

Australian Forest and Wood Products industry

Building a Low-
Carbon Future
for Australia



About us

Driving industry advancement through strategic research and market development activities since 2007.

Forest & Wood Products Australia (FWPA) is a Rural Research and Development Corporation (RDC) providing services to the forest and wood products industry.

We collaborate with industry stakeholders, including Australian forest growers, processors and importers, and the Australian Government to co-invest in strategic, collaborative and targeted initiatives to grow the market for forest and wood products.

We drive industry growth through transformative research, development and extension (RD&E) initiatives, and market development programs to improve the productivity, competitiveness and sustainability of the industry.

[Click here to learn more](#)

Our programs

- 1. Research, Development & Extension:** We empower a resilient and enduring forestry and wood products industry through research and development and extension and education.
- 2. Codes & Standards:** We support increased use of wood-based products across construction and other applications through the development and maintenance of key standards, codes and handbooks.
- 3. Forest Learning:** From forest to classroom - FWPA's Forest Learning initiative supports the education of the next generation with valuable learning resources for teachers and educators.
- 4. Statistics & Economics:** We support the growth and success of the forest and wood products industry by providing data driven insights and analysis. Our unique industry data helps inform member and industry business planning and decision making, including the new FWPA Data Dashboard.
- 5. The Ultimate Renewable™:** FWPA promotes the environmental, economic and social advantages of wood – the ultimate renewable, to grow the market and increase positive consumer sentiment towards the industry.
- 6. WoodSolutions:** The go-to resource for designing and building with wood – the ultimate renewable, supporting increased demand for timber products.



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Researchers

wood+beca
global expertise local understanding

edge impact™



Executive summary

Building a Low-Carbon Future: The journey to net zero and beyond

Australia's ambitious climate goals create an exciting opportunity for the forest and wood products industry to lead the way. Unlocking the significant potential of the nation's forest-based economy will help Australia achieve its decarbonisation targets while advancing key national priorities.

As an industry that is already close to net zero with a practical pathway to getting there before 2050, the commercial forestry industry and the diverse range of products it supports offer an extraordinary advantage. Expanding the use of wood-based products, while enabling the industry's drive to decarbonise its own operations, will allow Australia to harness this potential and build a low-carbon future. We aim to leverage our existing performance to go beyond net zero as an industry.

This report outlines three future pathways for the industry, each reflecting a different level of ambition. By adopting a forward-thinking strategy, the industry can achieve significant emissions reductions well ahead of the 2050 target, establishing itself as a carbon removal powerhouse.

