Climate
Change Office

State of Play Report: Tasmania's Land Use, Land Use Change and Forestry Sector

September 2024

Renewables, Climate and Future Industries Tasmania
Department of State Growth

Tasmanian Government

In recognition of the deep history and culture of these islands, we acknowledge all Tasmanian Aboriginal people as the continuing Custodians of this Land and Sea Country and pay our respect to Elders past and present.

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Executive summary

Reducing our emissions

Tasmania recorded net zero greenhouse gas emissions for the first time in 2014, and we have maintained our net zero status in the nine reported years since. However, our emissions profile is not guaranteed into the future, and we know we must do more to maintain our net zero status by reducing emissions in all our sectors, while also increasing the carbon stored in our managed forested state.

Tasmania's legislated economy-wide target of net zero emissions, or lower, from 2030, provides a flexible approach to emissions reduction and acknowledges that different sectors have different opportunities to reduce their emissions. For some sectors, more time, support and technology will be needed to transition to a lower emissions future. To ensure a practical and balanced approach to reducing emissions from our key sectors and building resilience to climate change, Tasmania's climate change legislation includes a requirement to develop sector-based Emissions Reduction and Resilience Plans (Plans).

Under the *Climate Change (State Action) Act 2008*, the Land Use, Land Use Change and Forestry (LULUCF) Plan is to be prepared by November 2024.

This State of Play Report has been prepared as the first step to prepare a Plan for the LULUCF sector in Tasmania. It provides an overview of Tasmania's LULUCF sector to identify gaps and future opportunities for the draft Plan, which will be released for public consultation.

Tasmania's land use, land use change and forestry sector

The LULUCF sector includes greenhouse gas emissions sources and removals associated with human-induced disturbances and activities, land and forest management practices, and the changes (or conversions) of land use that impact the carbon stored in vegetation and soils. The LULUCF sector includes emissions and removals in forests (harvesting of plantations and native forests and subsequent regrowth), crops, grasslands, wetlands, settlements, and harvested wood products.

Tasmania's LULUCF sector has been a carbon sink since 2012. The reduction in emissions has been due to declining net emissions from the harvest of native forests, and from forest land conversions to other land uses and increasing removals from forest regrowth on previously cleared land.

Climate change poses a considerable challenge to Tasmania's forests. The carbon sink of Tasmania's forests is not guaranteed in the future as risks from bushfires, heatwaves, drought, flooding, and invasive species and diseases are likely to impact forest health and productivity, soil quality and carbon storage.

Tasmania's land and forest managers are already experiencing the impacts of a changing climate. The ways the forestry industry can adapt and build resilience need to be based on continuous improvement and use existing frameworks, including the Tasmanian forest practices system.

Planting more trees in the landscape sequesters carbon. Increasing agro-forestry plantings may have other benefits for farmers such as improved farm productivity, biodiversity, soil health and water quality.

There are opportunities to increase our expertise and knowledge of innovative forest and land management practices and access additional revenue streams through carbon markets. Outreach programs can improve the capacity and capability of farmers, foresters, landowners and plantation managers that can lead to lower emissions and improved adaptation outcomes.

Land clearing and conversions of forested land to agricultural land uses in Tasmania have reduced in recent years. Tasmania's land use planning system can play a constructive role in reducing emissions and building resilience to the impacts of a changing climate. The demand for locally sourced fibre and wood products, that are produced in environmentally and socially responsible ways, is increasing and sustainably certified products can attract premium prices.

There are many initiatives already underway across Tasmania and Australia to increase tree plantings and improve the resilience of the sector to the impacts of climate change. There are opportunities to build on the current work to address barriers, communicate the benefits and accelerate the demand for long-lived wood products to ensure we have reliable sources of wood fibre and other essential products into the future.


Image: Chris Crerar

Background

The *Climate Change (State Action) Act 2008* (the Act) sets out the Tasmanian Government's agenda for action on climate change. Under the Act, Tasmania's emissions reduction target is to achieve net zero greenhouse gas emissions, or lower, in Tasmania from 30 June 2030. To help us achieve this goal, the Act requires the government to develop five-yearly sector-based Plans in consultation with business and industry. The Plans will support a practical and balanced approach for our key sectors to reduce greenhouse gas emissions and build resilience to climate change.

The Plans must support greenhouse gas emissions reduction, the transition to a lower emissions economy, and resilience to climate-related risks. The legislation also requires that the objects of the Act are taken into account during the development of the Plans. The objects of the Act include supporting emissions reduction, adaptation, and a consultative, partnership approach to action on climate change.

Plans must be developed for the following sectors:

- energy

- transport

- industrial processes and product use (IPPU)

- agriculture

- land use, land use change and forestry (LULUCF)

- waste

- any other sector or sub-sector determined by the Minister (the government has committed to develop a Plan for government operations).

A whole-of-economy roadmap outlining the links and cross-cutting issues between all sectoral plans and Tasmania's first statewide climate change risk assessment will also be developed.

Delivery and timeframes

Under the Act, this Plan must be prepared by November 2024. The Minister for Energy and Renewables, as minister responsible for climate change, is to consult with each relevant portfolio Minister, and with business and industry representatives, to develop the Plans. The Minister is also required to publicly consult on each draft Plan.

The Plans are to be tabled in Parliament and updated at least every five years. This work is being led by the Climate Change Office in Renewables, Climate and Future Industries Tasmania (ReCFIT) in collaboration with relevant portfolio agencies.

Why sector-based emissions reduction and resilience planning?

The latest data[1] show that Tasmania recorded net zero greenhouse gas emissions for the first time in 2014 and has maintained its net zero status in the nine reported years since. Our emissions profile is largely due to the carbon sink in our managed forest estate and our longstanding investment in renewable electricity generation.

Tasmania's LULUCF sector includes emissions from human activities, such as land clearing, harvesting and prescribed burns, and removals from regeneration and regrowth in the managed forest estate. The emissions of the LULUCF sector do not include conservation forests such as the Tasmanian Wilderness World Heritage Area and national parks, which have not been subject to human activities.

Tasmania's emissions profile is not guaranteed into the future. Emissions are influenced by a range of factors such as population growth, bushfires, changes in consumer demand, market forces and technological advancements. We know we must do more to maintain our net zero status by reducing emissions in all our sectors, while also increasing the carbon stored in our forests.[2]

The *AR6 Synthesis Report: Climate Change 2023* by the Intergovernmental Panel on Climate Change (IPCC)[3] confirms that humans are causing global warming and makes it clear that we need to act now. Global temperatures are now 1.1˚C above pre-industrial levels and are likely to reach 1.5˚C above pre-industrial levels in the early 2030s. In Tasmania, the environmental, economic and social impacts of climate change are already affecting our businesses, industries, communities, built environment and natural values. It is important that we adapt effectively to a changing climate and build strong, resilient communities, while continuing to reduce our emissions.

A consistent theme from consultation on the government's action on climate change is that a partnership approach between government and industry is preferred, to support emissions reduction, transition to a lower emissions economy and build resilience in Tasmanian businesses and industries.

Purpose of this State of Play Report

This State of Play Report (Report) has been developed to support the requirement to prepare a Plan for the LULUCF sector and to guide consultation. This Report provides a high-level summary of Tasmania's LULUCF sector, its emissions and the impacts of climate change on the sector. It also outlines emissions reduction and resilience opportunities and barriers, and relevant policies and actions at the local, national and international level. The Report identifies gaps and future opportunities for the draft Plan, which will be released for public consultation in mid-2024.

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[1] Tasmania's latest reported greenhouse gas emissions were released in April 2024 as part of the Australian Government's *National Greenhouse Accounts 2022* and *State and Territory Greenhouse Gas Inventories 2022*. The Australian Government reporting framework is consistent with UNFCCC and Paris Agreement reporting rules. National inventory reporting runs two years behind the current date, and represents the most recent official data in Australia on annual emissions.

[2] Point Advisory and Indufor (2021) '2021 Update of Tasmania's Emissions Pathway Review – technical report' (prepared for the Tasmanian Climate Change Office) www.recfit.tas.gov.au/__data/assets/pdf_file/0009/492093/Tasmanian_Emissions_Pathway_Review_-_Technical_Report.pdf

[3] IPCC (2023) 'Climate Change 2023: Synthesis Report - Summary for Policymakers' www.ipcc.ch/report/ar6/syr/

Framework for development of the Plans

Purpose	To develop pathways for key sectors to reduce greenhouse gas emissions that support Tasmania achieving its target of net zero emissions, or lower, from 2030, support the transition to a lower emissions economy, and build resilience to the impacts of climate change.
Objectives	To identify priority actions for government, business and industry.
Principles	• Sustainable development and social equity • Transparency and reporting • Science-based approach • Integrated decision making • Risk management • Community engagement • Complementarity
Sectors	• Energy • Transport • Industrial processes and product use (IPPU) • Agriculture • Land use, land use change and forestry (LULUCF) • Waste • Any other sector or sub-sector determined by the Minister (the government has committed to develop a Plan for government operations)
Consultation	• Portfolio Ministers • Climate Change Reference Group • Targeted consultation with key industry stakeholders and government departments • Public consultation on each draft Plan
Timing	• All Plans are expected to be finalised and published by 30 November 2024
Key public outputs	• State of Play Report • Draft Plan • Final Plan • Whole-of-economy roadmap
Next steps	• Implementation • Reporting through the annual climate change activity statement • Review of the Plans to identify gaps and opportunities for the development of Tasmania's next climate change action plan • Update the Plans at least every five years.

Scope of the Plan for the LULUCF sector

The sectors identified for the development of Plans are based on the sectors identified in the United Nations Framework Convention on Climate Change (UNFCCC) greenhouse gas reporting framework.

Under the UNFCCC reporting framework, emissions from the LULUCF sector include emissions sources and sequestration (emissions removals or carbon sinks) of greenhouse gases from land management practices, land use conversions and forestry activities that impact the carbon stored in vegetation and soils, as well as the impact of bushfires. The main driver of change in carbon fluxes across the Tasmanian landscape and the associated emissions relates to losses and gains of woody vegetation.

The Plan for the LULUCF sector will focus on the emissions that come directly from human-induced activities, land and forest management practices, and changes of land use across the landscape. Specifically, the LULUCF sector includes emissions sources and sinks for forest land, cropland, grassland, wetland, settlements and harvested wood products.

The LULUCF sector includes greenhouse gas emissions sources and removals from:

- the harvesting and regeneration of native forests and plantations
- the clearing of forested land and subsequent conversion to other land uses
- fuelwood consumption
- the establishment of new forests or plantations on previously cleared or unforested land
- the decomposition of vegetation matter
- biomass burning, including bushfires, regeneration burns and other planned burns
- the regrowth of vegetation after disturbances (for example land clearing).

Other minor contributions to LULUCF emissions include the wetland sub-sector and the methane emissions from man-made reservoirs, dams and storages, and the nitrous oxide emissions from coastal aquaculture production facilities.

