



02 March 2016

s 9(2)(a)

Ministry for the Environment
P O Box 10362
WELLINGTON 6143

UPDATED ESTIMATES OF FORESTRY ALLOCATION AND SURRENDERS

Dear s 9(2)(a)

MfE has requested MPI to provide a forecast on allocation and surrenders of forestry units to update the net government position over a five year period as part of the March 2016 baseline update. During this update a number of improvements were identified that will be addressed for the October 2016 update. These future improvements are listed in the appendix.

Post-1989 forest allocation

There is a change from the October 2015 update to the estimate of post-1989 forest allocation (Table 1). Three emission scenarios are now provided, with assumptions provided in the appendix.

Table 1: Estimated post-1989 forest allocation, year ending June (in million NZU's)

Emissions scenario	14/15	15/16	16/17	17/18	18/19	19/20	20/21
High emissions (0 – \$12.5)	-9.9	-8.2	-8.4	-16.0	-10.4	-10.3	-10.3
Mid emissions (\$12.5 – \$25)			-8.7	-16.8	-11.3	-11.6	-11.8
Low emissions (\$25+)			-8.8	-17.2	-12.0	-12.3	-12.8

Unit Surrenders

Updated projections of unit surrenders are provided in Table 2. These surrender scenarios take account all pre-1990 forest deforestation (excluding exemptions), post-1989 ETS registered deforestation and post-1989 registered forest harvesting (ARDC applied¹). Change's since October 2015 reflect the three surrender emission scenarios provided. Assumptions used in the calculation of surrenders are provided in the appendix.

Table 2: Estimated surrenders, year ending June (in million NZU's)

Emissions scenario	14/15	15/16	16/17	17/18	18/19	19/20	20/21
High emissions (0 – \$12.5)	7.8	6.0	6.3	7.7	7.9	8.2	11.4
Mid emission (\$12.5 – \$25)			2.9	3.0	3.3	3.4	4.6
Low emissions (\$25+)			0.8	0.9	0.9	1.2	2.5

Note 1: Surrender projections are estimated at the time that the activity is predicted to occur. This may differ to when the forest owner/manager submits an actual emissions return.

Note 2: The forestry unit surrenders assume 100% compliance in forest owners/managers submitting emission returns for any pre-1990 planted forest deforestation, registered post-1989 deforestation or post-1989 harvest liabilities. This is likely to be an over estimate, with future research/analysis required to identify the likely proportion/number that don't submit an emissions return.

¹ ARDC refers to the afforestation-reforestation/debit-credit rule. This rule ensures that when forest owner's surrender NZU's for any forest carbon stock decrease, the number of surrenders is capped at the total number of NZU's allocated/claimed.

There has been no change to the PFSI allocation forecast at this time.

Yours sincerely,

s 9(2)(a)