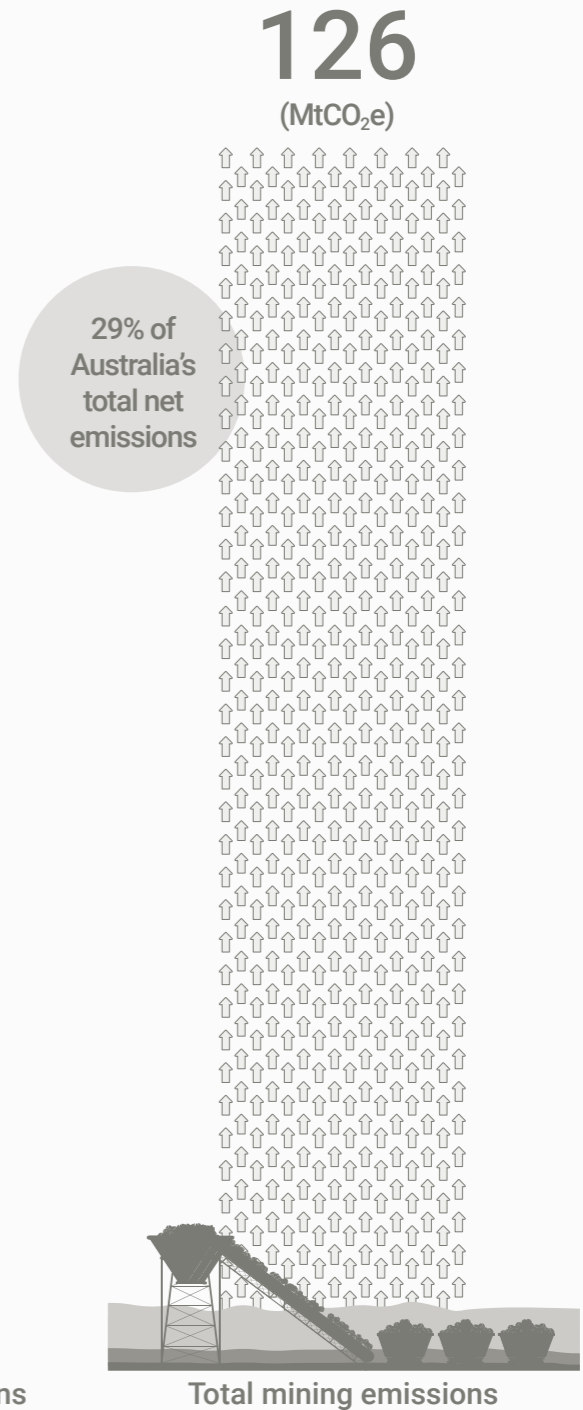
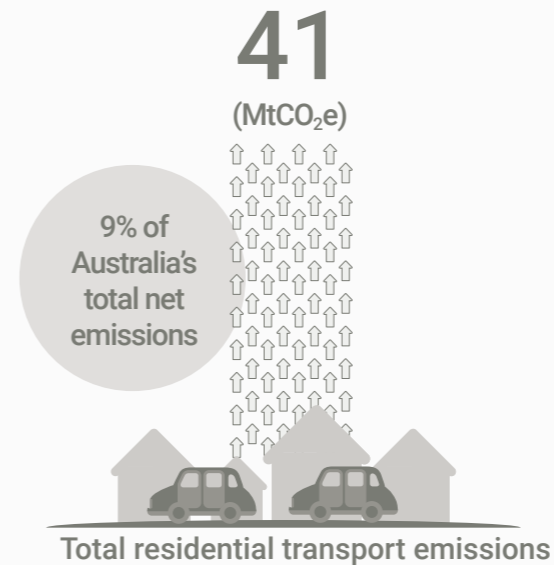
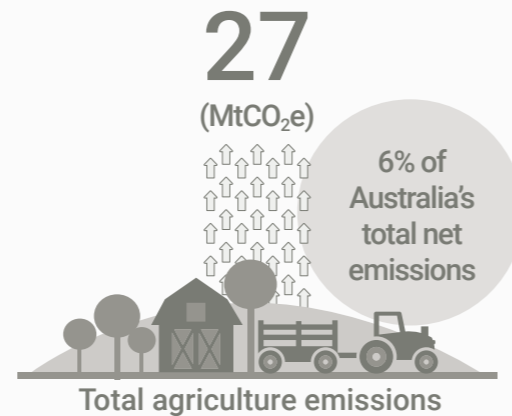
Decarbonisation isn't just about meeting climate goals - it's about securing a better future for all Australians. By choosing an ambitious pathway we can:

- **Accelerate climate action**
Supporting Australia's climate goals by becoming one of the only industries to remove more carbon than it emits well before 2050.
- **House the nation**
Scale up timber production to provide even more of the materials needed for future housing demand.
- **Drive economic resilience**
Strengthen a vital industry that employs thousands and creates opportunities across Australia.
- **Grow our future**
For every 1,000 Ha of new forest plantation, 0.4 MtCO₂ is stored long term in the forest.

Emissions at a glance

We are a low emissions industry releasing a net 1.4 million tonnes of carbon dioxide equivalent (MtCO₂e) into the atmosphere in 2023 - around 0.3% of Australia's total net emissions. By comparison, Australia's mining emissions are roughly 90 times greater, representing almost 30% of Australia's net emissions.

But, what sets this sector apart is that we can reduce emissions internally rather than just relying on offsets in other industries. We also have the capacity to remove more carbon from the atmosphere than it emits. This means its potential extends beyond merely reducing net emissions to zero, highlighting its valuable role in supporting Australia's climate ambitions.



The forest and wood products industry is in a strong position to decarbonise

Australia's sustainably managed forests are carbon vacuums. They pull CO₂ from the air, storing it in trees as they grow and ultimately in long-lived wood products. This puts our industry at a significant advantage in the journey towards net zero and beyond.

