

## Carbon Credit or Debit?

Recently the government announced that rather than a carbon deficit or liability NZ was forecast to have a 9.6 million tonnes of carbon surplus last year. So how does this work? Last year the balance sheet was looking very much in the red. How did these guys produce this figure and should we be relying on it?

It seems that last year, gross emissions were 23% higher than in 1990. New Zealand's initial assigned amount of carbon is fixed at 309,564,733 metric tonnes of carbon dioxide equivalent. This amount is based on the estimate of emissions for 1990 from the inventory which was submitted as part of the Initial Report under the Kyoto Protocol. This amount is fixed for the first commitment period.

The emissions and removals for all years of the national greenhouse gas inventory will change due to continuous improvement of the inventory. Continuous improvement is a requirement of the international reporting rules. All countries inventories change. So, the level of emissions in 1990 reported in the 2009 inventory submission is 0.06 million tonnes lower (less than 0.1 per cent) than the 1990 level used in the initial assigned amount calculation. This has no effect on the assigned amount.

The decrease in the agriculture figure can be contributed to several things. MAF has updated its Pastoral Supply Response Model which has now been linked directly to the emissions inventory for calculating emissions. The drought during 2007/2008 decreased projected agricultural emissions by 10.3 million tonnes (mt) (5 %). This reduction is caused by a drop in stock numbers and by reducing the feed intake. Feed intake is a major input to estimating emissions and a lower feed intake reduces the emission per head of livestock.

Another source of emissions from this sector is the contribution of nitrous oxide from nitrogen excreted from animals. To estimate this, the fraction of nitrogen that converts to oxide on NZ pasture is used in the calculation. This was an international default value of 0.2, but MAF have funded science to get a value for New Zealand soils and have concluded that 0.1 is a more appropriate fraction for the NZ situation- thus reducing emissions by 3.8 mt (3%). It is also expected that further use of nitrification inhibitors (DCD) will account for a further 0.3 mt reduction in the commitment period.

Total emissions from stationary energy, transport and industrial processes are projected to be 185.6 mt and have not changed from the 2008 projection. There have been reductions in the projected emissions from energy due to a lower than projected energy demand during 2008. The expected impacts from the economic recession were offset by removing the bio-fuels sales obligation, the renewables electricity preference, and a small increase in fugitive emissions from greater geothermal electricity generation. Total energy and transport sectors have a 2008 projection of 163.7 mt – an increase of 1.3 mt. Industrial process emissions have a 2008 projection of 22.0 mt – a decrease of 1.3 mt.

Projections of net removals for carbon from land use, land-use change and forestry were provided by MAF. Net carbon dioxide removals (net removals are carbon dioxide absorbed by trees less harvesting emissions) are from afforestation and re-afforestation, minus emissions from deforestation of all forests. Net removals are projected to be 85.0 mt. This is an increase of 17.8 mt of net removals over the first commitment period compared to the 2008 projection. The increase is due to two things:

1. Field studies showed that the post-1989 forests are removing more carbon dioxide per hectare than the overall forest estate due to fertile sites than older forests, and forests have less intensive forest management, particularly thinning. This equates to more trees per hectare growing at a faster rate than first thought. There is then an increase in credits from post-1989 forests of 8.2 mt during the first commitment period 2008–2012. The information is from a preliminary analysis of the Land Use and Carbon Analysis System (LUCAS) planted forest inventory field data.

2. Deforestation emissions are projected to be 9.6 mt lower than in the May 2008 net position. This is due in part to improved information on the area of immature forests intended to be deforested which produces lower emissions than older forests. It was also assumed that all forest carbon is instantly emitted at the time of deforestation whereas it was previously assumed that harvesting residues decayed over time. This change ensures that emissions from the high levels of deforestation leading up to 1 Jan 2008 do not enter New Zealand's accounts for the Kyoto Protocol.

According to Dr Nick Smith, the country's final position for the 2008-12 commitment period will not be known, he says, until 2015 when the final inventory report is filed and the review is completed.

The significant variations in agricultural and forest data indicate the challenges of estimating and forecasting emissions from natural systems where unpredictable effects like drought can have a huge effect on emissions. When you add in the job of forecasting how deep the recession will be across the entire economy and how long the recession will last, you can see the difficult job the government has in forecasting emissions.

Another factor is that the net position is a difference between 3 huge numbers – assigned amount at 310 mt, forecast emissions at 400 odd mt and sinks at 85 mt. If you have 10 mt change in forecast emissions (i.e. 400 to 390 or 2.5% change), then the net position would go from 10 to 20 mt. This is a 100% change.

You would then have to wonder if the suggestion of a surplus this year can be counted for certain. It's the best forecast at this point in time and as the economic situation or natural systems change, you can be a sure that the net position will change too. Can we expect the net position to be any less variable than the forecast for lamb or dairy payout – these are all inputs into the net position. I guess we will all have to wait and see.