

# Impacts of the revised Emissions Trading Scheme on potential demand for carbon credits from new forest planting

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## Introduction

The amended Emissions Trading Scheme (ETS) will very likely create a large demand for offsets, either as New Zealand emission units (NZUs), CERs or "greened" Assigned Amount Units (AAUs), and if a significant proportion of these are sourced domestically then this will require new forest planting.

New Zealand is currently very dependent on new forest planting to help balance its greenhouse gas (GHG) accounts, and so impacts of our ETS on demand for carbon credits, known in the New Zealand ETS as New Zealand emission units (NZUs), are important. The forestry sector can help mitigate climate change by sequestering carbon dioxide and also by providing more climate-friendly products and energy, but it is the provision of NZUs that offers some recompense for the carbon storage service that growers of forests provide.

New Zealand's GHG emissions profile in 2007 is shown in Table 1.

Table 1- New Zealand GHG emission in 2007<sup>2</sup>

Sector	Emissions of CO2 equivalents (millions of tonnes) in 2007
All energy	32.65
Industrial processes	4.60
Solvents and other products	0.04
Agriculture	36.43
Land use change and Forestry	-23.84
Waste	1.82

The Labour-led Government passed legislation that sought to create a "cap and trade" GHG market, aiming to encourage changes in behaviour by providing for payments from emitters of GHGs to sequesterers of GHGs. This scheme provided for a staged entry into the scheme by

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<sup>2</sup> New Zealand Energy Greenhouse Gas Emissions, Ministry of Economic Development, 2008 Calendar Year Edition

sectors, with forestry entering in 2008, Stationary Energy and Industrial Process (SEIP) emissions in 2010, liquid fossil fuels in 2011, and agriculture in 2013. Agriculture and Energy-Intensive Trade-Exposed (EITE) products (ie exported commodities such as wood pulp or products vulnerable to export substitution such as cement) were to receive free NZUs at 90% of 2005 emissions levels, falling by 7.5% each year until after 12 years the agriculture sector would be fully accountable for its emissions.

The National-led government elected in 2008 undertook a review of the scheme, and according to a release by the Hon. Nick Smith, the scheme was to be amended in order to bring the stationary energy, industrial processes and liquid fossil fuel sectors into the scheme simultaneously in July 2010, while delaying agriculture's entry until 2015. In addition there were some transitional measures until 2013 as follows:

- The stationary energy, industrial processes and liquid fossil fuels sectors would have to surrender 1 NZU for every 2 tonnes of emissions for the first three years;
- The government would allow emitters to pay \$25/tonne to the government instead of surrendering NZUs during a transitional phase;
- Allocate support (free credits) to trade exposed / emission intensive industry on a production (intensity) based, industry average approach rather than calculating the support based on 2005 levels of emissions;
- Align phase-out of support for EITE industry with a stated goal of a 50% reduction in GHG emissions by 2050 (a 1.3%/annum phase out instead of a 7.5%/annum phase out to align with the ETS proposed by the Australian Federal government); and
- Increased transitional support for the fishing industry from 50% to 90% of emissions.

Several people, including the author, initially interpreted the third and fourth bullet points above to mean that the stationary energy, industrial processes and liquid fossil fuel sectors would all be allocated transitional support of 90%, and that they would be liable only for emissions above that level. This was consistent with a national target of -50% GHG emissions by 2050, but others pointed out that it could be inconsistent with the first bullet point. Requests for clarification sent to the Minister and his staff revealed that the agriculture sector would be the primary recipient of free credit allocations. Most significantly, to the question, "Just so we are crystal clear on this, could you please confirm that 'All Energy' will be liable for 32,653,000 NZUs in 2013 if

their emissions stay at 2007 levels?", George Riddell, a Senior Advisor on Climate Change Issues for the Minister responded:

"First let us be clear that 1 NZU must be surrendered for every tonne of greenhouse gas emissions therefore using the figures you have used 75,550,000 NZU's will need to be surrendered each year. However the Government will, to protect the export sectors, allocate some 43,000,000 units free of charge. The difference is some 32,000,000 p.a. which will need to come from the forestry sector or from off-shore. So around the figure you came up with and as you say should encourage planting at a reasonably high level starting now."

With this clarification it is feasible to estimate likely demand for NZUs, and how this might affect the forestry sector.