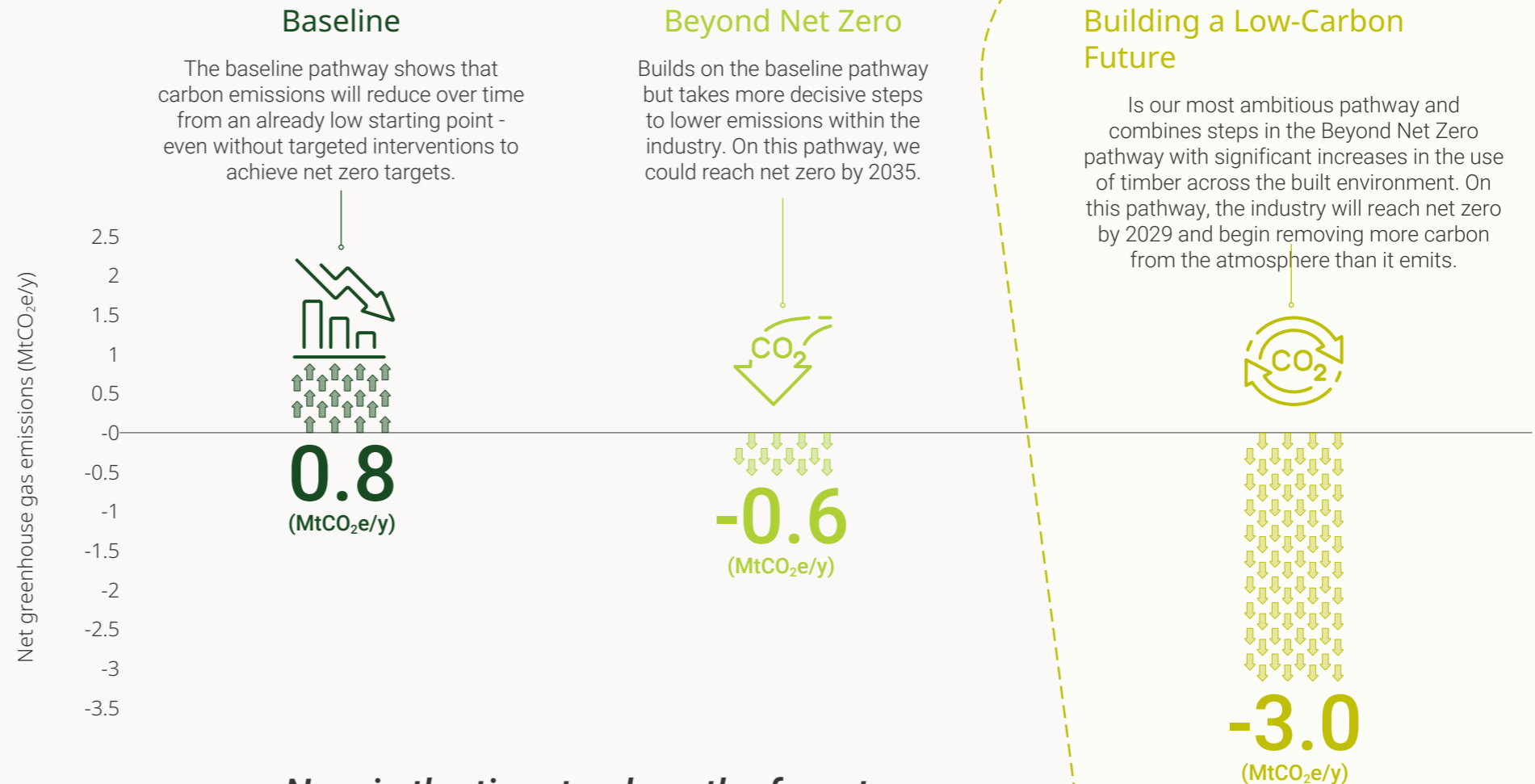
With the right policy settings, industry support, and sustainable initiatives such as using forestry wood waste for bioenergy, this industry could reach net zero as early as 2029. The forest and wood products industry is one of the few industries with a clear pathway to net zero and beyond.

