TRANSPOWER

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Transpower joint submission on the review of the NZ Emissions Trading Scheme and the redesigned NZ ETS permanent forest category

1 Transpower New Zealand (**Transpower**) is the State-owned enterprise that plans, builds, maintains, owns and operates New Zealand's high voltage electricity transmission network (**National Grid**).

2 Transpower wishes to make a joint submission on:

a Te Arotake Mahere Hohoko Tukunga – Review of the New Zealand Emissions Trading Scheme (**ETS**), MfE (2023) – which seeks feedback on the overall balance between the settings and incentives that apply to reductions in emissions vs measures to remove carbon from the atmosphere[1]; and

b A Redesigned NZ ETS Permanent Forest Category, MPI (2023) – which seeks feedback on the design of the permanent forest category in the ETS (including in terms of what kinds of forest should be allowed to qualify as permanent forests, how transition forests should be managed, and what rules will best maximise the benefits) (**Discussion Documents**).

3 Transpower's address for service is:

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Transpower's interest in the Discussion Documents

4 In broad terms, consistent with its role and commitments outlined below, Transpower supports any refinements to the ETS (including as it applies to forestry) that help deliver on New Zealand's global commitment under the Paris Agreement, and which create certainty of investment towards a low-emissions electricity system[2].

5 Beyond that position, Transpower's submission on the Discussion Documents focusses on the implications of the ETS and forestry for the National Grid and security of supply. The risks to the National Grid outlined in this submission can arise from forests of any kind, be they ETS or non-ETS registered, standard or permanent, native or exotic or transition. While

[1] Review of the ETS.
[2] We note that emsTradepoint Limited, a fully owned subsidiary of Transpower, has lodged a submission on *Te Arotake Mahere Hokohoko Tukunga – Review of the New Zealand Emissions Trading Scheme* focusing on the carbon market.

different forest types may raise different levels of risk,[3] Transpower does not seek different measures or settings (e.g. setbacks) to apply to different kinds of ETS forests.

6 Transpower's concerns relate to a number of the questions posed in the Discussion Documents: questions 2.4, 5.4, 5.5, and 6.5 of *Te Arotake Mahere Hokohoko Tukunga - Review of the New Zealand Emissions Trading Scheme*, and questions 1-3, 11, 15-18, 22, and 24 of *A Redesigned NZ ETS Permanent Forest Category*. Specific responses to those questions are set out in Schedule 1 to this submission.

Summary of impacts of trees/ETS regime on electricity supply

7 Electricity supports communities, enables business, and underpins the provision of essential services. To provide for the needs of people and communities, it is critical that there is, and continues to be sustainable, reliable, resilient, and efficient transmission of electricity. Recent severe weather events in the central and upper North Island, resulting in widespread power outages, have vividly demonstrated why this is the case.

8 There is a strong interdependency between electricity and other services, such that electricity outages can prevent other infrastructure from functioning, which in turn impacts services downstream. For example, electricity outages following Cyclone Gabrielle impacted telecommunications which in turn impacted on the ability to purchase via electronic transaction.

9 Transpower is responsible for planning, building, operating and maintaining the National Grid. Transpower is also a lifeline utility[4] with obligations to function to the fullest possible extent, during and after an emergency.[5] The need for a resilient Grid is recognised in key actions in the Emissions Reduction Plan and the National Adaptation Plan in relation to the resilience.[6]

10 Electricity, and a well-functioning transmission system, are also vital to New Zealand's response to climate change and transition to a low carbon economy. For example, increased electrification of transport and heating is an important part of our electricity transition. This means that, in the future, people and communities are likely to depend on reliable electricity supply even more than they do now. Conversely, if the electricity system is perceived as unreliable by the community (due to frequent outages), then that could lead to reluctance to making the necessary changes.

11 Transpower recognises that the removal of carbon from the atmosphere plays an important role in New Zealand's overall climate change response. However, forests and trees have the potential to negatively impact the National Grid if they are poorly located and/or managed, as they can grow, or fall into lines. Trees coming into contact with lines (or being too close) can result in fires, risk serious injury (or death) to bystanders, destroy property and damage to the National Grid, and affect security of supply.

12 To avoid these consequences, Transpower proactively manages trees near transmission lines, by encouraging appropriate setbacks from lines and ensuring landowners/foresters maintain safe distances between the two (by trimming or removing trees where necessary).

