

# Managing exotic afforestation incentives: proposals to change forestry settings in the NZ ETS

## Scion input to the consultation

The third instalment of the Intergovernmental Panel on Climate Change's Sixth Assessment report is a "now or never" clarion call to action. We need significant, rapid, and ambitious changes in our economy and ways of living to keep global temperature increase less than 1.5 °C. Globally, that means that emissions need to peak within the next two years and reduce sharply and consistently every year thereafter.

As the IPCC notes, we need to support a shift in land use that supports greater sustainable afforestation. Significant, rapid, planting of new forests – exotic and indigenous – will be an essential part of New Zealand's climate change response. A carbon budget to meet New Zealand's commitment to be net-zero by 2050 requires the amount of CO<sub>2</sub> removed from the atmosphere by forests each year to more than double within the next ten years. Even with that, we will need deep and rapid cuts in the amount of CO<sub>2</sub> released to the atmosphere from energy and transport, and in the amount of methane released from agriculture.

Afforestation isn't a 'get out of jail free card' for climate action: we cannot plant our way out of climate change. But afforestation can help buy us time to make the significant changes

New Zealand needs to make to get our gross emissions on a downwards trajectory. Forests are the only way we can remove CO<sub>2</sub> from the atmosphere with the scale and urgency needed to meet our net-zero targets. We need to establish significant new areas of forests quickly, and policy targets that constrain our ability to do that will make it harder for Aotearoa New Zealand to make the significant net emissions reductions in the short term needed to contribute a fair share of the urgent global climate change effort.

*The forestry-related settings of the Emissions Trading Scheme are an essential tool to encourage afforestation and drive greater ambition in New Zealand's climate change response.*

Meeting New Zealand's 2050 net-zero emissions targets will need the planting and use of significant new areas of forest – indigenous and exotic – and a significant increase in domestic use of carbon sequestered by forests in New Zealand. New Zealanders will need to manage those forests well to maximise the amount of CO<sub>2</sub> they remove from the air, make sure they deliver non-carbon economic benefit and ecosystem services, provide the materials needed to substitute for fossil carbon, and support the transition to a low-carbon circular bioeconomy.

New Zealand's climate change response should focus on domestic action first, and with measures that reduce gross emissions. If New Zealand's net-zero target relies on carbon sequestered by forests, we need to invest in New Zealand's future and grow those forests here in New Zealand rather than relying on forestry offsets offshore.

Our submission in response to the proposal to change forestry settings in the New Zealand Emissions Trading Scheme (NZ ETS) emphasises:

- The issues set out in the consultation document are important, and the proposal to remove the ability to register exotic species within the permanent forest category in the NZ ETS would help to address them.
- But there could be other ways to achieve the similar outcomes in ways that recognise the urgency of the climate change challenge and keep forest management options open.
- Unmanaged permanent forests – indigenous as well as exotic – risk falling short of our climate change, biodiversity, and environmental objectives. The potential for environmental and social impact from permanent exotic forests can be mitigated in ways that reflect the urgent need to plant significant areas of new forest in the next few decades while indigenous forests become established.
- There are significant challenges with supporting indigenous afforestation at scale. Scion is working hard with our key partners to address those, but we won't have the capacity for significant large-scale and cost-effective indigenous afforestation for quite a while.
- ETS policy settings need to balance the supply and demand of NZUs at a level that incentivises emissions reduction. Limiting supply of NZUs from forests is one way to manage unit supply in the NZ ETS, but there are 'demand side' options to help achieve this, too.
- Removing the ability to register all exotic species within the permanent forest category may limit forest management options and remove incentives to increase the diversity of our exotic forest estate.
- Not all exotic species are the same, and forest management needs to reflect this. Some are pioneering species that establish and grow quickly, while others can form stable forests that sequester significant amounts of carbon over the long term and are resistant to pests and disease.
- Data on long-lived exotic forests in New Zealand are limited but encouraging, including on how exotic forests can transition to indigenous over time. Scion is working with partners to increase the understanding and the relevant management practices. Further work in this area should be prioritised to maximise the opportunity to deliver short term carbon sequestration goals and long term environmental and social outcomes.
- Removing the ability to register exotic species within the permanent forest category in the NZ ETS will disproportionately affect whenua Māori, and impact on landowners' ability to diversify income.
- Scion has significant research capability, built on 75 years of experience in forest and forestry research, to help address these issues.