Choose the best path forward for Australia

All three pathways lead to strong outcomes for Australia's broader climate ambitions and for the forest and wood products industry. However, Building a Low-Carbon Future represents the industry's best opportunity to lead boldly, achieving better-than-net-zero emissions well before 2050.

By following our Building a Low-Carbon Future pathway, the forest and wood products industry can take a lead role in Australia's decarbonised economy, support critical national priorities, and provide long-lasting benefits for future generations.

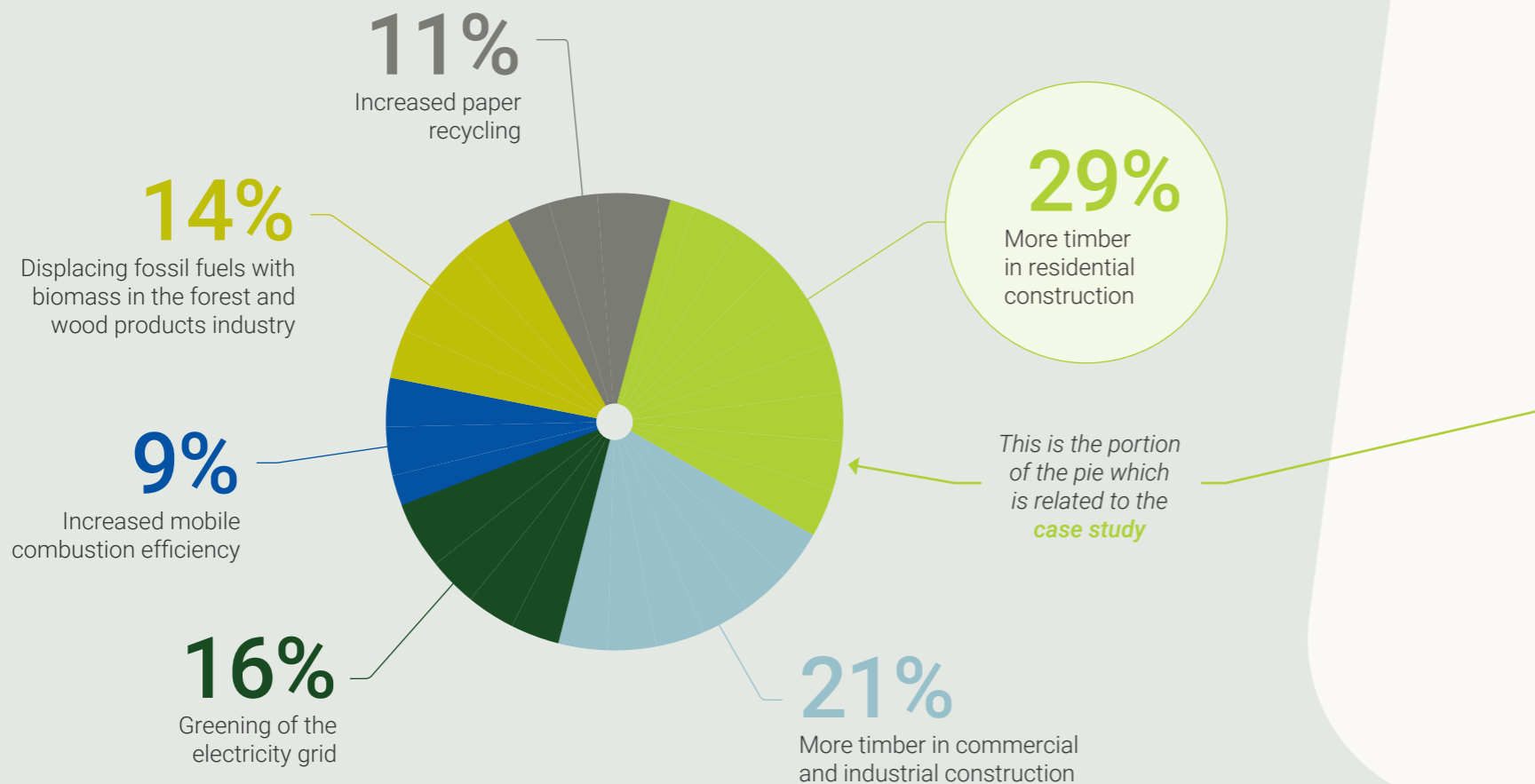
On these pathways, by 2050:



Now is the time to place the forest economy at the heart of Australia's sustainable future.

