

Advice on NZ ETS unit limits and price control settings for 2027–2031

Supporting material: NZ ETS forestry model description

April 2026



About this document

This document accompanies the public release of the Climate Change Commission's NZ ETS forestry model (forestry model). It provides additional information on the development and functionality of the model.

The forestry model has been used for multiple purposes in analysis for the 2026 NZ ETS unit limits and price control settings advice. Details of the assumptions used, and results, are included in Technical Annex 1: Unit Limits and Technical Annex 2: Forestry accounting.

About the forestry model

The forestry model was originally developed in collaboration with the Ministry for Primary Industries (MPI) in 2021. A previous version of the forestry model was released by the Commission in May 2024. Since then, there have been ongoing updates and improvements to the functionality of the model and the data and assumptions applied.

The forestry model is Excel-based, using a single workbook across multiple worksheets. There is a worksheet named *Input Variables* which contains the key user-variable assumptions. Other worksheets include a summary of results, the base data, and worksheets which apply the specific calculations.

The forestry model has two main functions:

1. estimating past and future NZ ETS unit allocations and surrenders
2. calculating forestry emissions and removals under target accounting.

We have used these functions for the specific purposes of calculating terms necessary for our unit limit analysis. The model is designed with these specific purposes in mind, and we have not thoroughly tested the model for uses beyond these purposes. The specific estimates produced by the forestry model which we have used for the 2026 NZ ETS settings advice are:

- units held for post-1989 harvest liabilities as at the end of 2025
- NZ ETS net forestry unit allocations (total allocations less total surrenders) over the fourth Mandatory Emissions Reporting Period (MERP4)
- differences between NZ ETS net forestry unit allocations and forestry emissions and removals under target accounting
- the breakdown of forestry emissions and removals inside and outside of the NZ ETS.

The two main functions of the forestry model are discussed in further detail in the sections below.

1. NZ ETS forestry unit allocations and surrenders

The model produces estimates of unit allocations and surrenders, from when the NZ ETS was established in 2008. The results are broken down into multiple unit categories including those associated with forests that are permanent or have a future harvest liability, and those allocated to forests using averaging or stock change accounting. Results are presented both on an annual and cumulative basis.

The model estimates the units theoretically earned or surrendered in respect of a forest annually, although the actual timing of unit allocations or surrenders often differs from these. This is because, while foresters may submit annual emissions returns, they are only required to do so at the end of each Mandatory Emissions Reporting Period (MERP), which are typically five years long.

In addition, emissions returns are only required to include the overall change in carbon stock for each Carbon Accounting Area (CAA). This means that if a CAA includes forests both growing and being harvested within a MERP, the emissions return will only report the net allocation or surrender figure, rather than the gross allocation and surrender components. This means it is only appropriate to compare net allocations (gross allocations less gross surrenders) from the model to actual reported values.

The Commission's uses of the model only require net allocation figures. However, we note this data issue means it is not appropriate to use the model to estimate gross allocations and surrenders.

Key variables

Multiple variables can be changed in the model's *Input Variables* worksheet to assess the impacts of different assumptions. The key input variables in our 2026 NZ ETS settings analysis were:

- the assumed percentage of additional “low-risk” unitsⁱ
- the rotation length of radiata pine, which is set in the model as a distribution across four user-selected ages
- the proportion of forests assumed to be managed as permanent, relative to the baseline assumption.ⁱⁱ

ⁱ Additional low risk units refers to units that may never have to be surrendered because a forest owner can offset surrendering units whilst they have other forests in different stages in their rotation that are continuing to earn units. Within the model 0% additional low risk units represents a portfolio of a single age class across the whole forestry estate and 100% represents a portfolio evenly spread across all ages. *Technical annex 1: Unit limits* has a detailed explanation of this concept.

ⁱⁱ The baseline assumption is based on information provided by MPI. For more information see *Technical annex 1: Unit limits*.

Other inputs can be varied including the average harvest age for exotic species, percentage of forest area that will deregister from the scheme, the afforestation projection scenario, and the time between harvest and replanting.

Below we describe four categories of input data required for the forestry model to estimate the NZ ETS forestry allocation and surrender results.

Forests currently registered in the NZ ETS

The first category of required data inputs relates to the forests currently registered in the NZ ETS. This is used for both historic and future estimates of unit allocations and surrenders. The required area of forestry registered is broken down by:

- species (radiata pine, Douglas fir, exotic softwoods, exotic hardwoods, indigenous forest)
- year of planting
- MERP of registration
- accounting method (stock change or averaging).ⁱⁱⁱ

This data was provided by MPI in October 2025.

Projections of future afforestation and deforestation within the NZ ETS

These are used for estimates of forestry unit allocations from yet to be planted forests. We have used the afforestation and deforestation projections from the 2025 government emissions projections. Other projection scenarios are available to use in the model. The model applies assumptions about the split of projected afforestation area inside and outside the NZ ETS. These assumptions are discussed in Technical annex 1: Unit limits and Technical annex 2: Forestry accounting published on our website.

NZ ETS yield tables

Forestry yield tables contain information on how much carbon is stored in each hectare of forest at different ages.

In the NZ ETS, default carbon yield tables are used for forests under 100 hectares and are publicly available in regulations for different regions for radiata pine, Douglas fir, exotic softwoods, exotic hardwoods and indigenous forest. Forests over 100 hectares are required to use participant specific carbon yield tables (PSTs) that are developed to provide more accurate calculations of carbon stored. This is known as the Field Measurement Approach (FMA).

The forestry model uses five yield tables, each for different tree species, which aggregate the yield tables used in the NZ ETS. It applies these aggregate yield tables across all forests

ⁱⁱⁱ All forests registered in MERP 1 and 2 are registered under stock change, and all registered in MERP 4 are under averaging accounting. Forests registered in MERP 3 had the ability to choose which accounting method they use.

registered in the scheme. The yield tables in the model were provided by MPI in September 2025 and are based on an area-weighted average of the publicly available NZ ETS default carbon yield tables and average PSTs.

2. Forestry emissions and removals under target accounting

The second main function of the forestry model is calculating annual estimates of forestry emissions and removals under target accounting. The forestry model applies the same methodology as the Commission's Energy and Emissions in New Zealand (ENZ) model.

To ensure consistency between the two functions, the model generally uses the same variables and input data as are used for estimating NZU allocations and surrenders. There are two key exceptions:

- Different carbon yield tables are used for target accounting. These reflect the different accounting rules in target accounting compared to the those used in the NZ ETS. The model uses the same target accounting yield tables as used in the Commission's ENZ model. ENZ forestry accounting is based on carbon yield tables, soil carbon and biomass carbon stock factors sourced from New Zealand's GHG inventory to replicate the current methodology used by Government for measuring and reporting on New Zealand's climate targets.^{iv}
- Historic and projected afforestation area uses the same input data as the unit allocations and surrenders function (afforestation and deforestation projections used in the 2025 government emissions projections) but includes forests both inside and outside the NZ ETS. Other projection scenarios are available to use in the model.

Minor difference in results compared to 2025 government emissions projections

There is a minor difference between the target accounting results produced by the model and the emissions reported in the 2025 government emissions projections. The difference is around 0.2 MtCO_{2e} per annum (2% of net forestry emissions) from 2025 onwards. We were not able to resolve this discrepancy, however we have adjusted for it when using the target accounting outputs from the model in our analysis.

^{iv} Climate Change Commission's ENZ Manual: <https://www.climatecommission.govt.nz/assets/Uploads/EB4/supporting-docs/EB4-05-ENZ-technical-manual-for-draft-EB4-advice.pdf>