## 1. Proposal to remove the ability to register exotic species within the permanent forest category in the NZ ETS

Removing the ability to register exotic species within the permanent forest category in the NZ ETS would address the three key issues with the establishment of permanent forests identified in the consultation. However, there are other options that could achieve a similar result, and in ways that reflect the urgency of the climate change challenge. We need a lot more fast-growing exotics to sequester carbon at pace as well as a lot more indigenous forests where longer-term carbon uptake and sequestration is one of a number of ecosystem services that are best provided by indigenous forest.

*Limits to permanent exotic afforestation can support a longer-term focus on gross emissions reduction, but will make it harder to meet our urgent short-term climate targets*

Limits to exotic afforestation will make it harder to meet our net-zero 2050 target. According to the Climate Change Commission, reaching this target requires the

amount of CO<sub>2</sub> removed from the atmosphere by forests to more than double within the next 10 years, from an average of 6.6 Mt CO<sub>2-e</sub> y<sup>-1</sup> now to 13.8 Mt CO<sub>2-e</sub> y<sup>-1</sup> every year from 2031 to 2035. We can achieve some of that through improvements to existing forest management, but not all. Achieving that will need a significant and rapid increase in the area of new forest established, over and above the current rate of new afforestation.

Nearly half of our emissions are currently excluded from the NZ ETS, and we already have a high proportion of renewables in our energy mix. Our national emissions – in both gross and net terms – have shown [no obvious sustained reductions](#) compared with 2005. Against that trend, achieving net zero emissions within the next 28 years is a very significant challenge. Limiting opportunities for increased CO<sub>2</sub> uptake by forests will make that even harder.

### *Relying only on indigenous forests for long-term carbon sinks could mean more agricultural land converted to forests.*

Although forest growth rates vary widely with location and forest type, fast growing exotic tree species will generally sequester carbon at much faster rates than indigenous species. This is particularly true given the relatively short time frames we need to act within. Increasing fast rates of sequestration in forests is critical to our climate change response while we develop and implement the emissions reduction options that will be needed for the long term response. We should manage and plan the afforestation approach to also offer opportunity for additional environmental, economic and social outcomes (rather than the concept of a permanent forest being left alone for ever).

We still only have an incomplete understanding of the dynamics of carbon uptake in indigenous afforestation. It is possible for well managed stands of planted indigenous forests to achieve rates of carbon uptake [that approach those for planted exotic forests](#), particularly once they have been growing for several decades. Conversely, some evidence from the national Land Use and Carbon Accounting System sampling shows that rates of carbon uptake in unmanaged early-growth indigenous afforestation [can be even lower](#) than default values in the current ETS lookup tables.

We expect this to change if New Zealand invests more in research to improve indigenous afforestation. But based on our current understanding, New Zealand would need to convert a much greater area of agriculture land to indigenous forest to achieve the same level of carbon sequestration possible with exotic forest.

### *Limiting supply of NZUs from forests is only one way to manage unit supply in the NZ ETS*

It is important to manage the supply and demand of units that are traded within the NZ ETS to ensure that the number of NZUs available in the market maintains NZU price at a level consistent with the overall objectives of the scheme.

While limiting exotic afforestation would limit the total number of NZUs available to trade into the NZ ETS, potentially supporting unit prices at a level necessary to incentivise gross emissions reductions, there are other ways that NZ ETS settings and policy could support this outcome. A similar effect could be partly achieved by limiting the supply of units into the scheme from other sources (e.g. the free allocation of units to trade exposed and emissions intensive industry). Likewise, demand could be increased by requiring surrender obligations for all sectors of the economy with emissions. As the consultation document notes, relative to the status quo, removing permanent exotic forestry from the NZ ETS will lead to increased levels of gross emissions from agriculture due to a reduced area of agricultural land being converted to permanent forests.

## *Potential environmental impacts from permanent exotic forest can be mitigated with other tools*

We already have a nationally consistent set of regulations to manage the environmental effects of plantation forestry through the National Environmental Standards for Plantation Forestry (NES-PF) which includes regulation around wilding tree risk and control, visual amenity, significant natural areas and outstanding features and landscapes, and boundary setbacks. The NES-PF could, including through amendment if needed, achieve the same environmental controls as envisaged by removing the ability to register exotic species within the permanent forest category. Or a more targeted National Environmental Standards could be developed and applied to all new forests – indigenous as well as exotic – established primarily for carbon uptake and storage that could address things like biodiversity conservation, fire risk, and pest and pathogen control.

Alternatively, a sustainable forest management plan could be required for all permanent ETS forests. These management plans could be registered against the forest interest (e.g. title or cutting right) and, depending on species and management regime, could require or enable a sustainable timber harvest that maintains a level of canopy closure. By requiring a sustainable timber harvest, forest owners will be incentivised to maintain their forests with good infrastructure, control fire risk, manage invasive species and grazing.