### Assumptions

Before examining likely demand for NZUs it is important to clarify the impacts of some critical assumptions upon which projections are based. Some of the key ones affecting demand for NZUs until 2020 are:

1. *The extent to which owners of existing post-1989 ("Kyoto") forests register for the scheme.* Kyoto forest owners can choose whether or not to register for the ETS. Registration means that they can claim and sell NZUs, but then they are also liable for NZUs when they harvest. A prominent Kyoto Forest owner wrote to me suggesting that, owing to perceived low returns in the proposed scheme and future liabilities, as little as 15% to 20% of Kyoto forest owners might register. I think these are low estimates, but if he is right then of course this would increase future NZU demand. It would also mean that forest owners had granted a gift to the nation of free sequestration that allowed us to pollute more without incurring extra costs.
2. *The precision of estimates of forest C sequestration.* Figure 2 shows a theoretical maximum supply from existing post-1989 forest, but if inventories of carbon sequestration were poor then this would reduce NZU supply from those forests, in accordance with ETS rules. Poor inventories in new forests would also increase the area of such forest required to meet demand.
3. *The speed of changes in behaviours in other sectors.* If other sectors reduced emissions, either by employing new technologies or through decreased production, then demand for NZUs would be reduced. The key sector here is the energy sector, that is liquid fossil fuels and stationary energy (including electricity), which would provide almost all the demand for credits in the short term (Figure 1). There may be a tendency for large energy companies to internalise their NZU supply by purchasing forests or entering into joint ventures with land owners.

In addition, the projections examine only short term NZU demand, and from around 2017 onwards growers who planted during the 1990s (Kyoto Forest owners) will increasingly face decisions about whether or not to harvest their crops in any particular year. If they had previously registered for the ETS, a high price for NZUs might make harvesting less likely. If they mostly chose not to register for the ETS because of perceived low returns then their free "gift" to the nation would effectively be withdrawn when they harvested and we would have much more difficulty in meeting our international commitments to reduce net GHG emissions during the 2020s. If, however, many of them register for the ETS and they decide to proceed with harvesting during the 2020s, then they will add to the demand for NZUs because at time of harvest they will have to surrender a proportion of those they had previously earned.

Returns to growers from new afforestation will also be influenced by the degree to which exports of NZUs are restricted. This is known for Kyoto Commitment Period 1 (2008-2012) but may be different for Commitment Period 2. The remaining NZUs that can be exported during period 1 without foreign purchases of NZUs is now 24 million, including a right to export 16 million allocated to pre-1990 forest owners for the loss of the right to deforest without financial penalty. With lower domestic demand for NZUs from the proposed ETS, restricted export capacity will be a concern for those contemplating investment in new forests.

### Demand for NZUs

Sources of demand by sector are shown in Figure 1. The energy sector will initially have the biggest shortfall between free credits and GHG emissions. Demand shown in Figure 1 was calculated by assuming that emissions remained at 2007 levels.

The difference between demand and theoretical maximum supply from existing Kyoto forests is shown in

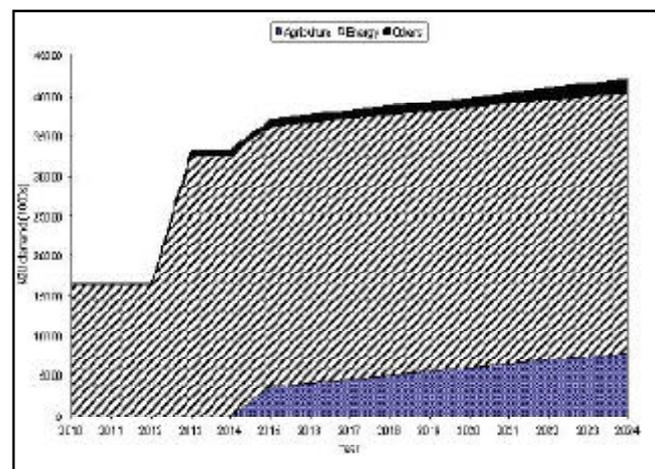


Figure 1 - Likely sources of demand for NZUs by sector, assuming emissions remain at 2007 levels.

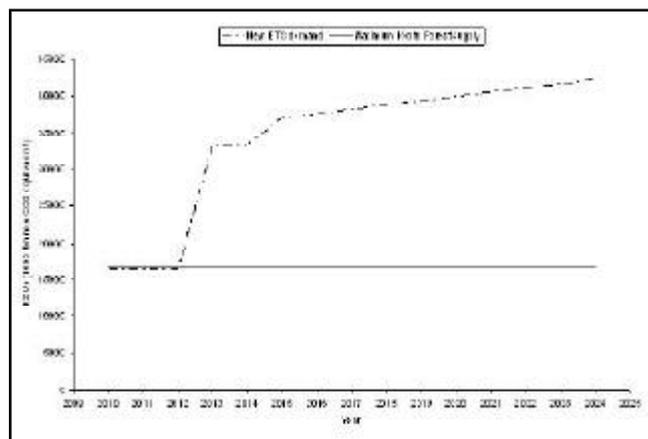


Figure 2 - Demand for NZUs assuming emissions remain at 2007 levels compared to a theoretical maximum supply for existing Kyoto forest.