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[3] The different levels of risk are associated with the amount of active forestry work undertaken. For example, permanent forests may raise additional risks as they are less actively managed, while transition forests may have increased risks associated with the active management of tree species.
[4] Civil Defence Emergency Management Act 2002, s4 and Schedule 1 (Part B)
[5] Civil Defence Emergency Management Act 2002, s60; National Civil Defence Emergency Management Plan Order 2015, cl 59
[6] Transpower acknowledges the on-going reform with respect to critical infrastructure. Particularly the *Strengthening the resilience of Aotearoa New Zealand's critical infrastructure system* consultation being undertaken by the Department of Prime Minister and Cabinet.

13 To help New Zealand's efforts to combat climate change, it is important that all actions and policies forming part of this response complement each other – including designing the ETS in a manner that incentivises and supports actions to maintain the integrity and resilience of the National Grid. In its current form, the ETS hinders rather than supports these efforts. This occurs in two ways:

a The ETS currently incentivises landowners to plant trees in inappropriate locations,[7] including in close proximity to transmission lines – these inappropriately planted trees cannot grow to maturity before needing to be trimmed or removed.

b Action taken to manage the risks from trees, despite being necessary to protect the National Grid and security of supply, is deemed to be 'deforestation' and attracts liabilities under the ETS. This in turn leads to resistance from landowners who oppose tree trimming/removal, and/or seek compensation.

Risks to the National Grid from forests

14 Where forests are located has a direct impact on Transpower's ability to safely maintain, operate and upgrade the National Grid. There are already significant areas of vegetation and forestry under and around the National Grid – ranging from specimen trees, to national parks, to ETS registered forests. Approximately 950km (out of a total of ~11,000km) of transmission lines have plantation forestry within a 40m 'fall distance' (the distance within which a falling tree could cause damage to a transmission line).

15 Planting and growing trees near transmission lines creates risks to National Grid assets, and leads to significant costs in managing these risks. The main risks or effects, as detailed further in the case studies at Schedule 2, include:

a **Loss of supply of electricity**: This can occur when trees are blown into or fall onto overhead lines, causing a circuit fault (which affects the supply and operation of the National Grid) or when trees come too close to the conductors (wires). In such instances, a flashover can occur, with the electricity "jumping" to the tree or a major electrical discharge occurring through the tree. This leads to loss of supply of electricity, requiring the services to be restored. This involves specialist staff identifying the location of the fault, so that other specialist staff attend the site (which can be in remote and difficult to access locations) with heavy equipment so as to undertake the necessary repairs.

b **National Grid asset damage**: Trees and branches can fall into transmission lines, damaging conductors, poles and towers. This can occur naturally or following high winds, large rainfall events or floods, fires, and so on.

c **Wildfires**: Flashovers can cause wildfires. A 'flashover' (described above) can also occur when a tree comes close to the conductor (wire). Vegetation related flashovers have the potential to ignite fires, which, under the right conditions, can be sustained and lead to widespread property loss.

d **Restricting access to National Grid assets**: Access to National Grid assets can be impeded or restricted in a number of ways. Forests and forest debris (such as slash) can impede access to National Grid assets which in turn, can compromise Transpower's ability to restore electricity supply, including during an emergency.

[7] The Report of the Ministerial Inquiry into land uses associated with the mobilisation of woody debris (including forestry slash) and sediment in Tairawhiti/Gisborne District and Wairoa District, found that the ETS encouraged planting of trees in inappropriate locations. The example provided in the Report was of permanent carbon forests planted on productive land, at [51] (p30).

16 The costs to people and communities from these incidents can be considerable. When trees disrupt electricity transmission (i.e. cause outages), this can impact other infrastructure and activities that rely on electricity to function. As was seen earlier in 2023, without electricity, telecommunications were unable to work. Without telecommunications, the electronic payment systems were affected, resulting in difficulties for communities and businesses to purchase necessary goods (from food to fuel for electricity generators).

17 In addition, the risks posed by forests to the National Grid are only likely to increase in the future as:

a Climate change effects occur – with more frequent and intense extreme weather events expected, including higher winds, flooding, land slips, increased heat and drought conditions; and

b Afforestation increases – which, without appropriate settings in the ETS, might increase inappropriately located forests near our lines. We are currently seeing an increase in inappropriately planted forests in close proximity to our lines.

How Transpower manages risks from trees to the National Grid

18 In a practical sense, Transpower currently protects National Grid assets from tree risks in the following ways:

a *Before impacts occur:*

i Transpower can request forest owners to trim tree branches under the Electricity (Hazards from Trees) Regulations 2003, or can negotiate with them to fell trees that are located too close to the National Grid.

ii If the trees in question are part of an ETS-registered forest, Transpower is asked to compensate owners for any surrender obligations, as well as any carbon credits that they could have earned in the future. The level of compensation required can be substantial, as illustrated in the case study in Schedule 2 (and is likely to increase in the future if the cost of NZ units increases). The costs associated with the ETS incentivising forests being planted too close to the Grid will ultimately be borne by electricity consumers. That in turn detracts from the overall cost-effectiveness of the climate change response that forests provide, which is something that the Discussion Documents identified as being an important consideration.[8]

iii Increasingly, forest owners have requested line outages to undertake forestry work, which is something that is technically possible but requires extensive consultation with industry to ensure that electricity needs in the affected area are met in alternative ways.

b *After forests impact the National Grid:* Transpower repairs affected assets and restores electricity (see Schedule 2 for examples of this work).