As the LULUCF sector includes land uses, the Plan will also consider Tasmania's planning system and how land use planning controls can reduce emissions and build resilience. The Plan will also consider how we can build resilience to the impacts of climate change on our forests and natural ecosystems.

Under the UNFCCC reporting framework, forested conservation areas that have not been subject to human-induced disturbances, such as the Tasmanian Wilderness World Heritage Area and national parks, do not contribute to Tasmania's emissions profile. Emissions from these undisturbed native forests are assumed to be in equilibrium as emissions from decomposing material are balanced by the carbon stored in growing and mature vegetation.

Relationship between LULUCF and agriculture sectors

Due to the nature of the land, forest, and farm management practices included in the LULUCF and agriculture sectors, there are important distinctions in the UNFCCC reporting framework for the treatment of emissions and removals in these two sectors.

As explained above, the LULUCF sector accounts for carbon fluxes in the landscape from land and forest management practices and activities, bushfires, controlled burns, land clearing and conversion to other land uses and regrowth on previously cleared land.

Emissions for the agriculture sector are largely attributable to methane and nitrous oxide from agricultural activities, including livestock and farm management practices such as the application of soil conditioners.

A summary of the main emissions sources and removals for both LULUCF and agriculture is provided below.

LULUCF	Agriculture
• Harvesting of native forests and plantations on private and public lands, including post-harvesting regeneration burns. • Clearing of forested lands and the conversion to other land uses. • Fuelwood for use in domestic wood heaters. • Establishing new forests or plantations on previously cleared lands. • Bushfires and controlled burns to reduce bushfire risk. • Regenerating and regrowing vegetation after disturbances. • Decomposing vegetation matter. • Constructed reservoirs and dams (which release methane). • Coastal aquaculture production facilities (which release nitrous oxide).	• Enteric fermentation (the digestion of plant material by cattle, sheep, pigs and other livestock, which releases methane). • Manure management (decomposing organic matter contained in manure releases methane). • Agricultural soils (processes, including application of nitrogen fertilisers, animal waste, sewage sludge and crop residues, add nitrogen compounds to the soil, which undergo a range of chemical transformations and release nitrous oxide). • Field burning of agricultural residues (directly and indirectly releasing methane, nitrous oxide and other greenhouse gases). • Application of lime products or urea to soils (leading to chemical reactions which release carbon dioxide and nitrous oxide).

Relationship between LULUCF and other sectors

Due to the nature of the LULUCF sector and the UNFCCC reporting framework, there is significant overlap between forestry activities and other sectors. For example:

- The combustion of fossil fuels associated with forestry activity and land management (such as diesel to operate harvesting machinery and farming equipment) is accounted for in the direct combustion (or stationary energy) sub-sector of the energy sector.
- The combustion of fossil fuels and use of electricity for transport and stationary energy purposes at coastal aquaculture and fisheries facilities are accounted for in the energy sector.
- The sequestration from agricultural activities, including agroforestry and practices to improve soil health and increase soil carbon sequestration, and the emissions from land clearing for agricultural production, are accounted for in the LULUCF sector.

The emissions from the use of fossil fuels to manufacture building materials used by the construction industry are accounted for in the energy sector. The reduction in emissions from the substitution of more emissions-intensive building materials with wood or wood fibre products will be seen in the energy sector. The substitution effect is a significant opportunity to reduce emissions in Tasmania, and in Australian and overseas markets where our long-life wood products are exported and used.

There are strong links between the agriculture and LULUCF sectors. These Plans are being developed concurrently to ensure all issues are considered across both Plans, and to support more efficient consultation with stakeholders.

The future opportunities identified in all sector-based Plans will be combined and inform the development of Tasmania's next climate change action plan, including the identification of priorities and gaps not addressed through the development of the sector-based Plans.

Tasmania's LULUCF sector

Employment and economic contribution

The Tasmanian forestry industry plays an important role in the state's economy. In 2017-18, there were around 3,100 direct jobs in the forest industry (primary and secondary processing) and around 2,650 indirect jobs generated in other industries as a result of demand from the forest industry.

Across Tasmania, 24 per cent of the direct jobs were in the north west region, 37.4 per cent in the north and 38.6 per cent in the south.

In 2015-16, the direct value of output by the Tasmanian forest industry at the point of sale of primary processed products was $712 million.[4] In 2017, the Ministerial Advisory Council on Forestry published *A Strategic Growth Plan for Tasmanian Forests, Fine Timber and Wood Fibre Industry*. The growth objective is to increase the industry value-add to $1.2 billion in real terms by 2036.[5] With this strategic direction, there is a clear driver for further increases in downstream processing, to increase value-adding for forestry products.

The Tasmanian Government has provided significant funding to support this strategic direction, and there are market factors that can limit value growth, including demand in international markets for exports and the competitiveness of wood product imports.

Policy and legislative context

Land use and land use change

Tasmania's Resource Management and Planning System sets out the overarching objectives for the use and development of the state's natural and physical resources. Several pieces of legislation embody those aims, including the *Land Use Planning and Approvals Act 1993* (the LUPA Act) and *State Policies and Projects Act 1993*.

The LUPA Act sets out the legal framework for the Tasmanian land use planning system, which includes:

- Tasmanian Planning Policies (TPPs) that describe the government's position on issues such as environment protection, hazards and risks, economic development, liveable settlements, heritage protection, infrastructure to support the economy and create liveable communities, and public engagement in planning processes.
- Regional Land Use Strategies that set out the long-term strategic planning goals for the three Tasmanian regions.
- The Tasmanian Planning Scheme that regulates the use, development and protection of land.

The TPPs are currently under development and have yet to be implemented. They will provide strategic direction on land use planning matters by informing the Regional Land Use Strategies, and the content and scope of the Tasmanian Planning Scheme.

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[4] Schirmer, Mylek, Magnusson, Yabsley, Morison, University of Canberra (2018) 'Socio-economic impacts of the forestry industry – Tasmania' fwpa.com.au/wp-content/uploads/2018/08/Socio_economic_impacts_of_the_forest_industry_TAS.pdf

[5] Ministerial Advisory Council on Forestry (2017) 'A Strategic Growth Plan for the Tasmanian Forests, Fine Timber and Wood Fibre Industry' www.stategrowth.tas.gov.au/__data/assets/pdf_file/0006/525633/Strategic_Growth_Plan_Final_As_Printed.pdf

Forestry

Tasmania's forest management system is a comprehensive system for delivering ecologically sustainable forest management across all land tenures. The system comprises an overarching legislative and policy framework, and associated planning and operational systems. It is complemented by an adaptive management and continuous improvement process, incorporating research findings and feedback processes associated with compliance and enforcement systems, stakeholder engagement, and monitoring and review mechanisms.

Tasmania's forest management system encompasses a range of legislation administered by several Tasmanian Government agencies and authorities, and applies to both public and private land tenures. The following key Tasmanian legislation underpins the forest management system:

- The *Forest Practices Act 1985* and Forest Practices Regulations 2017 provide for sustainable forest management associated with the growing and harvesting of forests on public and private land.
- The *Forest Management Act 2013* prescribes the Permanent Timber Production Zone land (PTPZL) and Sustainable Timber Tasmania (STT) as the land manager.
- The *Forestry (Rebuilding the Forest Industry) Act 2014* prescribes the Future Potential Production Zone Land and conversion to or exchange with PTPZL.
- The *Nature Conservation Act 2002* and the *Threatened Species Protection Act 1995* provide protection for listed flora, fauna and threatened vegetation communities.
- The *National Parks and Reserves Management Act 2002* prescribes management requirements for most of the Tasmanian reserve system.

The Tasmanian Regional Forest Agreement (RFA) is a bilateral agreement between the Tasmanian and Australian governments that was first signed on 8 November 1997. The RFA is a framework document that is underpinned by Tasmania's forest management system and covers both public and privately-owned forests. The RFA provides Australian Government accreditation that Tasmania's forest management system meets national environmental laws, and is independently reviewed every five years.

Tasmania's forest management system has three primary elements:

1. the Forest Practices Code to provide standards for forestry operations to further the objective of sustainable forest management
2. a comprehensive, adequate and representative (CAR) forest reserve system to securely protect nature conservation values
3. the maintenance of a permanent native forest estate to ensure the resource base is maintained for the long-term for all its various production, conservation and amenity values.

The *Policy for Maintaining a Permanent Native Forest Estate* is a key instrument in delivering the third element and prohibits broad-scale clearing and conversion of native forest, other than in limited prescribed circumstances. Broad-scale clearing and conversion has ceased on public land and the extent and rate of clearing on private land is constrained by the policy to 40 hectares per annum, unless a prescribed circumstance exists. Land clearing and conversion of forests and threatened native vegetation is further constrained by the *Forest Practices Act 1985* and the Forest Practices Regulations and Code.

The *Forest Practices Code 2020* is a key element of Tasmania's forest practices system and includes the following guidance:

> *Forest practices should be conducted in a manner that maintains the sequestration and storage of carbon in a reasonably practical manner by:*
>
> - *avoiding unnecessary damage to forest growing stock and soils*
> - *maintaining site productivity*
> - *ensuring the prompt reforestation and growth of native forests after harvesting.*
>
> *Forest practices should ensure that native forests are regenerated using seed from local or similar provenances in a manner that contributes to the maintenance of genetic diversity, taking into account the potential of ecosystems and species to adapt to climate change.*

Tasmania's forest estates

Tasmania has a total land mass of approximately 6.81 million hectares (ha), of which nearly half (3.35 million ha or 49 per cent) is forested. In June 2021, Tasmania had 3.05 million ha of native forest and 281,000 ha of plantations.

Of the total native forest area, 1.255 million ha is in conservation and public reserves, 812,000 ha is PTPZL and 833,000 ha is on private freehold land.

Just over two thirds (69 per cent) of the native forest estate is either wet or dry eucalypt forest. There are significant areas of other non-eucalypt forest types, such as rainforest, blackwood forest, paperbark forest, tea-tree forest, silver wattle forest, she-oak forest and Oyster Bay pine forest.

Tasmania's plantations are made up of 25 per cent softwoods (79,000 ha) and 75 per cent hardwoods (202,000 ha). *Pinus radiata* is the main softwood species, while *Eucalyptus globulus* and *Eucalyptus nitens* are the main hardwood species.[6]

Wood production

Production forests in Tasmania are managed to supply a wide range of wood products to local and overseas customers, including high and low-quality sawlogs, high-grade domestic peeler logs, special species timbers, pulpwood and firewood. These forests also support other commercial activities, such as bee keeping and tourism ventures, as well as recreational activities.

In 2022-23, Tasmanian forests produced a total of over 3.7 million tonnes of wood fibre. Nearly 79 per cent of this came from plantations. The main product from Tasmania's plantation forests is pulpwood, but a growing and increasingly important product is high quality sawlogs.

The main products from Tasmania's native forests are sawlogs, peeler billets and woodchips. Speciality timbers, such as celery top pine, sassafras, blackwood and myrtle, make up a minor but important component of the native forest harvest.