Figure 2. Kyoto forests are unlikely to provide this maximum supply because not all owners of these forests will register, and estimates of CO<sub>2</sub> sequestration from their forest inventories will be imprecise, thereby reducing the NZUs they can claim under ETS rules.

#### Area of new forest required to meet demand

It is feasible to estimate the number of hectares of new plantation required to satisfy domestic demand assuming that:

1. Emissions remain at 2007 levels;
2. Exports of forestry-related NZUs during commitment period 1 are 24 million, the maximum allowed;
3. 16 million NZUs are allocated to pre-1990 forest owners during commitment period 1 (from 2008-2012), and 50% of these are used for deforestation while a further 10% are carried forward to commitment period 2 (yet to be determined, but assume 2013-2017).
4. 21 million NZUs are allocated to pre-1990 forest owners during commitment period 2, and they are used in equivalent proportions to those allocated during commitment period 1.
5. 21 million NZUs are allocated to pre-1990 forest owners after commitment period 2.
6. 30 million forestry-related NZUs are exported during commitment period 2;
7. There are no imports of carbon credits;
8. Owners of existing Kyoto forest provide NZUs to the market at rates of either 25%, 50% or 75% of the theoretical maximum supply; and
9. New forests can sequester CO<sub>2</sub> at a rate of 30 tonnes/ha/annum. If most new forest is planted on marginal land then sequestration could be less than this. Note also that forest takes a few years to reach this level of sequestration.

Adopting these assumptions yields cumulative areas of new forest required to fully meet demand as shown in Figure 3.

Forest owners cannot immediately meet any given demand for NZUs, because establishing forests requires careful planning and investment. There are also constraints on planting rates in the short term due to nursery capacities and also numbers of silvicultural contractors, and so meeting a demand for almost a million new hectares by 2015 (Figure 3) would stretch resources in the sector as planting at these levels is unprecedented. The most new forest planted in New Zealand during any one year was 98,000 ha in 1995.

In addition generous free allocations of NZUs to the agricultural sector will probably keep land prices at current levels, which are often too high for the land to be profitably used for forestry, and that will likely reduce levels of investment in new planting.

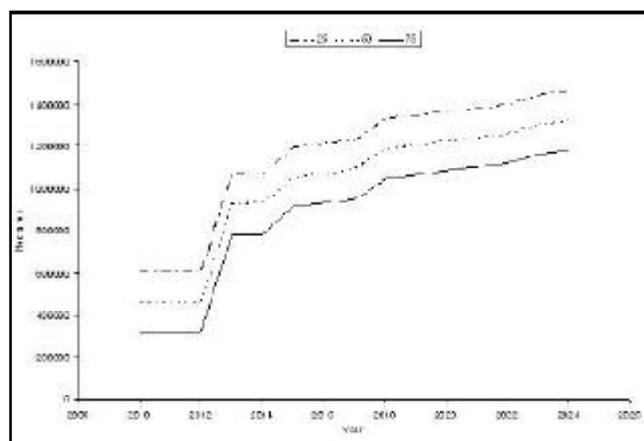


Figure 3 - Cumulative areas of new forest required to meet demand, with assumptions outlined above, assuming that planting is required for demand above 25%, 50% and 75% of the maximum potential supply (shown in Figure 2) from existing Kyoto forests.

#### Impacts of changes in behaviour in other sectors

If other sectors adopted new technologies or reduced output in response to the ETS, then demand for forest-based NZUs would be markedly curtailed. The extent to which this might happen is difficult to estimate, but the impact is clear. Assume, for example, that the energy sector reduced its GHG emissions by 5% per year (using 2007 as a base year) from 2010 and the resultant areas of new forest required to fully meet demand for NZUs are shown in Figure 4.