[8] A Redesigned NZ ETS Permanent Forest Category Discussion Document, pp10-11. See discussion on cost-effectiveness of transition forests.

Setbacks from National Grid assets

19 Transpower strongly supports the concept of "the right tree in the right place,"[9] which is a theme running through the consultation material. However, to date there is little evidence that it is actually being implemented through the ETS, or other parts of the regulatory system that impact on trees and forest management. We have raised related concerns in consultation on other review/reform processes.[10]

20 In our view "the right tree in the right place" requires a coordinated and cohesive regulatory regime. That regime includes the settings for planting, managing and harvesting trees under the Resource Management Act 1991,[11] and the Electricity (Hazards from Trees) Regulations 2003 (Trees Regulations) which govern when trees need to be trimmed or removed. These regulations do not provide adequate protections for electricity lines, and do not ensure planting of the right tree in the right place. Figure 1 below (left image) illustrates the regime that the Trees Regulations provides for – trees can be planted under lines – but can be trimmed when they grow into the 1m working zone. They are considered a hazard when they enter the Growth Limit Zone (which his 4m from the conductor). Inappropriately located trees are not able to grow to full maturity and must be repeatedly trimmed (left image). Further, the existing regulations do not prevent the planting of trees that can pose a risk of falling into lines (right image). Trees that create risks also need to be removed. (See Schedule 2 for further discussion of issues to the Grid created by inappropriately planted trees.)

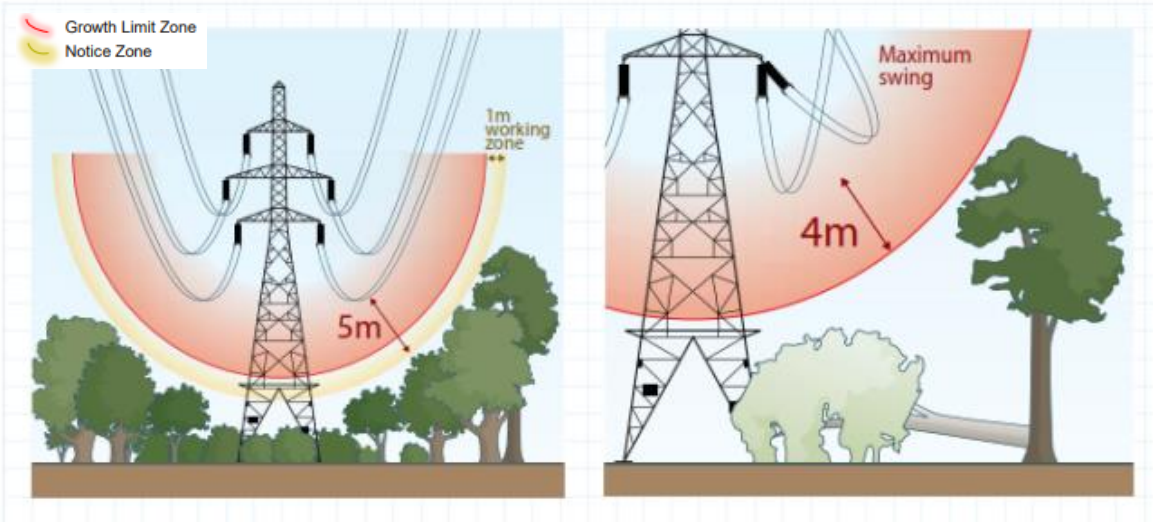

Figure 1: The existing regime under the Electricity (Hazards from Trees) Regulations 2003

21 While the ETS is only one part of this overall picture, it nonetheless has an important role to play, because the incentives it creates drive the behaviours and practices of landowners and foresters. Currently, the ETS encourages the planting of forestry without regard to the risks or adverse effects that planting creates or the costs that are borne in this case by electricity consumers. There is nothing preventing poorly located forests being registered under the ETS. Therefore, Transpower supports an ETS that:

[9] Review of the NZ ETS Discussion Document, Message from the Minister for Climate Change at p6; and p20, p22 and p30; and Summary of consultation, p5 (sometimes referred to as "right place, right tree, right purpose"); and A Redesigned NZ ETS Permanent Forest Category, p14.
[10] Transpower submissions on the: Climate Change Response (Emissions Trading Reform) Amendment Bill (10 Dec 2019), National Direction for plantation and exotic carbon afforestation (18 Nov 2022), and the Electricity (Hazards from Trees) Regulations 2003 (1 May 2023).
[11] Including under national direction for plantation and exotic carbon afforestation, and national direction for electricity transmission (under review).

a Does not incentivise trees to be planted in the wrong places, including inappropriately close to transmission lines; and

b Does not penalise (through ETS liabilities) appropriate actions to manage the risks from trees to transmission lines, in order to protect the National Grid and security of supply.

22 On-going, formalised, forest management practices which include setbacks from the National Grid could be used to incentivise appropriately located ETS forests.

23 Transpower proposes a two-step approach to determining the appropriate setback – firstly a broad brush (standard minimum setback) approach that requires limited assessment, and then a more accurate site-specific setback. This approach would involve:

a A *standard (conservative) minimum setback* from National Grid assets, designed to manage the risk from trees growing into or falling onto Grid assets, applicable to all forest types;

b An ability for forest owners who would prefer site-specific setbacks to engage with Transpower in order to establish a *site-specific setback*. This would take place at the forest owner's request and cost, as it would require an onsite assessment in some cases.[12]

24 The *standard minimum setback* could itself be calculated in a couple of ways:

a A single setback for all National Grid line voltage/structure types, calculated with reference to the maximum swing of the largest line and tree fall distance (of the tallest tree type, calculated based on the height of the tree at maturity); or

b Different setbacks for each National Grid line voltage or structure type, calculated with reference to the maximum swing of each line type and the tree fall distance (of the tallest tree type). This approach would mean, for example, that the minimum setback for a 110kV pole line would be smaller than for a 110kV tower line, and both would be smaller than for a 220kV line.

25 Of these options, a single distance for all line types would be inherently more conservative, but would have the advantage of being clear to forest owners and other regulators, and therefore be easier to implement and enforce.

26 The *site-specific setback* would vary, including to reflect the topography of the area, but would be derived from the relevant span of the National Grid asset present at the site and the maximum tree fall distance (of the relevant tree type, at maturity). A site-specific setback would be less conservative, meaning trees could be planted over a greater area (closer to the lines), but the assessment would be associated with greater costs. As such, we propose that standard minimum setbacks are used as a default or starting point, with site-specific setbacks able to be identified at the tree-owner's cost.

Implementing setbacks in the ETS regime

27 We suggest that such requirements could be implemented into the ETS regime in a number of ways, including:

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[12] Where available, Transpower would utilise LiDAR (Light Detection and Ranging, a remote sensing method that uses light in the form of a pulsed laser to measure ranges (variable distances) to the Earth), but this is not always possible.

a **Carbon credits do not accrue within the standard or site-specific minimum setback from the National Grid**: The ETS framework could provide that no carbon credits are accrued from trees located within a minimum setback from the National Grid. This could create a clear disincentive to plant trees in those areas, and could be complemented with a requirement to clear trees in those areas if, in time, any trees grow there. Such provisions would not (on their own) create an incentive to remove the trees already located within the minimum setback quickly, but would allow Transpower to undertake the required tree removal works within the setback area without having to compensate forest owners for their ETS liabilities and any future losses of carbon credits.

b **Best practice forest management:** Where trees around existing lines need to be cleared, that should not attract ETS surrender obligations. Currently the ETS regime provides an exception to treating cleared forest land as 'deforested' (for the purpose of calculating surrender obligations) if clearing was required for 'best practice forest management' (**BPFM**).[13] However, the ETS regime and associated regulations do not currently include any clear guidance as to what BPFM includes. Accordingly, we support a formalised standard for BPFM that includes the National Grid setbacks described above (including the ability to agree site-specific setbacks at the forest owner's cost). This would mean that clearance of trees already planted within the National Grid Setback do not qualify as 'deforestation' so do not attract ETS liabilities.

c **General exemption to liability**: In the alternative to option (b) above, Transpower would support a further general exemption from surrender obligations for clearing of forested land, when the clearing is undertaken to ensure that minimum setbacks from the National Grid are met. The mechanism could mirror the one for BPFM[14]. This could be achieved by amending the Climate Change Response Act 2002 or by order in Council under that Act.[15]

d **Pre-condition to forest registration**: For forests that are not yet registered in the ETS, an applicant for registration could be required to demonstrate that the relevant setback requirement is met prior to registering a forest under the ETS. Under this proposal a forest would not be able to be registered (and accrue any credits) until this requirement is met.

e **Carbon credits do not accrue if forest is or becomes non-compliant**: For ETS registered forests, the National Grid setback requirement would need to be met continuously for the life of the forest. We propose that, if the requirement is breached, the forest owner would be notified and given a short, but reasonable, period of time to comply (or allow access for Transpower to ensure compliance). During any time between the end of the compliance period and when compliance is achieved, to the satisfaction of a regulator[16] and/or Transpower, a portion of the forest (e.g. equivalent to double the setback area) would not accrue carbon credits.