## *Removing the ability to register all exotic species within the permanent forest category also limits options around planting of alternative exotic species with long term carbon sequestration potential...*

Scion research has [shown that some exotic species](#) can perform significantly better than *Pinus radiata* depending on site conditions. For instance, redwoods (*Sequoia sempervirens*) grow faster in many North Island areas, over a longer period than radiata, and are less susceptible to pests, diseases, and abiotic stresses such as fire and windthrow. Retaining the ability to register exotic species in the permanent forest category, particularly those that are naturally longer-lived, would increase the diversity of our planted exotic forests while increasing the amount of carbon stored in forests of an equivalent area.

## *...removing incentives to increase the diversity of our exotic forest estate...*

Our exotic forest estate is heavily dominated by *Pinus radiata*. Currently there is limited interest from industry to increase the diversity of our exotic estate because it is difficult to compete with the financial returns of radiata on short rotations. The additional income from sale of NZUs could close the gap between returns from radiata and from other exotic species. Removing the ability to register all exotic species within the permanent forest category could undermine this because alternative species would only be included in NZ ETS as post-1989 forest land. Allocations of NZUs for those forests will be determined using averaging accounting, which can significantly under-estimate the carbon sequestered from longer-lived exotic species, especially if based on the current lookup tables.

Non-radiata exotic species include trees that provide high-value timber options which would not only contribute to the carbon goals by 2050, but with critical mass of these species in accessible areas, and with an older-aged resource, would also help to diversify the forestry industry.

## *...or to manage radiata pine so that it is less prone to abiotic and biotic stresses.*

Research shows that radiata pine is most [prone to disease](#) and windthrow when grown at high final stand densities [that are typical of carbon regimes](#). This risk can be

mitigated through thinning to lower stand densities which improves stand air flow and results in a more stable tree form that is less prone to windthrow.

### *Data on long-lived exotic forests in New Zealand are limited...*

Concerns around stand senescence in *Pinus radiata* may be overstated because data on longer-term growth and mortality in *Pinus radiata* grown in New Zealand are relatively scarce. However [data from permanent growth plots](#), some of which contain trees older than 100 years, show that radiata pine stands in New Zealand can be grown to ages greater than 50 years without significant losses in standing yield. Evidence from permanent growth plots suggests that mortality of *Pinus radiata* stabilises once stand density reaches 200–300 trees per hectare and remains relatively stable, with forests actively growing to 80 years or more.

### *...including on how exotic forests can transition to indigenous over time.*

Our understanding of how exotic forests can transition to indigenous forests over time is very limited because there are very few examples of forests in New Zealand that are close to the expected natural lifespan of radiata pine. But managed well the prospect of using fast-growing exotic species to accelerate the succession from pasture to mature native forest could present a 'win-win' of rapid carbon uptake in the short term supporting a transition to biodiverse indigenous forest over decades to centuries.

In an ideal world it would be possible to rapidly establish significant areas of fast-growing species-rich indigenous forest that would sequester carbon at a rate similar to fast growing exotic species. But based on our current 'state of the art', this is not possible on the time scale needed to achieve our short-term climate change goals. So while transitioning from exotic to indigenous forest is currently not straightforward, we judge it to be possible with appropriate forest management and silvicultural interventions. For instance, preliminary research has indicated that thinning at an early age will provide the right environment for radiata pine- with the assumption that a native seed source is nearby. With research on how to do this properly, and proceeding based on existing evidence, this will be possible.

### *Removing the ability to register exotic species within the permanent forest category in the NZ ETS will disproportionately affect whenua Māori, and impact on landowners' ability to diversify income.*

Scion supports the rights and interests of our Māori partners to economic self-determination, and we remain committed to working with Government in partnership with Māori to achieve this. Some of our stakeholders and key partners are better placed to comment on the implications that removing the ability to establish register exotic species within the permanent forest category would have on whenua Māori landholders to provide better environmental, social, and economic outcomes.

As the consultation document notes, a relatively high proportion of whenua Māori is remote and marginal land, and our joint work with our Māori partners generally falls into land use classifications 6–8. We have been working on Māori-led research into permanent, and permanent-production native, exotic, and mixed-crop forests. This work is linked closely to climate adaptation and improving the resilience and resistance of taonga species and whenua Māori. This research is gathering data from climate related disease monitoring, seed collections, scaled propagation, establishment trials, pre-1990 plantation economics and land use transition research. This is responding to a desire from landowners for research approaches that uphold the principles of Te Tiriti o Waitangi and kaupapa-driven science methods that fast-track forest-based climate adaptation, taonga species resilience, and the intergenerational forest economics of Māori and Moriori owned forest lands.