[6] Forest Practices Authority State of the forest Tasmania 2022 Data Report (2023) fpa.tas.gov.au/__data/assets/pdf_file/0007/521548/Tas_SOF_data_report_2022_final_28_March_2023.pdf

Roles and responsibilities

Entity	Key roles and responsibilities
Australian Government	The Australian Government, through the Department of Agriculture, Fisheries and Forestry (DAFF) works to strengthen, support and continue a sustainable forestry sector. DAFF is currently leading the development of a national decarbonisation plan for agriculture and land.
Tasmanian Government	The Department of State Growth provides advice on forest policy and implementation, and develops strategies and policies for a sustainable forestry industry. The Tasmania Parks and Wildlife Service manages the state's 19 national parks, three World Heritage Areas and over 800 other reserves, including marine reserves. Private Forests Tasmania (PFT) has a legislated role to facilitate and expand the sustainable development of Tasmania's private forest resource. PFT plays a key role in encouraging and facilitating farmers to plant commercially viable trees in the agricultural landscape. The Tasmanian Planning Commission and State Planning Office provide policy advice on land use and development matters.
State-level regulators	The Forest Practices Authority manages the Tasmanian forest practices system on both private and public land, and regulates all activities defined as forest practices in the *Forest Practices Act 1985*. These practices include establishing forests, growing and harvesting timber, clearing trees, clearing and converting threatened native vegetation, and work within forest areas such as on roads and in quarries.
Government businesses	Sustainable Timber Tasmania manages the state's public multiple use forests and plantation estates. Hydro Tasmania and Tasmanian Irrigation manage many constructed reservoirs in Tasmania.
Local Government	Local government and Tasmanian councils are responsible for administering the State Planning Scheme, which comprises the State Planning Provisions and approved Local Provisions Schedules. Some Tasmanian councils have released strategies to increase the urban tree canopy cover across their local government areas, which have the dual benefits of sequestering carbon dioxide from the atmosphere and also improving resilience to heatwaves by increasing shade.
Local and regional bodies	Local and regional bodies, such as natural resource management organisations, play a critical role in helping landowners reduce emissions and respond to climate change, including through the delivery of services and programs.
Business and industry	Tasmania's commercial plantation, processing and forest products industry and supply chains seek innovative solutions to manage the state's natural resources and minimise the impacts of climate-related risks.

Sources of greenhouse gas emissions

UNFCCC framework

The main source of data on Tasmania's emissions is the Australian Government's State and Territory Greenhouse Gas Inventories (STGGI). The STGGI is a disaggregation of the data contained in Australia's National Greenhouse Gas Accounts and the National Inventory Report (NIR).

The Australian Government greenhouse gas emissions reporting framework is consistent with the UNFCCC and Paris Agreement reporting rules. National inventory reporting runs two years behind the current date and represents the most recent official data in Australia on annual emissions.

Under the Kyoto Protocol, which was adopted at the third Conference of the Parties to the UNFCCC in 1997, Annex I countries (including Australia) were required to set emissions reduction targets against 1990 levels. The NIR and STGGI emissions data provide a full time series for all reporting sectors and sub-sectors from the baseline year of 1990 through to the current reporting year.

The UNFCCC reporting framework includes many sub-sectors, categories and sub-categories used to classify and disaggregate the various sources of emissions and removals in LULUCF. To better understand the hierarchy level of a particular sub-category and the sub-sector to which it belongs, the alpha-numeric descriptors for all LULUCF classifications are included in this Report, together with the name of the reporting category.

Further explanation of the hierarchy of LULUCF sub-sectors and sub-categories, and their emissions for 1990 and 2022, is provided in Table 1 in the 'Greenhouse gas emissions' section below.

Under the UNFCCC reporting framework, emissions and removals for the LULUCF sector are attributed to the sub-sectors of:

- forest land (4.A)
- cropland (4.B)
- grassland (4.C)
- wetlands (4.D)
- settlements (4.E)
- other land (4.F)
- harvested wood products (4.G).

The first five sub-sectors are further disaggregated into two components: a 'remaining' category and a 'land converted to' category (for example the grassland sub-sector comprises the grassland remaining grassland (4.C.1) and land converted to grassland (4.C.2) categories).

The 'remaining' categories broadly include carbon stock changes and associated emissions and removals from human-induced activities, such as timber harvesting of native forests and plantations established before 1990, biomass burning, and farming and land management practices that result in changes to woody vegetation, woody crops and soils.

The 'land converted to' categories broadly include carbon stock changes and associated emissions and removals from human-induced activities that result in a conversion of land tenure such as planting and harvesting of hardwood and softwood plantations established after 1990, environmental plantings, and natural regeneration and regrowth on cleared lands.

Methods to estimate emissions from biomass burning, nitrous oxide emitted from nitrogen mineralisation, and nitrogen leaching and run-off are applied across all land use classifications.

Australia does not report emissions in the other land sub-sector (4.F). These land tenures typically occur in central Australia and have minimal impact on biomass, dead organic matter and soil carbon.

Australia applies the stock-change approach for the harvested wood products sub-sector (4.G), which includes solid wood, paper and paperboard products in use and in solid waste disposal sites. The emissions from wood products that contribute to Tasmania's greenhouse gas inventory are products in service life and consumed in Tasmania, including those imported and excluding those exported.

Modelling carbon stock changes

Predominantly, country-specific methodologies and Tier 3 spatially-explicit models, and Tier 1 and 2 non-spatially explicit models, are used to estimate LULUCF emissions and removals (see the Glossary and acronyms at the end of this Report for a brief explanation of the hierarchy of tier methods). Australia's land sector inventory system integrates spatially-referenced data with the Full Carbon Accounting Model (FullCAM), an empirically constrained, mass balance, carbon cycling ecosystem model, to estimate carbon stock changes and greenhouse gas emissions (including all carbon pools, gases, lands and land use activities).

FullCAM has been designed to comply with the IPCC Guidelines and to meet the Australian Government's international treaty estimation and reporting commitments. It is designed to fully integrate the estimation of carbon stock changes and related emissions and removals across the Australian landscape. The parameters of FullCAM have been informed by the latest empirical science and are continuously updated.

A comprehensive modelling approach to the estimation of carbon stock changes was originally chosen for the Australian land sector because of the absence of extensive forest inventory or measurement systems.

Spatial datasets for key disturbance events such as land clearing, forest planting and natural regeneration are derived from LandSat satellite imagery held by the Australian Geoscience Datacube (Digital Earth Australia). These datasets are processed by CSIRO Data61 and are informed by land use and vegetation datasets provided by the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) and the Australian Government Department of Climate Change, Energy, the Environment and Water (DCCEEW).

Improvements to LULUCF modelling

In the 2021 NIR and STGGI, the Australian Government introduced a spatially-explicit Tier 3 FullCAM model to estimate emissions from harvesting events in Tasmania's multiple-use public forests. This approach was initially introduced to model the emissions and removals from harvesting in public forests in Victoria and New South Wales in the 2020 NIR and STGGI and was extended to public forests in Queensland for this year's inventory.

The FullCAM spatial method for harvested native forests simulates carbon stock changes due to tree growth, timber harvesting and associated management, and fire. In the spatial method for harvested native forests, the type, location and date of timber harvesting and post-harvesting activities in Tasmania are drawn from historical harvest data provided by Sustainable Timber Tasmania.

The non-spatially-explicit estate modelling capability of FullCAM is used for both public and private forests in Western Australia, and for private native forests only in Victoria, New South Wales, Queensland and Tasmania. The area of native forests harvested in each broad forest type and age class is derived from roundwood log volumes removals for each state reported by ABARES, using an historical relationship between roundwood removals and harvest area data collated by state agencies.

Forest land (4.A)

Forest land remaining forest land (4.A.1)

The forest land remaining forest land category (4.A.1) in the forest land sub-sector (4.A) has had a significant influence on the fluctuations in Tasmania's LULUCF emissions since 1990 and comprises emissions and removals from changes in carbon stored in:

- fuelwood for domestic use (4.A.1.i.a)
- other native forests, which includes wilderness areas and national parks not previously subjected to harvesting; the main processes affecting emissions and removals from these forests include fire management practices and bushfires (4.A.1.i.c)
- private native forests subject to harvesting activities (4.A.1.i.d)
- multiple-use public forests subject to management activities, including harvesting events (4.A.1.i.e)
- commercial hardwood and softwood plantations established before 1990 (4.A.1.i.f)
- lands subject to biomass burning, including bushfires, prescribed burning to reduce bushfire risk, and regeneration and slash burning after harvesting events (4.A.1.ii).

Harvested native forests (whether on private or public lands) are those forests comprising native species subjected to harvesting practices, natural regeneration and regrowth. In some areas, regeneration is achieved using post-harvesting burns. Various silvicultural practices may be applied to initiate and promote particular growth characteristics. The forest lands included in this category are private native forests subject to harvest or regrowing from prior harvest, and multiple-use public forests and public forest areas which have been available for harvesting at any time since 1990.

Emissions from the decomposition of forest residues are included in harvested native forests on private and public lands. The change in dead organic matter in harvested native forests is the net result of additions from harvest residue and turnover, and losses due to decay and turnover into soils. Losses are caused by the decomposition of both natural accumulation and harvest residue and burning of residues as part of some silvicultural systems.

As for all forests, the harvested native forests sub-categories are monitored for forest conversions. Areas that are identified as direct human induced forest conversions are excluded from the forest land remaining forest land category from the time of the conversion event, and any harvesting losses associated with the conversion event are also excluded and reported only under the new land use category, to avoid double-counting.

Land converted to forest land (4.A.2)

The carbon dioxide removals associated with forest regrowth emerging on previously cleared croplands, grasslands and settlements are accounted for as part of the land converted to forest land category (4.A.2) in the forest land sub-sector. The removals from grassland converted to forest land is the main contributor to this category.

Grassland converted to forest land contains forest established on land that was previously non-forest, including commercial plantations and environmental plantings, forest that has regrown on land that was previously converted from a forest to grassland, and regeneration from natural seed sources on land protected by state vegetation management policies.

The land converted to forest land category has had a relatively minor influence on Tasmania's LULUCF sector across the time series from 1990, when compared with the emissions and removals from the forest land remaining forest land category.

Bushfires and natural disturbance provisions


Image: Chris Crerar

Fire (biomass burning) is the principal form of natural disturbance which impacts terrestrial carbon stocks in Australia. Most Australian eucalypt forests are adapted to fire, and fires, whether bushfires or prescribed fires, are generally not stand-replacing (stands of trees or forests killed by an event, such as rare major bushfires). In the absence of traditional burning practices, the fire-adapted ecology of Australian eucalypt-dominated temperate forests leads to infrequent, extreme bushfires characterised by fire intervals on the decadal scale.

The Australian Government monitors all forest land for bushfires, harvesting and other land use change events for inclusion in FullCAM. Where forest cover loss events are identified, these areas are attributed to either a direct, human-induced (anthropogenic) or a natural background (non-anthropogenic) land use change. The forest loss is monitored to determine whether this is temporary with subsequent post-event recovery or there is evidence of a permanent land use change.