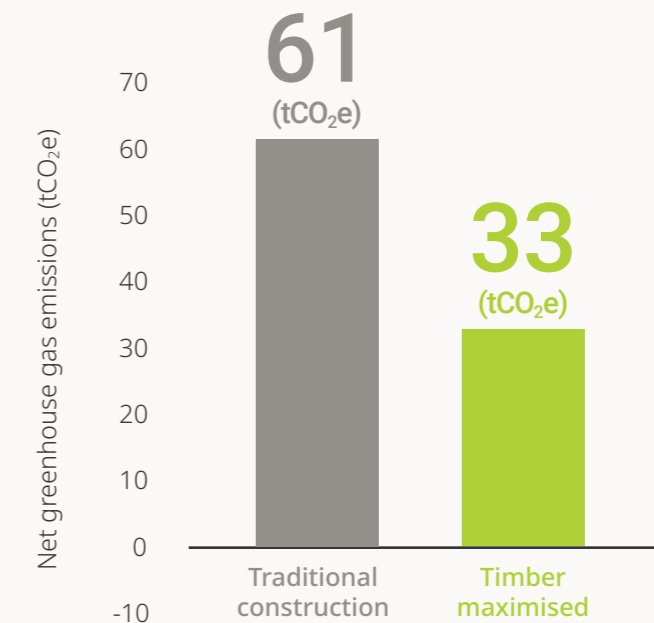
Breakdown of emissions savings

In 2050, net emissions under Building a Low-Carbon Future are 3.8MtCO₂e per year lower than in the Baseline Pathway. This is achieved by substituting fossil fuels with low-carbon energy sources, increasing paper recycling, and increasing the amount of timber used in construction. The pie graph below shows the breakdown of this 3.8MtCO₂e/y improvement.



Low-carbon construction

This **case study** considers emissions used in the construction of traditional single-storey houses (e.g. houses built with concrete and steel materials) and the difference in emissions in the same houses when more timber is used⁽¹⁾. Using more timber in residential construction is a key component in Building a Low-Carbon Future.



⁽¹⁾ [researchgate.net/publication/257679940_Quantifying_the_greenhouse_benefits_of_the_use_of_wood_products_in_two_popular_house_designs_in_Sydney_Australia](https://www.researchgate.net/publication/257679940_Quantifying_the_greenhouse_benefits_of_the_use_of_wood_products_in_two_popular_house_designs_in_Sydney_Australia)

Introduction

Quantifying carbon in the forest and wood products industry

Australia's forest and wood products industry plays a significant role in helping meet the nation's climate targets by managing sustainable forests and enabling the production of wood products, both of which store carbon over the long-term.

Because forests pull carbon out of the air as they grow, and wood products lock that carbon away long-term, the forest and wood products industry can remove more carbon from the air than it emits.

This study analyses the carbon profile of Australia's forest and wood products industry, looking at its sequestration, fossil fuel emissions, and biogenic emissions⁽¹⁾. It evaluates three pathways - **Baseline**, **Beyond Net Zero**, and **Building a Low-Carbon Future** - to explore how targeted actions can drive the industry to net zero before 2050.

Scope and boundaries of the study

This study takes a industry-wide, whole-of-life approach, evaluating sequestration and emissions from:

- Commercial forestry
- Solid wood products
- Paper and packaging
- Disposal of wood-based products

The geographic boundary of the study is Australia and includes the flows of imported and exported wood products across the border.

Methodology overview



⁽¹⁾ Biogenic emissions refer to greenhouse gas emissions (like carbon dioxide) that originate from the natural carbon cycle, specifically from biological sources such as plants, trees, and other organic matter.

Understanding our starting point

The following section is a look at the industry's current carbon balance outlining how much carbon is removed, released, and locked away long-term.