28 We understand there will be further opportunities for engagement in relation to the detailed design of the ETS,[17] following this current round of consultation. We would be happy to

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13 Climate Change Response Act 2002, s 179A(1)(a) and (c).
14 Climate Change Response Act 2002, s 179A.
15 Climate Change Response Act 2002, s 60.
16 The regulator will be determined following reform of the relevant legislative frameworks, and could be local councils, the Ministry for Primary Industries or another organisation.
17 Review of the NZ ETS Discussion Document, p12 and p77.

contribute to the detailed design of forest management as part of that process, bringing to bear Transpower expertise and experience with these issues.

Schedule 1 Discussion Document Questions

Given the nature of Transpower interest in the proposals, not all of the discussion document questions are relevant to this submission. However, responses to some of the specific questions are set out below.

Te Arotake Mahere Hokohoko Tukunga - Review of the New Zealand Emissions Trading Scheme

Question 2.4 Do you agree with the summary of the impacts of exotic afforestation? Why/why not?

1 Transpower agrees with the exotic afforestation impacts that are listed, but considers the list is incomplete because it fails to consider impacts on infrastructure (such as the National Grid) and associated implications for security of electricity supply. Nor does it consider the consequential impacts for interdependent infrastructure.

Question 5.4 Do you agree with the primary assessment criteria [Table 4] and key considerations [Table 5] used to assess options in this consultation? Are there any you consider more important and why? Please provide any evidence you have.

Question 5.5 Are there any additional criteria or considerations that should be taken into account?

2 Key consideration 3 (Manages overall costs to the economy and households) should also explicitly include avoiding imposing additional financial costs by impacting other systems required for New Zealand to transition to a low-carbon economy.

3 As detailed above in these submissions, the cost of planting forests in the wrong location, too close to the National Grid, results in risks and impacts on the National Grid. These risks and impacts ultimately have a financial cost (an ongoing vegetation management regime is required, and where risks result in impacts, the affected National Grid assets must be repaired and, where impacted, electricity transmission services restored). That cost is passed on to electricity consumers (ultimately, the majority of households and businesses).

4 It is more cost-effective to avoid such impacts by planting in the right place, than to fix the assets once damage occurs and have to buy-out forest owners when seeking to remove inappropriately planted trees.

5 A further criterion or consideration should be protecting the National Grid by requiring forests (or other removal options, to the extent that this is applicable to them) to ensure they are physically located in a way that does not impact the National Grid. This criterion could be broadened to apply to all electricity lines, and potentially all infrastructure.

Question 6.5 Based on your preferred option(s), what other policies do you believe are required to manage any impacts of the proposal?

6 Whichever option is adopted, Transpower wishes to ensure that the ETS does not create new means of carbon removal that impacts negatively on the National Grid (which also plays a role in addressing climate change).

7 Policies should be put in place – either within the ETS and/or as complementary measures[18] – to ensure that forests or other reduction/removal mechanisms are not located in a way that will endanger the on-going operation, maintenance, upgrade and development of infrastructure such as the National Grid.

A Redesigned NZ ETS Permanent Forest Category

Question 1: How do you think the Ministerial Inquiry into land uses associated with the mobilisation of woody debris and sediment in Tairawhiti and Wairoa Districts' recommendations should be reflected in proposals to redesign the permanent forest category

8 Recommendation 36 is to 'Expand the current review of the Emissions Trading Scheme to include consideration of the matters in Paragraph 54' (which includes ensuring the RMA planning system (and the incoming SPA and NBA) and ETS are better integrated, such as by excluding non-compliant forests from ETS registration or by the loss of credits gained (i.e. using enforcement processes under the RMA)).

9 We agree with recommendation 36. However, the Ministerial Inquiry focussed on effects or externalities of forestry other than those on the National Grid (there were no National Grid lines in the affected areas), Transpower considers the same rationale should apply to adverse effects of forestry on the National Grid where appropriate setbacks are not complied with. Accordingly (as detailed above), Transpower's preference is for a system whereby plantation forests (**PFs**) that do not comply with National Grid setback do not accrue carbon credits for as long as they remain non-compliant. This would place the onus on PF owners and operators to ensure that they take action as soon as possible and that they advise regulatory authorities, so that they can continue to accrue carbon credits.