Natural background emissions and removals caused by natural disturbance fires are considered to be caused by non-anthropogenic events (for example ignition from lightning strikes) and are beyond the control of, and not materially influenced by, the efforts of Australian authorities to prevent, manage and control them. These fires are considered to be part of the natural background of non-anthropogenic emissions and removals, which are assumed to average out over time and space.

Consistent with the IPCC accounting guidelines, two bushfire emissions estimates are reported. The first estimate includes the net emissions from non-anthropogenic natural disturbances and the second is the long-run trend in net anthropogenic emissions from bushfires and post-fire removals as the forest recovers and regrows.

To identify emissions from human activity, a statistical approach is applied to identify non-anthropogenic natural disturbances on forest land remaining forest land (4.A.1). For these fires, the carbon stock loss and subsequent recovery from non-anthropogenic natural disturbances are modelled to average out over time, leaving emissions and removals from anthropogenic fires as the dominant result in the national inventory.

The IPCC accounting guidelines allow for the national emissions inventory and natural disturbance provisions to include an annual upper threshold on the impact of major bushfires. A statistical approach is applied by comparing each year's emissions data with a national natural disturbance threshold for the calibration period 1989-90 to 2019-20. Once natural disturbance years are identified at a national level, the bushfires are spatially identified and the area burned is tracked at the sub-national level. A state and territory level threshold is then applied and natural disturbance areas identified where both national and sub-national thresholds are exceeded.

This effectively means that the impact of major bushfires in Tasmania can be excluded from the national inventory, provided the area burned is restored over an allocated monitoring period. If the original forest is converted to a different land use post-bushfire, the land use conversion and associated emissions are then recorded in both the national and the Tasmanian inventories.

This national definition of natural disturbances applies to bushfires on temperate forests and does not apply to fires reported as controlled burning (for example in temperate forests or in wet-dry tropical forests and woodlands). The impacts of human activities (for example post-harvesting regeneration and slash burning, salvage harvesting, prescribed burning, deforestation) are also excluded from the identification of natural disturbances. All fires on land converted to forest land (4.A.2) are treated as anthropogenic.

To identify lands subject to natural disturbances and monitor for forest recovery, the Tier 3, Approach 3, modelling system is used for FullCAM, which has been designed to comply with the following safeguard mechanisms:

- the use of geo-located time series bushfire activity data
- coverage of all forest lands
- monitor if there is a permanent land use change on those lands following a bushfire event
- identify lands where the natural disturbance is followed by another disturbance event, to avoid double counting.

FullCAM uses two remote sensing data sources. The Advanced Very High Resolution Radiometer is used to identify and map natural disturbance impacts due to bushfire on forest lands, whereas Landsat data is used to map forest cover changes and identify permanent land-use changes across all forest lands.

FullCAM spatially tracks areas and carbon stocks at the 25 metre x 25 metre pixel-level on lands identified as experiencing natural disturbances in a particular year, until another anthropogenic activity occurs (for example non-natural disturbance fire, salvage harvesting or land use change).

Cropland (4.B)

Cropland includes all land that is used for continuous cropping and those lands managed as crop-pasture rotations, as well as perennial woody horticulture that would otherwise reach the forest thresholds. Non-carbon dioxide emissions from land management practices and activities that fall under cropland remaining cropland (4.B.1) are reported in the agriculture sector. Net emissions from conversions between croplands and grasslands are included in cropland remaining cropland (4.B.1) as it is common for cropping systems to include pasture and grazing rotations.

Croplands are generally of high land value with a high return on production and moderate to high soil nutrient loads. Therefore, there are relatively low emissions and removals from the conversion of cropland to forest land (4.A.2.1) or grassland (4.C.2.2) but rather the lands remain as croplands and the emissions are retained in the cropland remaining cropland category (4.B.1).

Anthropogenic emissions and removals on croplands occur as a result of changes in management practices such as crop type and land use. Permanent changes in management practices generate changes in the levels of soil carbon or woody biomass stocks over the longer-term.

Emissions from the land converted to cropland category (4.B.2) make a relatively minor contribution to Tasmania's cropland emissions, largely due to the low levels of clearing of forest land for cropping purposes due to the *Policy for Maintaining a Permanent Native Forest Estate.*

Grassland (4.C)

Anthropogenic emissions and removals on grassland remaining grassland (4.C.1) result from changes in management practices on grasslands, particularly from changes in pasture and grazing, and changes in sparse woody vegetation that do not meet the definition of a forest (for example shrubs). Permanent changes in management practices generate changes in the levels of soil carbon or woody biomass stocks over the longer-term.

Net emissions from the forest land converted to grassland category (4.C.2.1) make the largest contribution to the grassland sub-sector.

Wetlands (4.D)

Emissions and removals in the wetlands remaining wetlands category (4.D.1) include gains and losses of sparse woody vegetation on wetlands, coastal aquaculture production facilities, seagrass removal from capital dredging projects, and constructed reservoirs.

Land converted to wetlands (4.D.2) includes where forests are cleared as part of the construction of reservoirs or the IPCC land categorisation of flooded lands.

Constructed reservoirs

Methane emissions from constructed reservoirs and dams (as opposed to naturally occurring lakes) are included in the flooded land remaining flooded land sub-category (4.D.1.2) for existing reservoirs or dams and land converted to wetland sub-category (4.D.2) for new reservoirs or dams. These reservoirs and dams in Tasmania include those used or established by Hydro Tasmania, TasWater and Irrigation Tasmania.

Blue carbon

Blue carbon refers to the emissions sources or carbon sinks associated with coastal and marine ecosystems such as seagrasses, mangroves and saltmarshes. The other wetland remaining other wetland sub-category (4.D.1.3) includes greenhouse gas emissions from a limited number of human-induced blue carbon activities. These include emissions of nitrous oxide from the production of finfish and crustaceans in aquaculture systems located in coastal wetland habitats (4.D.1.3.viii) and the emissions from seagrass removal due to capital dredging projects (4.D.1.3.vii).

Emissions from blue carbon activities do not currently make a major contribution to Tasmania's emissions profile. The majority are associated with nitrous oxide emissions from coastal aquaculture production. Blue carbon activities may have a greater impact on Australia's emissions inventory in the future, as more research helps us to better understand and quantify the carbon cycle in coastal, tidal and estuarine ecosystems.

Settlements (4.E)

Emissions and removals in the settlements remaining settlements category (4.E.1) include urban environments and infrastructure such as urban parks and gardens that have not observed a land use conversion.

The land converted to settlements category (4.E.2) includes forest land converted to settlements (4.E.2.1) where terrestrial forests are cleared for human settlements and mangrove forests are cleared for commercial developments such as marinas.

Harvested wood products (4.G)

Emissions and removals in the harvested wood products sub-sector (4.G) include the solid wood (4.G.1), paper and paperboard (4.G.2) products in use and in solid waste disposal sites (4.G.3) categories. The emissions from wood products that contribute to Tasmania's greenhouse gas inventory are products in service life, consumed and disposed to landfills in Tasmania, including those imported and excluding those exported. Harvested wood products in solid waste disposal sites are tracked using methods consistent with those used for the waste sector.

Other forestry and land-related emissions

The combustion of fossil fuels associated with forestry activity and land management (such as diesel to operate harvesting machinery and farming equipment) is accounted for in the direct combustion (or stationary energy) sub-sector of the energy sector.

Emissions reductions from the substitution of long-life wood products in construction projects for more emissions intensive building materials will be accounted for in the energy sector.

Methane emissions associated with livestock (such as enteric fermentation) and nitrous oxide emissions associated with cropping (such as the application of nitrogen fertilisers) are accounted for in the agriculture sector.

Greenhouse gas emissions

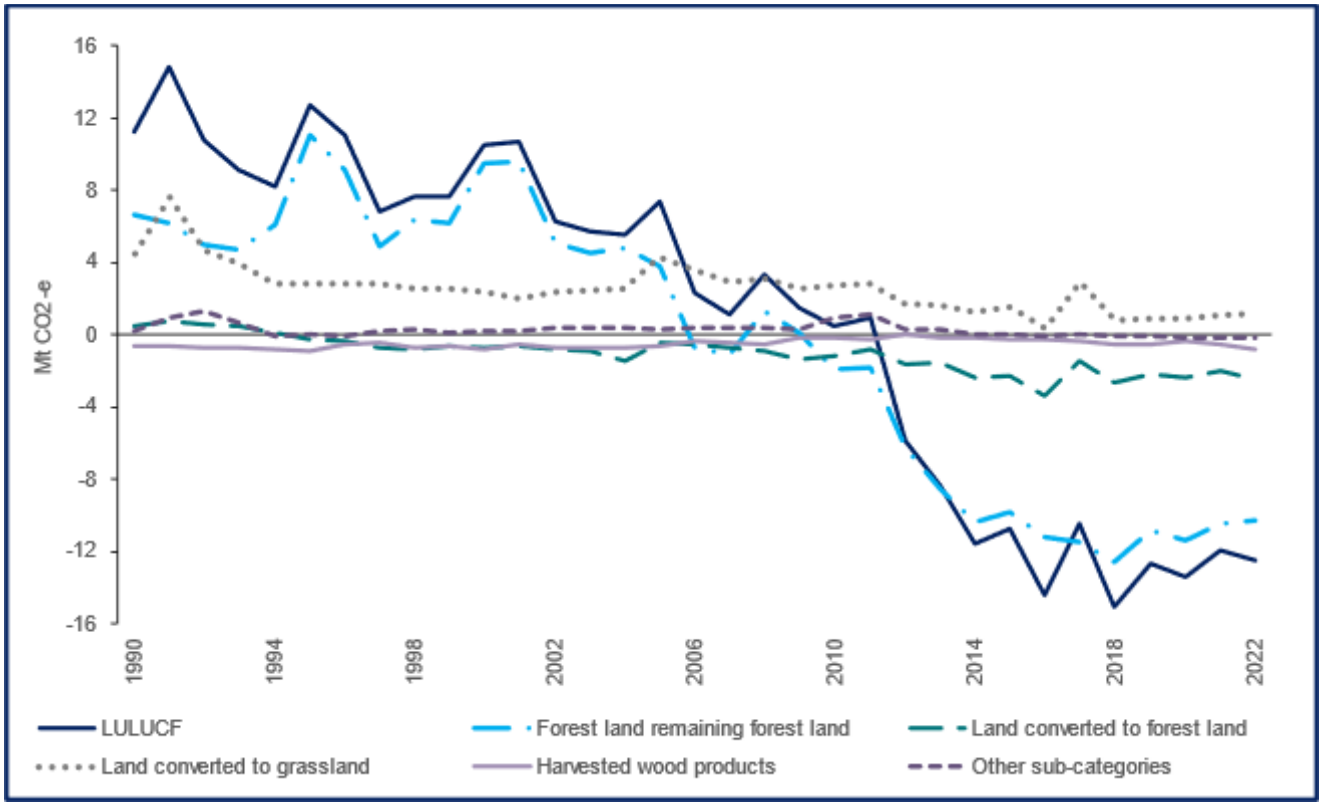
In 2022, emissions from Tasmania's LULUCF sector were a carbon sink of minus 12.51 megatonnes (Mt) of carbon dioxide equivalent (CO_2-e), which is a reduction of 211 per cent on 1990 levels. A carbon, or emissions, sink removes more carbon dioxide from the atmosphere than it emits. The carbon is most often stored in the form of growing vegetation.