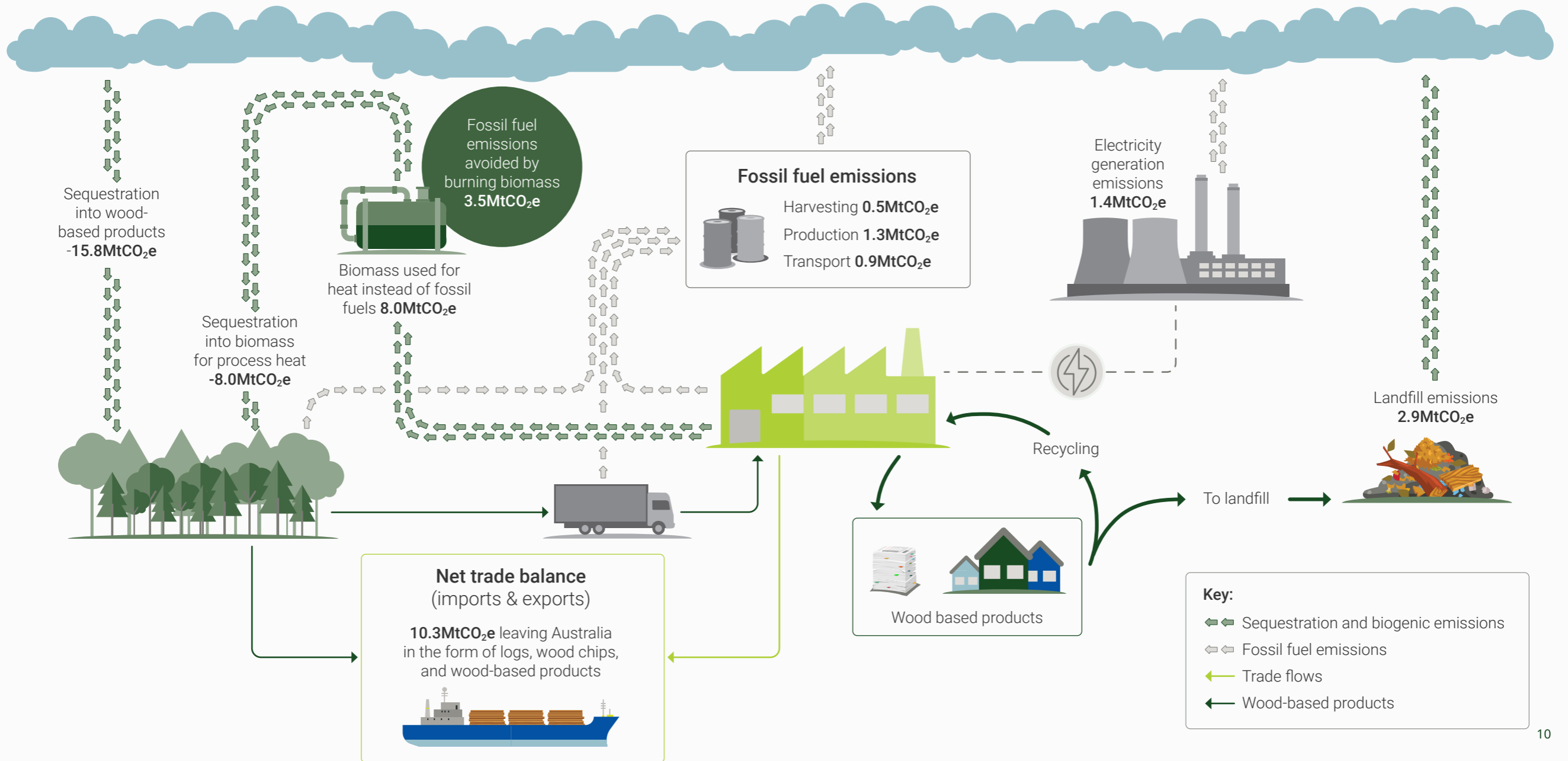
To calculate the baseline, we worked closely with industry to gather energy intensity data specific to each group (forestry, solid wood products, paper and packaging, etc.), which we then applied to the total estimated production for Australia. These domestic production figures were based on 2023 harvesting and production data from ABARES (Australian Bureau of Agricultural and Resource Economics and Sciences).

The modelling considered the whole life cycle of harvested wood, following its journey from growing trees through processing, use, and eventual disposal. Recycling and reuse rates for solid wood products, as well as paper and packaging, were also incorporated to reflect current practices.