Question 2: Do you agree with our assessment criteria [pp. 14-15] for the redesigned permanent forest category? If not, what would you change and why?

Question 3: Do you think any of these criteria are more important than the others? If so, which criteria and why?

10 Transpower considers that assessment criteria 2 and 5 need to be expanded, so that the Permanent Forest Category (**PFC**) does not impact other activities that enable climate change adaptation and resilience; and that currently support rural economies and communities – such as the provision of electricity. One way to avoid the unintended consequence of impacts of the PFC on National Grid assets is to require setbacks from National Grid assets (as described in the submission text above).

11 For the reasons above, Transpower considers that assessment criteria 2 (resilience) should be prioritised as the consequences of PFC damage to the Grid include decreased resilience, and to associated costs for people and communities when incidents and outages occur.

[18] For instance, included in the Resource Management (National Environmental Standards for Electricity Transmission Activities) Regulations 2009; Electricity (Hazards from Trees) Regulations 2003; or Resource Management (National Environmental Standards for Plantation Forestry) Regulations 2017.

Question 11: Of these options [options 3.1 (no rules under ETS); 3.2 (forest management rules applicable to ETS registered permanent forests and/or 3.3 (forest management rules for transition forests)], what is your preferred approach? Why? Are there other options you prefer, that we haven't considered? (Note, options 3.2 and 3.3 are not mutually exclusive)

12 Transpower supports forest management requirements under the ETS (options 3.2 and 3.3) including:

a Appropriate location of PFs (whichever subcategory) in relation to National Grid assets; and that appropriate compliance, monitoring and enforcement obligations are in place to ensure location requirements are met;

b On-going management of climate risks (from fire, wind, floods, etc) so as to protect National Grid assets from PF debris in such cases.

13 Such rules would ensure that PFs are long term carbon sinks, are not removed, and are less likely to fall or grow into National Grid assets causing damage.

Question 15: If forest management requirements are implemented, do you think these should be prescriptive or outcomes-focused? Why/Why not?

14 Transpower considers that there could be a combination of both systems:

a A prescriptive system (as a baseline) with information and requirements available for any risk, that can be adopted as part of the forest management plan (**FMP**); and

b An outcomes-focused approach, if a more site-specific system is required in the specific circumstances. In this case, the FMP needs to be verified periodically.

Question 16: What are your views on forest management plans?

15 Transpower considers that FMPs are a necessary tool to ensure that (among other things) PFs take the required steps to meet minimum setback from National Grid requirements, allowing them to accrue carbon credits.

Question 17: What should forest management plans include?

16 FMPs should include (among other things):

a Minimum setbacks from National Grid assets, within which no PF is planted.

b Minimum fire risk, wind, flood management requirements, to ensure National Grid assets are not impacted by forest fires caused within the PF, wind or flood debris from the PF or that impact is minimised.

17 These requirements could be altered with Transpower's agreement, at the request of the PF owner or operators.

Question 18: Who do you think should be allowed to verify and/or monitor forest management plans?

18 Transpower considers that it is important that such verifications occur periodically, so the number of verifiers needs to be as large as possible. In the circumstances, allowing both Government and independent verifiers (potentially including Transpower staff in relation to

trees in proximity to the National Grid) may ensure that verifications can proceed in a timely manner.

19 Timely and consistent verification is important to Transpower as the situation on the ground may change in time, and Transpower wants to ensure that the integrity of the National Grid is maintained. The verification timeframes of the management plans in relation to Transpower lines could vary – potentially ranging from annually to 3-5 years as technology and different patrol methods become available. Any verification could state when the next review was required.

Question 22: Do you think there should be new or expanded compliance tools for permanent forests? Which ones and why?

20 Yes. Transpower's preference is for a system whereby all ETS forests, including PFs, that do not comply with minimum requirements of distance from National Grid assets do not accrue carbon credits for as long as (and to the extent that) they remain non-compliant. This would place the onus on PF owners and operators to ensure that they take action as soon as possible (or allow Transpower to take action) and that they advise regulatory authorities, so that they can continue to accrue carbon credits.

Question 24: For the compliance tools you think we should have, when do you think they should be used?

21 The compliance tool that Transpower suggests (see Question 22 above) should be used every time there is non-compliance. This can be subject to a short, but reasonable, period where the PF owner or operator is advised of the non-compliance and allows it to become compliant. Consistent application of sanctions is important, as extreme weather events can occur at any time leading to increased damage to the National Grid and resulting loss of supply of electricity to communities.