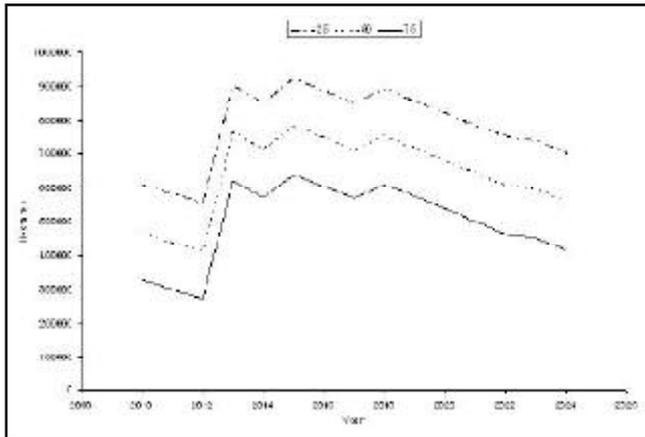


Figure 4 - Area of new forest required to fully meet domestic demand for NZUs assuming a decline in energy sector GHG emissions of 5% per year, and existing Kyoto forest supply of 25%, 50% and 75% of potential maximum.

### Grey carbon credits

In September 2007 (the pre-compliance market era) Meridian Energy offered carbon credits for sale on the internet auction site TradeMe that had reportedly been accrued by building a wind farm instead of building a power plant that would have emitted GHGs, under an earlier Government initiative named projects to Reduce Emissions ("PRE"). Had the PRE initiative been continued into 2008, the units allocated under these circumstances, would impact on demand for forest-based NZUs.

Units allocated for "avoiding GHG emissions" are markedly different from those earned through GHG sequestration. For convenience, let's call the former "grey Credits" and the latter "green NZUs". With a rationally administered ETS the reward for avoiding emissions should be that one is not required to purchase and surrender green NZUs. Grey Credits, if allowed, would debase the currency of NZUs and could undermine the ETS. Consider, for example, a forest owner that claimed, "I was going to harvest and emit GHGs, but I decided not to and I should therefore be allocated NZUs *in addition to any I might earn through sequestration in future*". This is patently absurd, but it is equivalent to a power company claiming NZUs for a decision not to emit GHGs.

### Pricing

Supply and demand of NZUs will be affected by pricing, and a thorough evaluation of pricing is beyond the scope of this paper. It is important to note that the cap on NZU price and allocations of free NZUs will have significant impacts on supply and demand (Figure 5). Provision of free credits for some sectors would move the demand curve to the left, and a transitional price cap of \$25 might reduce the supply from sequesterers and increase the demand from emitters if the unfettered market price exceeded the cap. Please note

that Figure 5 is a theoretical construction and that the real shape and positions of the supply and demand curves are unknown at this time. A more thorough and detailed analysis of impacts of impacts of ETS structure on prices and impacts on supply and demand is urgently required.

### Final comment

This short paper presents some scenarios that might result from the introduction of the revised ETS, but more importantly identifies some of the key variables that will affect the market for forest-based NZUs. A more thorough analysis that examined pricing would provide a greater understanding of opportunities for the forestry sector to make a worthwhile contribution as a participant in emissions trading.

Proposed amendments to the New Zealand Emissions Trading scheme will bring to an end a period of uncertainty generated by a review of the existing scheme, and this reduced uncertainty will be welcomed by potential investors in new forests. It is likely that the ETS will result in both reductions in gross GHG emissions and new planting, but high land prices resulting from minimal ETS impacts on the agricultural sector may limit the extent of afforestation. In addition the response of the energy sector to the ETS is not yet clear, and this will significantly impact on demand for NZUs and therefore on rates on new planting.

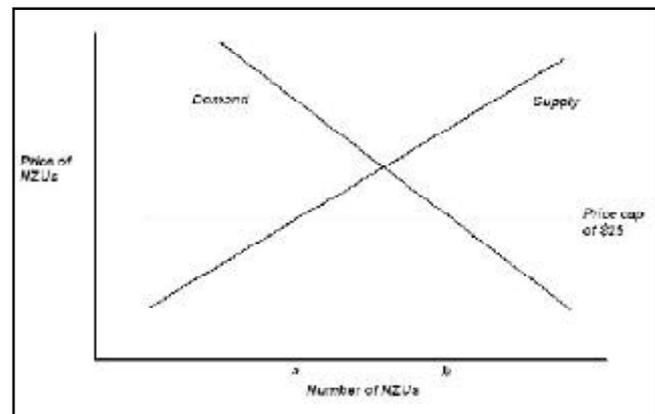


Figure 5 - Hypothesised supply and demand for NZUs and possible impact of the proposed provision of a \$25/NZU tax alternative by the amended emissions trading legislation. The market would supply NZUs up to point a and the excess from point a to b would be effectively supplied by the State.

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