Acting Manager: Resource Information and Analysis

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Appendix

Explanation and Assumptions

1. Allocation of NZU's

- a. Three allocation emission scenarios are provided. These are based on either high emissions (\$0 to \$12.50 per NZU), midpoint emissions (\$12.50 to \$25 per NZU) or low emission (\$25+ per NZU) scenarios.
- b. The scenarios are described in terms of the impact the activity has on greenhouse gas emissions. For example the high emissions scenario (a factor of low levels of new planting, higher rates of deforestation and no delay to post-1989 harvest) results in lower NZU allocation.
- c. Current and future uptake (the amount of post-1989 forest registered in the ETS) into the ETS is a significant factor in projecting future NZU allocation. Current post-1989 forest uptake in the ETS is around 50% of the total post-1989 forest area². The amount of post-1989 forest projected in the ETS over the next five years varies based on each emission scenario:
 - High emissions (\$0 to \$12.50): Uptake is held constant at around 50% of post-1989 forest registered in the ETS. This scenario assumes that any new planting from 2016 is registered into the ETS.
 - Mid emissions (\$12.50 to \$25): A 1% increase per year from 2017 resulting in around 56% registered post-1989 forest in the ETS by 2021. This scenario assumes that all new planting is registered into the ETS from 2016 and a small proportion (approx. 15,000 ha) of the non-registered post-1989 forest - that was previously registered - and is considered economically viable to register, re-enters the ETS over time.
 - Low emissions (\$25+): A 1.5% increase per year from 2017, resulting in 59% uptake by 2021. This scenario assumes that all new planting is registered into the ETS from 2016 and a small proportion (15,000 ha) of the non-registered post-1989 forest - that was previously registered - and is considered economically viable to register, re-enters the ETS over time.
 - Further analysis is required to assess the economic viability of any non-registered post-1989 forests, and the likelihood of participants registering their post-1989 forest in the ETS with higher carbon prices/ altered ETS settings.
- d. New planting projections are the same as those used for the international climate change projections:
 - High emissions (\$0 to \$12.50): Approx. 5,000 hectares of new forest plantings per year
 - Mid emissions (\$12.50 to \$25): Gradual increase to 15,000 hectares of new forest plantings per year
 - Low emissions (\$25+): Gradual increase to 30,000 hectare of new forest plantings per year
- e. The impact of harvested wood products is excluded from these ETS allocation and surrender projections.
- f. Averaging is excluded from these ETS projections.
- g. Based on historical evidence not all ETS forest participants complete voluntary emissions returns - hence post-1989 forest allocation will likely increase during mandatory emissions return periods. This assumption is reflected in an increase in the 2018 allocation where a mandatory return is required.
- h. Some activity data such as the net historical planting rates and yield tables are sourced from LUCAS team (upcoming 2016 submission).
- i. Currently the projections utilise the national inventory estimate of post-1989 forest area and age, to which allocation is modelled based on historical and projected uptake rates. A future improvement planned for 2016 will be using actual ETS post-1989 forest area, species and age class data to better estimate allocation.

²Varies on how this is measured: gross or net forest area

2. Surrender of forestry NZU's

- a. Registered post-1989 forest owners in the ETS are required to surrender units for carbon stock decreases (harvesting or deforestation). A small number of post-1989 participants have previously completed Net returns (surrenders are netted against entitlements). Further research/analysis is required to assess the likelihood of these net returns increasing once post-1989 forests are harvested.
- b. Surrenders are modelled at the point the activity occurs which may differ from the actual point that the units are surrendered to the Government. Participants may also wait to submit a mandatory return, rather than a voluntary return upon harvesting registered post-1989 forest.
- c. The projections exclude any post-1989 forest not registered in the ETS that is harvested/deforested.
- d. The calculation of pre-1990 planted forest deforestation includes exemptions from:
 - Tree weeds
 - <50 ha
 - <2ha
- e. Deforestation projections for pre-1990 planted forest are based on the 2015 Deforestation Intentions Survey.
- f. Pre-1990 planted forest deforestation is assumed to occur at 28 years/point of clear-fell. This assumption needs to be assessed against the deforestation surrenders logged to date and will be undertaken for the October 2016 baseline update.
- g. Offsetting/FLU is applied to pre-1990 planted forest deforestation at only the midpoint and low emission scenarios. This assumption is based on the findings from the Deforestation Intentions survey which suggest that the threshold for offsetting was generally above \$10 per NZU.
 - High emissions (\$0 to \$12.50): 5,500 ha per year, minus exemptions.
 - Mid emissions (\$12.50 to \$25): 4,900 ha per year, minus exemptions and 25% offsetting applied
 - Low emissions (\$25+): 2,800 ha per year, minus exemptions and 50% offsetting applied
- h. Post-1989 forest deforestation between 2008 and 2017 occurs at the average age of the post-1989 forest estate, then at ages 28, 30, and 32 depending on the emissions scenario.
- i. Post-1989 forest deforestation surrenders are subject to the participation rates at that time.
 - High emissions (\$0 to \$12.50): 1,400 ha per year * participation rate
 - Mid emissions (\$12.50 to \$25): 1,200 ha per year * participation rate
 - Low emissions (\$25+): 700 ha per year * participation rate
- j. ARDC is applied to post-1989 forest registered in the ETS at the point of harvest/deforestation.
- k. Post-1989 harvesting scenarios are sourced from SCION under contract, which vary by scenario and are subject to post-1989 forest participation rates in the ETS.
- l. Deadwood is decayed over 10 years.
- m. The impact of harvested wood products is excluded in these projections.
- n. Averaging is excluded in these projections.
- o. The modelling only assumes surrenders of NZU's.
- p. The modelling of future surrenders assumes a 100% emission return compliance for pre-1990 planted forest deforestation, and any post-1989 carbon stock decrease. This 100% compliance is likely to be an over estimate based on analysis of historical deforestation published within the National GHG inventory, then compared to total forestry ETS surrenders (excluding exemptions). Future research is required in this area.
- q. No post-1989 forest ETS withdraws are assumed during the projection period.