Schedule 2 Case studies

Costs to Transpower of managing risks through trimming vegetation

1 A significant work programme is required to address the risks from vegetation. For the 2021/2022 Financial Year, Transpower had 13,564 work orders to address vegetation that was creating risks to the Grid. This work is summarised in **table 2** below:

Vegetation issue	No. of work orders	% of vegetation work
Vegetation affecting conductor at maximum sag (ie. growing into the conductor)	7,389	54.5%
Vegetation affecting conductor at maximum swing (ie growing into the area where ethe conductor swings at high wind)	2,561	18.9%
Fall distance	3,614	26.6%
Total	**13,564**	**100%**

2 A poorly located forest (and other vegetation) results in a number of costs. In addition to financial costs, significant time and effort is required – including to negotiate with forest owners to keep the lines safe, and to compensate the forest owners (for removing vegetation and in keeping the lines safe). Line outages have also been required for high-risk harvests. Arranging line outages is not a simple task, as consultation is required with the electricity industry to ensure there are sufficient alternative supply options to keep electricity supplied to communities.

3 The examples below address both the risks resulting from poorly located forests, and costs of informal vegetation management.

4 **Photo 1** below shows damage to the Bunnythorpe-Wairakei A transmission line caused by plantation forestry near Rangipo in 2012. The forest was compliant with the Electricity (Hazards from Trees) Regulations 2003. New foundations and tower repairs were in the order of $500,000.

Photo 1: damage to National Grid line

Photo 2: fire caused by damage to distribution line from tree-fall

5 **Photo 2** above shows a fire resulting from a tree coming into contact with a distribution line. Similar issues have arisen as a result of trees contacting National Grid lines in Te Horo and Clevedon, and in the South Island where a hedge grew into transmission lines. The machinery used for forestry operations also creates risks.

6 In another incident, forestry workers who were moving hauling machinery through a forest close to National Grid lines, created a 'flashover' (where electricity arcs from conductors onto an object, in this case the machinery) causing damage to the lines and the machinery and creating significant fire and safety risks.

Costs to Transpower from removing trees from ETS registered forests

7 In 2022, Transpower relocated the Bunnythorpe-Ongarue A line as a result of the road edge slipping away and two tower legs being exposed. A new structure needed to be erected approximately 40m to the side of the existing alignment, in a registered carbon sequestration forest.

8 The forest owner claimed, and was given compensation of over $300,000 for loss of 2.74ha of forest, including costs to cover surrender obligations under the ETS and future loss of New Zealand Units.

9 This compensation is illustrative of the amounts that could be claimed for removal of fall distance trees from ETS registered forests if no provisions are made requiring minimum setbacks and imposing an obligation on forest owners to pay for the costs of compliance with that setback.

Costs to Transpower from felling trees from abandoned forests

10 In 2021-2023, Transpower spent ~$170,000 on resolving issues with an abandoned pine forest in the vicinity of the Bunnythorpe-Wilton A line, between span 0197-0198 (photo 3 below). This work involved consultation with the landowner, council and iwi, and ultimately felling of the fall distance trees. Costs would have been significantly more if the pine forest had been registered under the ETS.

Photo 3: Abandoned forest BPE-WIL A 0197-0198

Tree fall events in January 2023 Severe Weather Events

Central North Island – Rangipo forest

11 Transpower has a number of assets in the forests in the Rangipo area, where there was widespread destruction of mature forest. We understand that up to $150 million worth of trees are on the ground and/or destroyed.

12 A total of 42 spans on three lines were struck by trees.[19] This damage occurred in a situation where there were corridors around the lines compliant with the setbacks currently imposed under the Electricity (Hazards from Trees) Regulations, but this was insufficient as the leading edge of the forest was well within the fall distance.[20] Further, hundreds of trees were left standing – damaged and vulnerable to high winds as they are no longer sheltered by the surrounding forest. The conductors on these lines were covered in bark, and in many instances large tree stems. It is surprising that at least six structures had not collapsed under the weight. It was incredibly lucky that the vegetation striking the line did not result in loss of supply of electricity to the region.

13 Transpower engaged a forestry contractor to work full time to remove the remaining unsafe trees near our lines. This work took more than two weeks, with initial costs being ~$300,000. Final costs are yet to be tallied.

[19] Affected spans: BPE-WRK A 439-477 (39 spans), BPE-WKM 400-401, BPE-WKM 407-408, WRK-WKM 0006-0008.

[20] In this respect, Transpower considers that the setbacks under those regulations are not sufficient, and raised that issue in its submission (see Transpower's Submission on the review of the Electricity (Hazards from Trees) Regulations 2003 (9 May 2023), paragraph [95] and following).