The reduction in Tasmania's LULUCF emissions since 1990 has been largely driven by:

- changes in forest land remaining forest land (4.A.1)
- changes in levels of timber harvesting in Tasmania's native forests on private land (4.A.1.i.d) and in public multiple-use forests (4.A.1.i.e)
- a reduction in emissions from the forest land converted to grassland sub-category (4.C.2.1) largely associated with lower rates of clearing of forested lands
- an increase in the carbon sink of land converted to forest land (4.A.2) from hardwood and softwood plantations, environmental plantings and natural regeneration and regrowth.

Figure 1 below provides a graphical representation of the changes in emissions and contributions of the major sub-sectors to Tasmania's LULUCF sector for the time series 1990 to 2022.

Figure 1: Tasmanian LULUCF and sub-sector emissions – 1990 to 2022



Source: Department of Climate Change, Energy, the Environment and Water (DCCEEW) 2024, State and Territory Greenhouse Gas Inventories 2022

Table 1 shows the change in emissions for key LULUCF sub-sectors and sub-categories from 1990 to 2022.

Table 1: Tasmania's LULUCF emissions by sub-sector - 1990 to 2022

Sub-sector/Sub-category	Emissions (Mt CO_2-e)[1]			Change (%)
	1990	2022	Change	
Forest land (4.A)	7.13	-12.78	-19.91	-279.3
Forest land remaining forest land (4.A.1)	6.69	-10.33	-17.01	-254.4
Fuelwood (4.A.1.i.a)	*0.05*	*-0.06*	*-0.12*	*-222.8*
Harvested private native forests (4.A.1.i.d)	*13.81*	*-6.06*	*-19.86*	*-143.9*
Multiple use forests (4.A.1.i.e)	*-6.45*	*-5.54*	*0.90*	*14.0*
Pre 1990 plantations (4.A.1.i.f)	*-0.97*	*0.33*	*1.30*	*134.0*
Biomass burning (4.A.1.ii)	*0.21*	*0.98*	*0.78*	*373.1*
Land converted to forest land (4.A.2)	0.44	-2.45	-2.89	-659.1
Grassland converted to forest land (4.A.2.2)	*0.44*	*-2.45*	*-2.89*	*-658.2*
Post 1990 hardwood plantations (4.A.2.2.i.a)	*0.01*	*-0.29*	*-0.28*	*-2,441.5*
Post 1990 softwood plantations (4.A.2.2.i.b)	*0.00*	*-0.17*	*-0.17*	*-4,914.3*
Environmental plantings (4.A.2.2.i.c)	*0.02*	*-0.48*	*-0.49*	*-3,032.1*
Natural regeneration (4.A.2.2.i.d)	*0.37*	*-0.98*	*-1.35*	*-361.5*
Regrowth on cleared lands (4.A.2.2.i.e)	*0.01*	*-0.61*	*-0.62*	*-4,645.5*
Cropland (4.B)	0.16	0.04	-0.12	-76.3
Cropland remaining cropland (4.B.1)	0.12	0.03	-0.09	-72.6
Cropland soils (4.B.1.1)	*0.12*	*0.05*	*-0.07*	*-60.2*
Perennial woody crops (4.B.1.2)	*0.00*	*-0.02*	*-0.02*	*-1,858.6*
Land converted to cropland (4.B.2)	0.04	0.00	-0.03	-88.4
Grassland (4.C)	3.91	0.82	-3.09	-79.1
Grassland remaining grassland (4.C.1)	-0.60	-0.36	0.24	39.5
Land converted to grassland (4.C.2)	4.51	1.18	-3.33	-73.8
Forest land converted to grassland (4.C.2.1)	*4.50*	*1.17*	*-3.33*	*-73.9*
Wetland converted to grassland (4.C.2.3)	*0.01*	*0.01*	*0.00*	*0.0*
Wetland (4.D)	0.55	0.21	-0.34	-62.3
Wetland remaining wetland (4.D.1)	0.06	0.21	0.15	249.5

Sub-sector/Sub-category	Emissions (Mt CO_2-e)[1]			Change (%)
	1990	2022	Change	
Flooded land remaining flooded land (4.D.1.2)	*0.06*	*0.15*	*0.09*	*158.4*
Other wetland remaining other wetland (4.D.1.3)	*0.00*	*0.06*	*0.06*	*3,329.4*
Land converted to wetland (4.D.2)	0.49	0.00	-0.49	-100.0
Land converted to flooded lands (4.D.2.2)	*0.49*	*0.00*	*-0.49*	*-100.0*
Settlements (4.E)	0.13	-0.01	-0.15	-109.7
Settlements remaining settlements (4.E.1)	0.00	0.00	0.00	160.0
Land converted to settlements (4.E.2)	0.13	-0.01	-0.15	-108.6
Forest land converted to settlements (4.E.2.1)	*0.13*	*-0.01*	*-0.15*	*-108.6*
Other land (4.F)	NR[1]	NR[1]	NR[1]	NR[1]
Harvested wood products (4.G)	-0.61	-0.78	-0.16	27.4[2]
LULUCF Total	**11.26**	**-12.51**	**-23.78**	**-211.1**

[1] Sub-sector not reported.

[2] The percentage change from 1990 to 2022 for the harvested wood products sub-sector reflects an increase in the size of the carbon sink, that is, a larger negative outcome.

Source: Department of Climate Change, Energy, the Environment and Water (DCCEEW) 2024, State and Territory Greenhouse Gas Inventories 2022

Factors influencing Tasmania's LULUCF emissions

The main driver of change in carbon fluxes across the Tasmanian landscape and the associated emissions relates to losses and gains of woody vegetation from human-induced land management practices.

The emissions from losses and gains of woody vegetation are mainly reported under the following classifications: forest converted to other land uses (such as grassland (4.C.2.1) or cropland (4.B.2.1)), forest land remaining forest land (4.A.1), grassland converted to forest land (4.A.2.2) and grassland remaining grassland (4.C.1).

The emissions associated with land clearing reported under forest land converted to grassland (4.C.2.1) are offset from removals (carbon sequestration) in the environmental plantings (4.A.2.2.i.c), natural regeneration (4.A.2.2.i.d) and regrowth on cleared lands (4.A.2.2.i.e) classifications reported under grassland converted to forest land (4.A.2.2).

Impacts of climate change on the LULUCF sector in Tasmania

Under a changing climate, Tasmania is expected to experience increased storm events and changes in rainfall patterns, which are likely to result in increased flooding, coastal inundation and erosion. We are also expected to experience increased temperatures, more hot days, heatwaves and drought, and longer fire seasons in Tasmania, with more frequent and intense bushfire events.

Tasmania is expected to experience marine heatwaves, rising sea levels and increased windspeed. Extreme weather events are projected to increase in frequency and intensity over time. These events will have environmental, economic and social impacts on Tasmania's farmers, land and forest managers, communities, and our natural and cultural values.

The projected changes to the Tasmanian climate will increase physical risks to forestry and land management practices, and forest and soil cover from extreme events such as bushfire, drought, storms and floods.

Current international emissions accounting methodologies assume that Tasmania's undisturbed native forests are carbon neutral, with emissions from decomposing material in balance with the carbon sequestered in growing and mature vegetation. This state may not continue due to the impacts of climate change and, as forests age, tree biomass and carbon stocks approach a plateau. The carbon stocks in Tasmania's wet eucalypt forests are expected to reach a maximum and then reduce to a plateau.

More intense rainfall and flooding events are likely to increase the risk of soil erosion, reduce stream health and water quality, and may result in changes to soil biota and nutrient cycling. Coupled with increased periods of soil drying and bushfires that will impact the strength of tree root systems, compound extreme events may increase the risk of loss of tree cover and dieback.

Tasmania may also experience more invasive species and diseases in a changing climate. Our forests may be subject to damage and deterioration in health from new pathogens or pests that they have not evolved adequate defence mechanisms to fight.

Heatwaves

An increase in the frequency and intensity of heatwaves in Tasmania will potentially cause long-term loss of carbon stocks in native forests, as the rates of carbon sequestration in mature eucalypt forests decline in warmer temperatures.

Tasmania's tall *Eucalyptus obliqua* forests are among the most productive natural forest ecosystems globally and can store large amounts of carbon. Research conducted at the Warra flux tower site in southern Tasmania found that tall *Eucalyptus obliqua* forests suffered a sharp decline in productivity during the record-breaking heatwave of November 2017. The forest switched from being a strong carbon sink to a source of carbon dioxide emissions.

The research showed that Tasmania's tall eucalypt forests are poorly adapted to heatwaves compared with similar forests in mainland Australia. As temperatures increase and heatwave events become more intense and frequent, these forests may become a permanent source of emissions and in prolonged or severe heatwaves may result in forest dieback.[7]

Bushfires

Climate change is likely to have a direct impact on forest health by negatively impacting forest regeneration and regrowth, and tree survival, especially as bushfires become more intense and frequent.

Under a changing climate the current assumption that forests will naturally regrow back to their original extent and store the same amount of carbon may not be valid, as the increased frequency of major bushfires can potentially reduce the carbon storage capacity of forests. The impact of bushfire on carbon stocks could be a relatively rapid step-change, with repeat bushfires burning through regrowth too young to self-regenerate.

As future fire seasons lengthen, land and fire managers will have less ability and time available to conduct prescribed burns and undertake other methods to reduce bushfire intensity.

[7] Wardlaw TJ (2024), Climate Futures, University of Tasmania and Terrestrial Ecosystem Research Network Giants Under Threat: The vulnerability of Tasmania's tall eucalypt forests to a warming climate. www.tern.org.au/wp-content/uploads/Giants-Under-Threat_Climate-Futures_DIGITAL_.pdf

Risks for the sector in the transition to a lower emissions economy

In addition to the physical impacts on the sector, there are risks associated with the transition to a lower emissions economy and potential opportunities for demands of low emissions products. Carbon has become a valued commodity. International and Australian carbon markets have been established to certify and monetise the emissions reduced, or carbon abated, by eligible projects.

Tasmania's land and forestry sector is well placed to participate in the Australian Carbon Credit Unit (ACCU) Scheme, as well as international and national voluntary carbon markets. In May 2024, there were 99 Tasmanian-based abatement projects registered under the ACCU Scheme. Of these, 37 projects were related to forestry activities under the 2017 and 2022 plantation forestry methods or the reforestation by environmental or mallee plantings method. Many of these forestry-related abatement projects are not currently generating ACCUs.

In addition, Tasmanian landowners, with otherwise eligible projects, may not be participating in the ACCU Scheme for a variety of reasons such as scheme complexity, high administrative, compliance and insurance costs, scale of projects, suitability of methods, risks to vegetation cover from bushfire and other hazards, long project life-spans, ACCU price volatility, and commitments to industry emissions reduction targets.