3. Scenarios and carbon price Impacts on Pre-1990 Planted Forest Deforestation

- a. Pre-1990 planted forest deforestation projections from 2016 to 2020 are based on a combination of the 2011 – 2015 annual Deforestation Intentions Survey's conducted by Canterbury University.
- b. The 2011 survey is used for the Midpoint scenario (\$12.50 – \$25) which was undertaken when carbon prices were in the range of \$17 - \$14, and offsetting was an economically viable option. Respondents

indicated that around a quarter (25%) of all pre-1990 planted forest deforestation would be 'avoided' due to the offsetting provision in the NZ ETS.

- c. The 2014 survey is used for the high emissions scenario. The survey was undertaken when carbon prices were \$4/NZU and offsetting was not economically viable, or a restriction for forest owners in converting pre-1990 planted forest to other land uses.
- d. The low emissions scenario assumes a reduction in deforestation due to the higher liability forest owners would face. In this scenario offsetting of pre-1990 planted forest is economically viable, with around half (50%) of potential deforestation taking up the offsetting provision. Even with high carbon prices deforestation is still likely to occur at some level as forest owner's decisions to change land use are not solely driven by carbon prices.
- e. ARDC is not applied to any pre-1990 planted forest deforestation

4. Scenarios and carbon price impacts on new planting

- a. New planting projections are based on a combination of consultation with industry, historical trends and economic modelling. However, new planting projections are particularly difficult to quantify as there are numerous factors that influence both investors and commercial forestry objectives, such as:
 - Wood product returns
 - Differing rates of return between forestry and other land uses
 - Nursery capacity
 - Forest/land owners future intentions
 - Future international and domestic carbon accounting rules
 - Land availability, health and safety issues related to topography
 - Government planting schemes and current private sector interest in participating in forestry schemes administered by the government.
 - Forest owner's carbon price predictions.
- b. Three emission scenarios are provided that take into account the likely range in future new planting rates based on the uncertainties indicated previously. The gradual increase of new planting was considered based on nursery production constraints and the likelihood of the low carbon price not changing significantly in the near future. Projected new planting scenarios are as follows:

Table 1: New planting projections from 2016 - 2050 (hectares)

Low emissions (\$25+/NZU and other favourable conditions)	Midpoint (\$12.50 - \$25/NZU and other favourable conditions)	High emissions (\$0 – \$12.50/NZU)
A gradual increase in new planting of 30,000 hectares per year by 2030	A gradual increase in new planting of 15,000 hectares per year by 2030	With 5,000 hectares of new planting (mostly based on government planting schemes) per year to 2030

- c. The impact of any new planting on forestry allocation under the ETS only has a significant impact after 5 – 6 years of forest growth. Also assuming the gradual increase in new planting due to any increased carbon price, the impact on increased allocation between the emission scenarios only becomes noticeable in the 2020's.

5. Scenarios and carbon price impacts on post-1989 forest harvesting

- a. Post-1989 forest rotation ages could become more variable as a result of the NZ ETS. Post-1989 forest owners will consider not only product returns, but also the carbon balance in the forest (whether it is

better to continue to accrue units or meet liabilities) and the price of carbon, which will be a significant new factor that comes into the felling decision. Post-1989 forest rotation lengths could increase with increasing carbon prices, but the forest will eventually be harvested as the primary revenue source is from timber and forest owners are likely to have forward harvesting and timber supply contracts.