14 **Photos 4 and 5** below show one span through the forest, where a clean up has to occur.

Photo 4: BPE-WRK A line, span 0454-455

Photo 5: BPE-WRK A line, span 0454-455

Northland

15 A number of trees also fell into the lines in Northland in January and February 2023. While none of them resulted in supply issues, they did result in outages for some of the circuits that were hit.

16 A large tree fell on top of the 110kV Henderson-Maungatapere A line – holding the conductor (wires) to the ground. The line tripped out of service (a protective measure which isolates the faulty line from the rest of the National Grid). Transpower's service providers were able to remove the tree and carefully release the conductor back to air the following day, with the line returned to service. It was fortunate that on this occasion there was no loss of electricity supply or that this tree fall did not result in a fire.

Photo 6: Tree holding bottom phase of conductor on the ground

Photo 7: Tree being cut away

Photo 8: Minor conductor damage that had to be repaired

17 A second tree hit the same line a day earlier – also resulting in the line tripping. Once the cyclone cleared, a helicopter patrol identified evidence that the trip was caused by a falling tree that clipped the conductor.

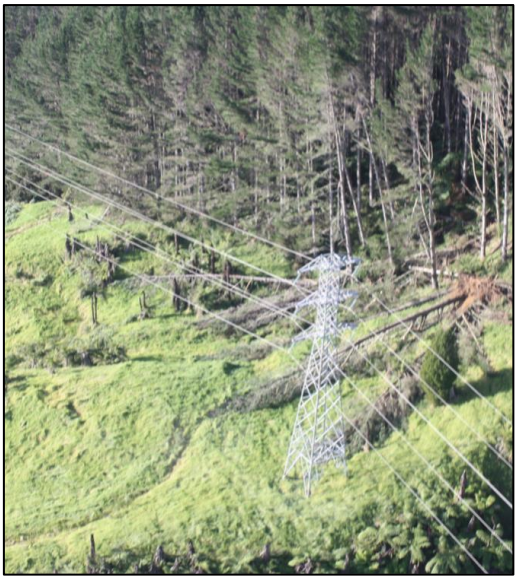

Photo 9: Several large trees fallen towards the line. Small pieces of debris hanging from the conductor

Arapuni-Edgcumbe line - Kinleith-Lichfield-Tarukenga 1 circuit

18 Locating the source of some faults can result in significant time, effort and cost. The Kinleith-Lichfield-Tarukenga 1 circuit tripped on 13 February 2023. No distance to fault information was available to determine the most probable fault location on a transmission line.

19 A line patrol was initiated, with ground crews starting at either end of the line. A helicopter patrol of the forestry sections was also undertaken. This helicopter patrol identified trees having been blown into a section of the line, in the span between Arapuni-Edgcumbe-A0123 and A0124 structures. The ground patrol was dispatched to the location and reported that the line had freed itself from the vegetation.

20 An attempt to re-liven the line was unsuccessful. Distance to fault information from the reclose attempt suggested the fault was between Tower A0666 and the Kinleith substation. This area was patrolled with nothing found, and a further reclose attempt was made which was also unsuccessful.

21 Due to worsening weather conditions it was decided to stand the patrols down and continue the following day.

22 On 14 February 2023, a tree branch was found on the conductor (wire) of Arapuni-Edgcumbe-A0236 and A0237 span. This was removed and the circuit was successfully returned to service about 6 hours after the tree was initially found.

Photo 10: Image of the branch on the conductor (wire) of Arapuni-Edgcumbe-A0236 and A0237 span

Hawke's Bay

23 Less damage was caused to lines due to tree fall in Hawke's Bay during Cyclone Gabrielle, as the wind was not as severe. However, tree fall damage did occur in a few forestry blocks.

24 Photo 11 shows a slip that resulted in tree fall into the Redclyffe-Tuai A line in the vicinity of tower 0086-0096. Photo 12 shows the resulting damage to the conductor. It is surprising that the conductor did not snap, given the damage that has occurred. We expect that our costs will be in the vicinity of $150,000 to widen the forestry corridor, and replace the damaged conductor in this section of line.

Photo 11: slip and tree fall in vicinity of RDF-TUI A line

Photo 12: damaged RDF-TUI A line as a result of treefall

Other recent damage to lines due to tree strike

25 In October 2022, a tree strike resulted in the conductor dropping on the Tuai-Bunnythorpe A line in span 0221-0222. The resulting damage cost ~$120,000 plus ongoing corridor management costs. This damage is shown in **photos 13 and 14** below.

Photo 13: TUI-BPE – mid-span looking back to tower 221

Photo 14: TUI-BPE A, tree fall span 0221-222