There may be increased pressure to reserve greater areas of forest in the future to offset emissions from the combustion of fossil fuels. There is already tension with the agriculture industry over the use of arable land in Tasmania for food production.

With more frequent and intense fire in the landscape, both fire-intolerant and fire-adapted species will be placed at greater risk and forest age is likely to decrease. Climate-resilient old growth and carbon-dense native forests have high social and natural values.

There is likely to be an increase in demand for, and use of, wood products as a low carbon resource to reduce fossil fuel and embodied carbon emissions and replace emissions intensive building materials.

It is also likely there will be increased pressure on land managers to demonstrate good forest stewardship by actively managing and reporting on forest carbon stocks. There are already requirements in international certification schemes for forest managers to minimise emissions, consider the impact of climate change on forests and forest management, and maintain the capacity to sequester carbon.

Opportunities, challenges and barriers

Emissions reduction opportunities

Industry consultation to date has highlighted that some sectors, such as transport, are well positioned to transition to a lower emissions future. Other sectors, such as agriculture and industrial processes, will require research, investment and time to develop the necessary technology and skills.

Tasmanian Emissions Pathway Review

The 2021 *Tasmanian Emissions Pathway Review* (TEPR) identified 16 'best-fit' opportunities for emissions reduction in Tasmania, four of which relate to the LULUCF sector, mainly in forestry and forest/plantation management. There is a fifth opportunity to reduce emissions through changes to land use planning more broadly.

1 Reduce the conversion of plantations to other land uses

The TEPR identified an ongoing decline in plantations established after 1990 of around 1,000 ha per annum. The conversion of existing plantations to other land uses, such as cropland or grassland, will generally lead to increased emissions as these land uses will store less carbon than plantations.

This abatement opportunity assumes that plantation owners will replant all existing plantations after harvesting, effectively reducing the conversion of plantations by around 10,000 ha across the state. Policies and other incentives may be required to address market factors that would otherwise encourage private landholders to convert plantations after harvest.

For this opportunity to be realised, landholders would need to be sufficiently encouraged to replant, based on a range of expectations, including obtaining the same or higher yields (potentially through improved seed stock and genetic improvements), improved market access (including roading/port access to those markets), and ongoing demand that will underpin acceptable prices.

The Australian Government's updated plantation forestry method provides more opportunities for the plantation forestry industry to participate in the Australian Carbon Credit Unit (ACCU) Scheme. There are currently 31 Tasmanian-based projects registered for the ACCU Scheme under the 2017 and 2022 plantation forestry methods.

This opportunity is estimated to reduce emissions in Tasmanian by around 123 kt CO_2-e per year by 2050.

2 Increase plantations, including agroforestry

The TEPR identifies an opportunity to establish agroforestry on up to 10 per cent of agricultural land in Tasmania, while not negatively impacting farm productivity. This could result in a 10-15 per cent uplift in softwood and hardwood plantations by 2050 with a total area of around 30,000 ha to produce saw and pulp logs and wood fibre. Commercial timber plantations are typically established with around 1,000-1,400 trees per ha, while agroforestry systems would typically have 300-600 trees per ha.

This LULUCF abatement opportunity would require targeted promotion and potentially incentives for agroforestry development. While there may be productivity gains for planting trees on farms, agroforestry generally has lower removal rates than industrial plantations and therefore low emissions reduction benefits in the short- to medium-term.

This opportunity is estimated to reduce emissions in Tasmanian by around 300 kt CO_2-e per year by 2050.

3 Increase the proportion of forestry logs to long-term wood products and increase domestic processing

The TEPR identifies that providing stronger encouragement for investment in domestic processing of wood products, such as cross-laminated timber products, can result in an increase in forestry logs directed to long-term wood products of 25-50 per cent over the next 20 years.

The use of long-term engineered wood products has the benefit of storing carbon over long periods. When substituted for emissions intensive building materials such as steel and concrete, use of these products can also reduce emissions in the industrial processes and product use sector.

Tasmania exports significant volumes of woodchips from plantations and multiple-use native forests for processing in overseas markets, mainly in Asia. However, the TEPR acknowledges that, while this opportunity has high achievability, the potential benefit is low to medium, as uplift would start from a low base and the emissions benefits of wood products exported from Tasmania are not included in the state's emissions accounts. This opportunity is estimated to reduce emissions in Tasmanian by around 25 kt CO_2-e per year by 2050.

4 Introduce measures to reduce the risk of major bushfires

The TEPR identifies that increasing levels of prescribed burning of up to 20,000 ha per year, and firebreak maintenance programs, have the potential to mitigate bushfire risks. This opportunity recognises the increased risk of a mega-fire (a stand-replacing bushfire at the landscape level) due to climate change that could significantly disrupt or destroy large parts of Tasmania's carbon sink in its native forests.

The potential benefit of this abatement opportunity could be high. However, the TEPR moderates this assessment to medium to take into account national and international carbon accounting rules and protocols, which include the natural disturbance provisions that place annual caps on the impact of bushfire on Australia's National Greenhouse Accounts. This opportunity is estimated to reduce emissions in Tasmanian by around 70 kt CO_2-e per year by 2050.

5 Land use and land use change

The land use sector and Tasmania's planning system have important roles to play in supporting actions to reduce emissions across other sectors and take advantage of emerging opportunities in a low-emissions future by:

- promoting compact urban form that reduces the reliance on private vehicle use, encourages use of public and active transport modes, and utilises existing infrastructure and services
- supporting the integration of energy efficient materials and low emissions technologies into buildings and settlements
- supporting the uptake of low and zero emissions vehicles by siting charging and refuelling infrastructure in buildings and the public domain
- enabling the sustainable development of emerging low-emissions technologies (for example renewable energy generation and renewable hydrogen), and ensuring development is planned appropriately.

Resilience opportunities

The global transition to net zero emissions presents risks and opportunities for Tasmania's land, forestry and wood products sectors. There is likely to be an increase in the future demand for products with low embodied carbon, such as engineered wood products, to be used as alternatives to more emissions intensive building materials. Other opportunities exist for land managers to generate income through the sale of carbon credits from projects that sequester carbon, and lead to emissions reductions, such as from the on-site use of bioenergy, or improve biodiversity outcomes.

The ACCU Scheme is designed to ensure that land-based abatement projects will continue to sequester carbon for 25 years and in some cases up to 100 years. Managing these projects over long time periods will come with an increased risk profile that the expected abatement may not be realised, due to the increased incidence and severity of drought or bushfire. In some cases, these risks may be so high that it may be difficult to secure insurance for these abatement projects.

There will be an increase in demand for expert knowledge and advice to not only identify the opportunities available in the transition to a lower emissions economy, but also to quantify the risks and develop mitigation strategies.

Forestry

Opportunities to preserve forest health and productivity, and improve the resilience of Tasmania's forests to the impacts of climate change, include:

- varying the genetic stock of seeds sown for regeneration activities, plant better climate-adapted species, and collect seed from optimum seed provenances
- sowing more seeds from local areas potentially adapted to warmer temperatures
- taking measures to reduce the incidence and intensity of bushfires by managing the availability of fuel in the landscape, through fuel reduction burns, mechanical removal, forest thinning, establishing fire breaks, maintaining access, and improving the detection of bushfires and firefighting capacity and techniques
- maintaining or increasing the structural diversity of forests by maintaining multi-age forests while also retaining some larger, older trees, reducing clearfell operations, increasing forest thinning, and sowing alternative climate-suitable species or provenances and a diverse array of understorey species
- promoting improved post-fire recovery and regenerate areas that suffer dieback by increasing seed storage capacity for re-seeding and developing post-disturbance harvesting prescriptions for the largest and most severe bushfires
- improving research capabilities, knowledge, capacity and technologies to monitor and assess forest health and condition, invasive pests and diseases, water availability, changing fire regimes and heatwaves
- planning forestry activities and resources at multiple spatial and temporal scales across tenures
- adjusting sustainable yield calculations and harvesting levels to include potential reduced levels in forest productivity and increased mortality during heatwaves and the impacts of larger unplanned disturbances such as bushfires.

Land use and land use change

Tasmania's planning system and land use planning controls have important roles to play in reducing the exposure of buildings and infrastructure to the projected impacts of a changing climate by:

- identifying areas that are subject to the impacts of natural hazards such as coastal erosion, flooding and bushfire
- encouraging the appropriate location of land use and development, and inclusion of risk mitigation measures.

The land use sector can also support liveable communities by encouraging water sensitive urban design and green infrastructure to reduce the impacts of natural hazards (for example heatwaves and coastal erosion and inundation) on settlements.

Challenges and barriers

Consultation to date has highlighted key barriers preventing the LULUCF sector taking further action to reduce emissions and mitigate the risks from climate change. These include:

- Provision of accurate and contemporary future climate projections for Tasmania that are tailored for forest and land managers, farmers and other decision makers. These projections include a range of physical climate risks linked to bushfire, heatwaves, drought and flooding.
- Complexities and challenges in understanding, reporting, and in turn reducing land-sector emissions. As previously noted in this Report, forestry and land-based emissions are not just accounted for in the LULUCF sector, but also in energy, transport and agriculture. Consultation has highlighted the need to take a holistic, systems-based approach to supporting land managers to understand, report on and reduce their emissions.
- Australia's National Greenhouse Accounts use FullCAM to model the emissions for various land management, forestry and agricultural activities. This modelling approach does not reflect actions taken to reduce emissions at the property level. There are opportunities to improve how emissions reductions are estimated at a state, territory and national level to recognise the actions taken by business and industry.[8]
- A lack of access to trusted, independent advice may be a barrier for some landowners adopting new technologies and innovative land management and forestry practices. Effective, accessible education, information sharing and demonstration activities are needed, as well as supported ongoing extension and outreach for landowners to accelerate adoption.
- Most of the emissions from the land sector and forestry industry are the result of complex biological processes that will be subject to a changing climate and are hard to abate and maintain.
- Many commercial plantation managers will be impacted by increased regulatory burden due to changes to reporting standards for climate-related financial disclosures. It is important that Tasmania's legislative and regulatory frameworks support the uptake of low emissions, climate-resilient technologies and practices.

[8] Department of Agriculture, Fisheries and Forestry, Australian Government (2023) *Agriculture, land and emissions: discussion paper,* storage.googleapis.com/files-au-ag/agriculture-au/p/prj2f191574ff8314929f695/page/Agriculture_land_and_emissions_discussion_paper.pdf

- Opportunities to deliver carbon abatement projects under the ACCU Scheme may be limited for smaller forestry and farming businesses and landowners. High costs associated with carbon measurement and other auditing and compliance requirements can make small projects unviable. This could be addressed by supporting the aggregation of projects across a number of properties or 'stacking' of multiple methods for the one property.
- There are also a limited number of forestry-related methods currently available for landowners and project proponents to access the ACCU Scheme. The new proponent-led process for identifying new methods or improvements to existing methods may support a greater range of relevant methods for the forestry industry.
- While many of the emissions reduction and resilience opportunities have the potential to increase productivity, reduce costs and provide a range of other co-benefits in the longer-term, they require initial capital investment that can be a barrier for small landowners and businesses.