- b. Projecting future post-1989 harvest is based on supply-side modelling. The modelling also assumes a non-declining yield, which takes into account the whole forestry estate and not just post-1989 forest registered into the ETS. MPI research is underway to determine the proportion of the post-1989 forest estate that is unlikely to be harvested, whether due to the forest being uneconomic to harvest (location, access, carbon forestry etc.). The outcome of this research will likely reduce the amount of post-1989 forest harvest projected in the future and therefore surrenders.
- c. With lower carbon prices (high emissions scenario), post-1989 forest owners face a lower surrender liability upon harvest. Harvest age is assumed to occur in a normal 'optimal' rotation of 28 years.
- d. With a higher carbon price of around \$25, the rotation could be delayed while forest owners maximise the returns from carbon, with associated less incentive to harvest.
- e. The projections model the impact of carbon price on ETS registered post-1989 forest rotation length into through the three emission scenarios.

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From: s 9(2)(a) @mpi.govt.nz
Sent: Wednesday, 2 March 2016 6:13 p.m.
To: s 9(2)(a)
Cc:
Subject: Memo for MfE appropriations March 2016.doc

Hi s 9(2)(a)

Please see attached the draft March 2016 projections of ETS forestry surrenders and allocations.

During this update we have identified a number of improvements to the modelling and assumptions that will be addressed for the October 2016 update. Some of these improvements require the completion of external contracted research, while others require analysis of historical ETS data and revised assumptions.

We have tried to be very explicit about the assumptions and methods in the appendix – so I hope that you find this useful.

I'll be able to send you a final signed copy early next week – in the knowledge that the numbers will not change, rather some of the wording maybe improved/added to.

I am also considering the usefulness of relaying this information in letter format. Perhaps it would be better for both MPI and MfE if more of a report style document was supplied to MfE for each update. This would take the form of the old style net position updates that MPI completed years ago and would provide the basis to detail the results, assumptions, methods, uncertainty, future improvements etc in more of a transparent manner.

Welcome your thoughts on this

Cheers

s 9(2)(a)

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From: s 9(2)(a) [redacted] @mpi.govt.nz]
Sent: Tuesday, 8 March 2016 4:39 p.m.
To: s 9(2)(a) [redacted]
Cc: [redacted]
Subject: RE: MBU projections

Hi s 9(2)(a) [redacted]

Revised allocation below

Based on 5% delay in allocation over 15/16 and 16/17. More work is required to determine proportions filling voluntary versus mandatory returns and the relative delay in allocation.

Table 1: Estimated post-1989 forest allocation, year ending June (in million NZU's)

Emissions scenario	14/15	15/16	16/17	17/18	18/19	19/20
High emissions (0 – \$12.5)	9.9	-9.7	-10.0	-12.9	-10.4	-
Mid emissions (\$12.5 – \$25)		-9.9	-10.3	-13.6	-11.3	-
Low emissions (\$25+)		-10.0	-10.5	-14.0	-12.0	-

Note: Allocation for 15/16 and 16/17 is assumed to be only 95% of that available. This assumes that a proportion of owners will not file a voluntary return. The 5% of allocation is then carried forward to the mandatory return. The proportions has been adjusted downwards than supplied previously to be more conservative.

From: s 9(2)(a) [redacted] @mfe.govt.nz]
Sent: Tuesday, 8 March 2016 4:02 p.m.
To: s 9(2)(a) [redacted] @mpi.govt.nz>
Cc: [redacted] mfe.govt.nz>
Subject: MBU projections

Hey s 9(2)(a) [redacted]

Thanks for the phone call, apologies for cornering you a bit...

While you're looking at the MBU projections, how easy would it be to split out surrenders due to p90 and p89 in the memo? I assume it's almost all p90 at the moment, but should start to switch over the next 5-10 years?

Thanks again,
s 9(2)(a) [redacted]

s 9(2)(a)

Climate Change Analysis

Ministry for the Environment – Manatu Mo Te Taiao

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