strategies in their national forest programmes and plans, through capacity building;
2. enhance capacities of FAO Members for the use of alternative renewable energy sources, including hydropower, solar energy and biogas;
3. increase the energy efficiency of wood combustion at household and industrial levels;
4. make better use of post-consumer wood;
5. consider the value of wood for other end-uses before using it for energy generation;
6. build wood energy strategies based on sustainable forest management concepts;
7. address bio-energy as a cross – sectoral issue and integrate energy in the forest, agriculture and other land use policies;

8. coordinate bio energy strategies with poverty eradication and poverty reduction policies;
9. effectively disseminate research and development findings, technologies and know-how for the efficient and healthy energy use;
10. avoid market distortions when promoting bio-energy;
11. design systems of continuous check-ups and balances for production of bio-fuels to avoid negative impacts on the environment and well-being of the local communities;
12. carefully consider food security and negative effects on the other sectors when designing and implementing incentives for the bio-fuel production

As well as the primary use for logs, secondary use of residues from processing provides biofuel utilised at the processing plants and beyond. The production of greenhouse gas neutral biofuel is a significant output of forest growing with up to 35 PJ of energy produced annually from woody biomass out of a New Zealand total amount of 237 PJ of energy produced from renewable energy sources.

An alarming issue that the NZ forest industry has identified is that in NZ whey is used to produce methanol. The other use of this methanol is in NZ Vodka – thus bio-energy brings risk of increasing booze prices!!!

Gull Force 10 is a blend of petrol with 10 per cent bio- ethanol, a whey-derived product supplied by Fonterra.

<http://www.contrafedpublishing.co.nz/Energy+NZ/From+whey+to+petrol+but+why.html>

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