A key consideration in the Plan will be government policies and mechanisms to reduce these barriers where possible, or support the sector to overcome them.

What mechanisms are available to overcome the barriers and support the adoption of the opportunities for the sector?

Broadly, policy options to drive emissions reduction and resilience in the LULUCF sector include:

- supporting education and awareness to accelerate adoption of different technologies and practices
- investing in research and development
- working directly with businesses, industries, research institutions, community groups and other levels of government to drive change
- providing financial support, such as grants, subsidies and no-interest loan schemes, to incentivise the adoption of technologies and practices
- ensuring policy and regulatory settings support the uptake of relevant technologies and practices
- skills development and capacity building.


Image: Chris Crerar

Trends, targets and initiatives

International

The Taskforce on Nature-related Financial Disclosures (TNFD) aims to provide decision makers in business and capital markets with better quality information through corporate reporting on nature. TNFD is developing standards, frameworks and tools on nature-related issues that allow business to incorporate nature-related risks and opportunities into their strategic planning, risk management and asset allocation decisions.

The Forests and Climate Leaders Partnership (FCLP) is a voluntary international group of governments that aims to accelerate global progress to reverse forest loss and land degradation, increase restoration and support sustainable development. Australia is a founding member of the FCLP.

At COP26 in Glasgow, over 100 member nations reaffirmed their respective commitments to sustainable land use, and to the conservation, protection, sustainable management and restoration of forests, and other terrestrial ecosystems, through the Glasgow Leaders' Declaration on Forests and Land Use (the Declaration). The Declaration includes a commitment to working collectively to halt and reverse forest loss and land degradation by 2030 while delivering sustainable development and promoting an inclusive rural transformation.

The Declaration has since been endorsed by 145 member nations, including Australia, with coverage of over 90 per cent of the world's forests. The Declaration also includes the Global Forest Finance Pledge (the Pledge) to collectively provide US$12 billion for forest-related climate finance between 2021 and 2025.

At COP28 in Dubai, under the auspices of the Pledge, a coalition of 17 countries including Australia committed to advancing policies and approaches that support low carbon construction and increase the use of wood from sustainably managed forests in the built environment. The coalition stated such policies and approaches will result in reduced emissions, and an increase in stored carbon.

National

Australia has an economy-wide target of 43 per cent reduction in greenhouse gas emissions by 2030, and net zero by 2050 (*Climate Change Act 2022*).

National Agriculture and Land Decarbonisation Plan

The Australian Government is developing six sectoral decarbonisation plans as part of its Net Zero Plan.

The plans will consider ways to reduce emissions in each sector and opportunities for collective action that support decarbonisation. This information will provide industry, governments and the community with certainty needed to invest in Australia's lower emissions future.

Public consultation on the agriculture and land plan was undertaken in late 2023, and the Department of Agriculture, Forestry and Fisheries is using feedback from the consultation to develop the plan.

The Australian Government has announced funding of $63.8 million over ten years to implement the agriculture and land plan. The key measures as part of this package include:

- $30.8 million expand the Carbon Farming Outreach Program, including train-the trainer sessions for advisers, resources for First Nations peoples and information on nature positive

National Agriculture and Land Decarbonisation Plan

and climate-smart farms, and grants for Rural Research and Development Corporations to deliver information, resources and extension activities

- $28.7 million to improve greenhouse gas accounting in the agriculture and land sector at both the farm level, through the development of voluntary emissions reporting standards for the sector, and at the national inventory level.

The Tasmanian Government is providing input into this process to advocate for the best outcomes for Tasmania.

The Australian Government's A Better Future for our Regions and A Future Grown in Australia policies establish the government's commitment to Australia's forest industries. The policies aim to strengthen, support and continue a sustainable forestry sector now and into the future.

The government will deliver initiatives totalling over $300 million to support Australia's forest industries to innovate and improve the capacity and capability of the sector. The government will also reserve $500 million of its $15 billion National Reconstruction Fund specifically for agriculture, fisheries, forestry, and food and fibre.

Specific forestry-related programs and initiatives announced by the Australian Government from these funding allocations include:

- Funding of $73.76 million has been allocated over four years for the Support Plantation Establishment program to establish new long-rotation softwood and hardwood forestry plantations in Australia. The program aims to expand our domestic timber supply, particularly construction and manufacturing timber resources, contribute to Australia's carbon emission reduction targets, and support regional communities through the retention and creation of regional jobs.
- Investment of $10 million over four years in the Forestry Workforce Training Program. The program will support the delivery of skills and training to meet the requirements of Australia's forest and wood products sectors. The forestry sector is a significant employer in remote and regional Australia. Issues related to an ageing workforce, increasing participation by First Nations Australians and women, and accessing specific training and credentials required by the workforce are becoming increasingly important.
- The Australian Government has signed an agreement with the University of Tasmania to establish and manage the Australia-wide National Institute for Forest Products Innovation until 2026-27. The administration centre will be based at the University of Tasmania in Launceston and will operate under the new name of Australian Forest and Wood Innovations (AFWI). AFWI will support transformative research, development and innovation for Australia's timber industry, while also supporting the training and development of forest industries researchers.
- An additional $8.6 million over three years has been committed to continue the 11 Regional Forestry Hubs across Australia (one hub covers the entire state of Tasmania) to June 2027. This additional funding will allow the hubs to continue to provide strategic planning, technical assessments and analyses to support growth in their regions, and the expansion of roles to include extension services.
- Up to $110 million in grant funding has been committed through the Accelerate Adoption of Wood Processing Innovation Program. The program supports the medium- to long-term sustainability of wood processers by stimulating investment in upgrades to existing manufacturing lines, as well as supporting innovation to diversify domestic products.

The Australian Government has established the ACCU Scheme (previously known as the Emissions Reduction Fund) for the generation and trade of carbon credits associated with carbon stored, or abatement by projects related to improved energy efficiency, agricultural practices and forestry activities and landfill gas and waste reduction.

To ensure Australia's carbon crediting framework was fit for purpose, in 2022 the Australian Government initiated the *Independent Review of Australian Carbon Credit Units* chaired by Professor Ian Chubb AC. The Chubb Review concluded that the ACCU Scheme arrangements are essentially sound and incorporate mechanisms for regular review and improvement. Sixteen recommendations were made by the Chubb Review to clarify governance, improve transparency, facilitate positive project outcomes and co-benefits, and enhance confidence in the integrity and effectiveness of the ACCU Scheme.

The Australian Government accepted all 16 recommendations in principle and has released an implementation plan setting out the timing and approach for each recommendation. DCCEEW is currently establishing a proponent-led method development process to propose ideas for new methods or adjustments to existing methods made to the Emissions Reduction Assurance Committee.

Forestry Australia has recently submitted a proposal for a new proponent-led method Enhancing Native Forest Resilience under the ACCU Scheme that recognises the carbon, forest health and resilience benefits of active forest management.

In 2022, the Australian Government expanded the scope of the 2017 plantation forestry method to provide more opportunities for the plantation forestry industry to participate in the ACCU Scheme. The following four activities can be conducted under the 2022 plantation forestry method, each with different eligibility requirements:

- establishing a new plantation forest
- converting a short-rotation plantation to a long-rotation plantation
- continuing rotational harvest cycles in a plantation forest
- transitioning a plantation forest to a permanent forest, in situations where that plantation is at risk of being converted to non-forested land.

In addition, the Australian Government is developing a training package as part of the Carbon Farming Outreach Program. The package aims to build capacity of independent advisers to deliver advice, and support farmers and land managers to make decisions to reduce emissions in their farming operations and store carbon on their properties.

The Australian Government is also introducing mandatory climate-related financial disclosures for large businesses, which will start from 1 January 2025.[9] This requirement may increase the demand for ACCUs as these companies seek to offset hard to reduce emissions.

[9] For more information see Australian Treasury's *Climate-related financial disclosure: exposure draft legislation* released in January 2024, available at treasury.gov.au/consultation/c2024-466491

Tasmanian Government

The Tasmanian Government has an economy-wide target of net zero greenhouse gas emissions, or lower, from 2030 (*Climate Change (State Action) Act 2008*).

The government has a target to double the forestry industry value-add in Tasmania to $1.2 billion by 2036 *(Ministerial Advisory Council on Forestry).*

In February 2024, Private Forests Tasmania launched the $600,000 Stems for CO2 program. The program aims to reduce emissions by supporting Tasmanian farmers and landowners to plant and grow commercial trees on their properties. Stems for CO2 includes a $450,000 grant program with nearly 250 hectares of trees to be planted across three farming properties, which were announced in May 2024. The grants will directly support the three successful Tasmanian farmers with upfront establishment costs to integrate commercial trees into their agricultural enterprises.

The Stems for CO2 program is complemented by $150,000 to undertake carbon modelling to determine the emissions reductions, and develop case studies and education resources, to allow other farmers and landowners to understand the benefits of planting trees on their properties. Benefits include increased productivity and biodiversity, and reduced soil erosion. The Stems for CO2 program is a key initiative in *Tasmania's Climate Change Action Plan 2023-25*.

Private Forests Tasmania: supporting farmers and landowners to plant more trees

Private Forests Tasmania has established the Tree Alliance Knowledge Hub to provide landowners with information about the benefits of integrating trees into their operations, and tools and resources to help simplify the planning process.

Private Forests Tasmania is delivering the Integrated Farm Forestry Demonstration Sites Program to develop landscape-scale best practice forestry plantings in north west, northern and southern Tasmania. There have been two rounds of demonstration sites, resulting in nearly 500 ha of new farm forestry plantings. The Stems for CO2 grant program, launched in 2024, builds on the success of this program.

Successful applicants for these programs can gain a broad range of benefits, including direct value from carbon credits and increasing carbon productivity, as well as indirect value from improving biodiversity, native species habitat, soil health, and land amenity and value.

For example, through the program, the Fulham property in Dunalley has established over 20.2 ha of commercial shelterbelt plantings along fence lines. These plantings aim to limit erosion and sediment run off, provide shelter for livestock and crops, while also increasing carbon stores for the property.

The Department of Natural Resources Tasmania administers the $250,000 Carbon Farming Advice Rebate Pilot Program that provides primary producers with rebates of up to $10 000 to offset the cost of obtaining expert advice on carbon farming projects tailored to their enterprise.

The Landcare Action Grants Program, delivered in partnership with TasFarmers and Landcare Tasmania, provides grants for practical on-ground works for sustainable agriculture and river-care activities, including carbon farming initiatives. The government has committed a further $900,000 to expand the program and assist landholders to participate in carbon markets.

Agro-forestry, land use and emissions reduction: the Farm Forestry Carbon Tool

Launched in January 2023, the Farm Forestry Carbon Tool was created by the Regional Forestry Hub, in collaboration with Private Forests Tasmania. It is designed as a conversation starter for farmers. In just minutes, the tool provides an indicative estimate of a farm's carbon footprint and the impact that trees may have on improving environmental outcomes, including potential tree carbon offset opportunities.