## 2. Averaging accounting for remote and marginal land

Scion's research into longer-term growth rates of a range of exotic forest species suggests there would be good evidence to justify extending the average stand age for all exotics (not just *Pinus radiata*) established in remote and marginal land.

## 3. Incentives for establishment of biodiverse indigenous forests

Scion is undertaking significant research to support the growth healthy, resilient forests that are planted primarily for their standing forest benefits. This will enable opportunities to replenish our resources for the generations to come and recognise a more holistic value of New Zealand forests. It will overcome challenges to establishment of indigenous and mixed species planting to enable the establishment of indigenous forests/mixed species at scale with environmental and economic efficiencies.

We are developing research programmes to generate knowledge to help better establish indigenous forests that will be resilient and provide health, wealth and wellbeing to communities, ecosystems and the environment. The portfolio aims to make native forest establishment as easy and economically viable as possible including through increasing our understanding of Indigenous plant production at scale, smart establishment of indigenous forests translating and stretching Scion's 75 years of exotic forestry research to establish large-scale indigenous and mixed species forests, including through the restoration, protection & Mauri o Te Waonui a Tāne through mātauranga-led approaches and co-designing future forests and distinct value indigenous wood product systems. A key outcome of this research is to produce the framework for multi-use ngahere through policy advice, strategic framework, tikanga, communications planning and innovating new management guidelines to be carried out under the leadership and guidance of Māori, indigenous forestry communities of interest, and MPI/MfE.

### *Scion's 75 years of forest and forestry research can help better understand the challenges and opportunities from large scale afforestation needed to meet our climate change and biodiversity goals*

We know that there are significant gaps in our understanding in the ecology of forest establishment, growth, and carbon uptake and storage. A simple 'for instance' of this is the carbon look-up tables currently used to approximate the amount of carbon removed from the atmosphere by five broad forest types, only two of which are species-specific. Those tables are a blunt instrument which needs significant work to improve. Scion stands ready to help.

As our submission sets out, meeting our climate change challenge needs new ways of thinking about forest management. 'Plant and walk away' afforestation – of exotic as well as indigenous forests – is a sub-optimal forest management approach that risks under-achieving the potential of our forests to provide good outcomes across a range of social and environmental measures. We don't yet know enough about how to optimise the transition of forests of fast-growing exotic species to indigenous forests that maximise ecosystem services like conservation of indigenous biodiversity, and soil and water quality; or about agroforestry options suitable for the 21st century.

Over the last 18 months we have completely transformed our organisation to drive impact and achieve our strategic vision for Aotearoa New Zealand to 2030 and beyond. We have a pivotal role in shaping New Zealand's future wellbeing, and New Zealand's forests are a key part of a just, and highly positive, transition to a low-carbon, circular bioeconomy. Forests are a renewable resource with the scale needed to sequester significant amounts of carbon, provide New Zealand with low-emissions materials and fuels to help meet our climate change commitments, grow and

transform the economy and improve environmental and social outcomes. They provide a range of ecosystem services, from supporting biodiversity and water quality, to helping support New Zealanders' wellbeing through landscape amenity and recreation, including in our urban treescapes.

We are helping bring about the transformation to a low-carbon, circular bioeconomy through our purpose-driven capability, partnerships that support Māori aspiration and economic development, incorporate mātauranga Māori, and build on collaborative connections with industry and the regions. We have completely transformed who we are and how we work, aligning our capability to deliver three major impact areas that focus where we will apply our expertise to deliver maximum impact for New Zealand:

- *Forests and landscapes*. To grow healthy, resilient forests that are planted primarily for their standing-forest benefits.
- *High-value timber manufacturing and products*. Development of products, manufacturing, high-value trees and healthy, resilient forests that capture an increasing share of the global high-end market for timber.
- *Biobased manufacturing and products*. Development of products, processes, manufacturing, trees, other biomaterials and healthy, resilient forests to replace petrochemicals and non-sustainable materials.

These impact areas can all enhance New Zealand's transition to a circular bioeconomy and provide the information we need to better manage the forests that need to be an essential component of our climate change response.

Scion should be commissioned to prepare a national afforestation strategy based on our "Right Tree, Right Place; Right Purpose" approach and our 75 years of knowledge that sets out the appropriate approaches to forestry that provides for environmental, economic and social outcomes balancing the relatively short term needs of accelerated sequestration with a long term plan for any new forests. This strategy/plan should be used to determine settings within the ETS that will promote these beneficial outcomes for New Zealand over the short, medium and long terms. It is critical to understand that not all trees, indigenous or exotics are the same and individual species have their place and their purpose.

22 April 2022