Learn more about the Farm Forestry Carbon Tool.

The *Tasmanian Wood Encouragement Policy* ensures locally-sourced wood is considered, where feasible, in Tasmanian Government procurement, particularly for new building construction and refurbishment projects. The Policy does not mandate the use of wood, but seeks to ensure it is considered as a key design component where it:

- represents value for money
- provides appropriate quality and functionality, and complies with relevant Australian Standards
- complies with the Tasmanian Government's Buy Local Policy
- has no technical or performance reasons for not considering wood.

The use of locally-sourced wood products in new building construction and refurbishment projects can lead to lower greenhouse gas emissions by replacing more emissions intensive building materials.

ReCFIT is currently working with three government agencies on projects to displace fossil fuels used in existing boilers. These projects include a combination of bioenergy and renewable electricity options.

Government businesses

Sustainable Timber Tasmania (STT) is responsible for sustainably managing approximately 812,000 hectares of public production forests in Tasmania's PTPZL and undertaking forestry operations for the production and sale of forest products.

The Tasmanian Government has rewritten the Ministerial Charter for STT, formalising a new function for it to participate in the carbon markets. STT currently has four eligible projects registered with the Australian Government's Clean Energy Regulator to generate carbon credits under the ACCU Scheme. Three of these projects convert existing short rotation plantation forests into long rotation plantations for commercial harvesting of wood products and one is a reforestation project that establishes permanent plantings of native tree species on land that was previously used for agricultural purposes.

Hydro Tasmania has a target to achieve net zero reportable scope 1 and 2 emissions by 2025.

TasWater has targets to achieve net zero greenhouse gas emissions by 2050, produce 30 per cent of its energy demand onsite from renewable sources and contribute to healthy waterways.

Local and regional initiatives

Local government and regional bodies such as natural resource management (NRM) organisations play a critical role in helping producers reduce emissions and respond to climate change.

NRMs ensure that Tasmania's natural resources are managed sustainably across the state to increase the health of our land and waters. This management includes development and delivery of a range of programs that work with communities, farmers and landholders. Programs include initiatives that help farmers improve soil health, address weeds and other pests, and promote sustainable agricultural practices.

Tasmania has three legislated NRMs: NRM North, NRM South and NRM Cradle Coast. In addition, the Tamar NRM is a community-based organisation delivering NRM services throughout Launceston, West Tamar and George Town.

In 2022, NRM South was awarded $793,947 from the Australian Government's Blue Carbon Ecosystem Restoration Grants program for a saltmarsh restoration project at Pitt Water – Orielton Lagoon in southern Tasmania. The project will be used as a demonstration site for the development of the tidal restoration of blue carbon ecosystems method under the ACCU Scheme.

Collaborative approach to natural resource management across Tasmania

Tasmania's three regional NRMs work together towards a single vision for natural resource management in Tasmania: Collaborative action for healthy landscapes and seascapes, protected natural values and sustainable livelihoods and lifestyles.

Each NRM has its own strategy for achieving this vision, with shared aims to create a balanced approach to build, support and maintain:

- healthy, resilient and biodiverse environments
- healthy and productive water and marine resources
- productive and sustainable land management.

Each NRM identifies how to advance these priorities in their regional context.

Business, industry and the community

Tasmanian-based commercial plantation forest manager, Forico, has released three natural capital reports into its forestry and land management operations. Forico has also published a world-first illustrative example of a report integrating the Taskforce for Climate-related Disclosures and TNFD methodologies in financial decision making. The release of Forico's first natural capital report was an Australian first and the company has been recognised with national and international awards for integrating sustainability principles and financial reporting practices across the business.

Collaboration

There are many mechanisms in place to support collaborative, coordinated action on climate change in the LULUCF sector at national, state and regional levels.

Private Forests Tasmania, through its Tree Alliance program, collaborates with a range of industry stakeholders including landowners, individuals, commercial plantation managers, NRMs, not-for-profit and research organisations and peak bodies to integrate more tree plantings on farms.

The Tasmania Forestry Hub (the Hub) was established as part of the Australian Government's *National Forest Industries Plan*, which is focused on planting a billion new trees in forestry plantations to meet Australia's future needs for wood and fibre in the next decade.

The Hub, in consultation with industry, community and government stakeholders, has identified four priority themes shaping its scope of work:

- access to land and land use policy for plantation forest investment
- supply chain and infrastructure
- climate change and carbon policy
- culture, skills and training.

The Tasmanian Forests and Forest Products Network is supported with seed funding from the Tasmanian Government. The Network provides a centralised communication hub for industry participants, focuses on community engagement and education, promotes skills development, fosters research and development, and provides informed policy advice to government and industry.

Tasmania's three regional NRMs work together towards a single vision for natural resource management in Tasmania. The government has committed to providing additional funding of $2.4 million to Tasmania's three NRM regions over 2024-26.

Further opportunities to increase coordination and collaboration, both within the LULUCF sector, and with other sectors, will be a focus of the Plan.


Image: Chris Crerar

Glossary and acronyms

Term	Description
Agro-forestry	Establishment or management of trees or forest stands on private agricultural land and often integrated with crops and animals, generally for commercial benefit, including wood production but also for farm management, environmental or aesthetic reasons.
Bioenergy	A form of renewable energy produced using biomass (plant, algae or animal material). Bioenergy can include electricity, heat, gas and transport fuel.
Biomass	Living and dead organic material of biological origin, located above-ground and below-ground, for example trees, grasses, leaf litter, roots and soil organic matter.
CAR forest reserve system	Comprehensive, adequate and representative forest reserve system that includes the full range of vegetation communities (comprehensive), with sufficiently large reservation to maintain species diversity as well as community interaction and evolution (adequate), and conserving the diversity, including genetic diversity, within each vegetation community (representative). The CAR reserve system comprises dedicated formal reserves, informal reserves, and areas where forest values are protected by management prescriptions, as well as areas protected on private land.
Carbon sequestration	Removal of carbon from the atmosphere and its storage in vegetation, soils or elsewhere.
Carbon sink	A carbon reservoir or pool that has the capacity to accumulate carbon.
Commercial plantation	A forest category in the National Forest Inventory that comprises hardwood or softwood plantations managed commercially to supply logs to wood-processing industries for the manufacture of wood products.
CO_2	Carbon dioxide; a greenhouse gas.
CO_2-e	Carbon dioxide equivalent. This is a standard unit to measure greenhouse warming potential of gases. Each different greenhouse gas is represented in terms of the amount of CO_2 that would create the same amount of warming.
DCCEEW	Australian Government Department of Climate Change, Energy, the Environment and Water
Deforestation	Land clearing that results in the permanent removal of forest cover.
Direct combustion	Burning of fuel(s) for energy, predominantly in manufacturing, mining, residential and commercial sectors.
Emissions	Greenhouse gas emissions.
Environmental planting	Trees or forest stands established for environmental benefit (rather than for commercial use), usually by direct seeding or planting.
Forest	An area, incorporating all living and non-living components, that is dominated by trees having usually a single stem and a mature or potentially mature stand height exceeding 2 metres and with existing or potential crown cover of overstorey strata about equal to or greater than 20 per cent (includes native forests and plantations).
Forest estate	An area of forest managed by an agency, private organisation or individual, including the trees, flora, fauna, soil, streams, water-bodies, roads and other infrastructure.

Term	Description
Forest health	The effects of the sum of the ecosystem processes (energy, nutrient, hydrological and biological processes) that together maintain the vitality of a forest ecosystem.
Forest management	A system of practices and activity for conservation, stewardship and productive use of forest land, aimed at fulfilling desired environmental, economic and social functions and objectives for the forest.
FullCAM	Full Carbon Accounting Model
GWP	Global warming potentials are values that allow direct comparison of the impact of different greenhouse gases in the atmosphere by comparing how much energy one tonne of a gas will absorb compared to one tonne of carbon dioxide.
Growth stage	A stage in the development of trees or forests, associated with tree or stand age. Four growth stages for trees or forests are recognised in Australia: regeneration, regrowth, mature and senescent.
ha	Hectares. One hectare is equivalent to 10,000 square metres.
Harvested wood products	Wood products originating from harvested trees and removed from harvest areas for use as-is or after further processing.
IPCC	Intergovernmental Panel on Climate Change, an independent body that assesses the scientific, technical and socioeconomic information relevant to understand the risk of human-induced climate change. This includes developing guidelines for national greenhouse gas inventories which are used under the UNFCCC.
IPPU	Industrial Processes and Product Use.
kt	Kilotonnes. One kilotonne is equivalent to 1,000 tonnes or 1 million kilograms.
Land clearing	Removal of vegetation to convert land to another land use.
LULUCF	Land Use, Land Use Change and Forestry.
Methane	A type of greenhouse gas, which contributes approximately 28 times more atmospheric warming than carbon dioxide.
Mt	Megatonnes. One megatonne is equivalent to 1,000 kilotonnes or 1 million tonnes.
Multiple-use public forest	Publicly owned state forest, timber reserves and other land on which a range of forest values are managed by state government agencies in accordance with relevant legislation. The forest values can include provision of wood for harvest, supply of water, conservation of biodiversity, recreation, and environmental protection.
Native forest	A forest category in the National Forest Inventory that comprises national forest types dominated by the suite of native tree species naturally associated with forest in that location and located within their natural range.
NRM	Natural resource management
Plantation	Intensively managed stand of trees of either native or exotic species, created by the regular placement of seedlings or seeds. Commercial plantations are managed for the purpose of commercial wood production.
Prescribed burning	The controlled application of fire under specified environmental conditions to a predetermined area and at a time, intensity and rate of spread required to attain planned resource management objectives.

Term	Description
Production forest	Public or private forest managed for the production of wood products, whether plantation or native forest.
PTPZL	Permanent timber production zone land.
Pulpwood	Wood used to manufacture pulp or paper products.
ReCFIT	Renewables, Climate and Future Industries Tasmania
Reforestation	Establishment of forest on land that historically contained forest but had been converted to another land use, such as agriculture.
Sawlogs	Logs meeting specified quality requirements used to manufacture sawn timber.
Silvicultural practice	The art, science and technology of managing forest establishment, composition, growth, harvesting and regeneration to achieve prescribed objectives.
STGGI	State and Territory Greenhouse Gas Inventories
t	Tonnes. One tonne is equivalent to 1,000 kilograms.
Tier	The methods for estimating emissions and removals are divided into 'tiers' by the IPCC, which encompass different levels of methodological complexity and technological detail. Tier 1 methods are generally very simple and require less data and expertise. Tier 2 is more complex and Tier 3 methods are the most complex, generally requiring more detailed country-specific information.
Time series	A sequence of data taken at successive equally spaced points in time.
UNFCCC	United Nations Framework Convention on Climate Change
Woodchips	Small chips of wood produced from logs for use in fibre products or for conversion to pulp for paper manufacture.

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