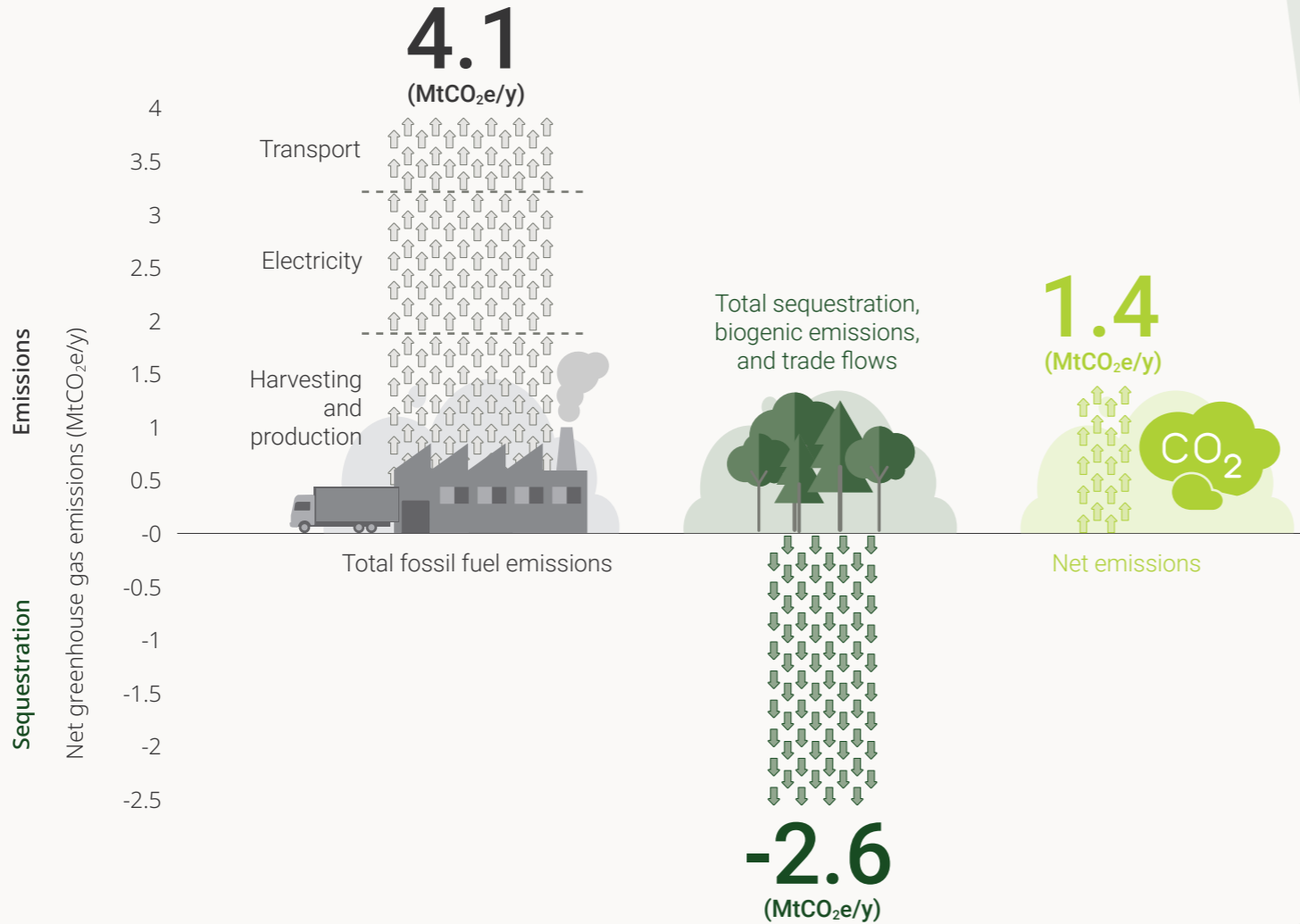
This analysis was only possible through the direct participation of the industry. Many contributors dedicated significant time and effort, sharing detailed energy use data without which we could not have completed this study.



2023 Carbon flows overview



Carbon flow totals

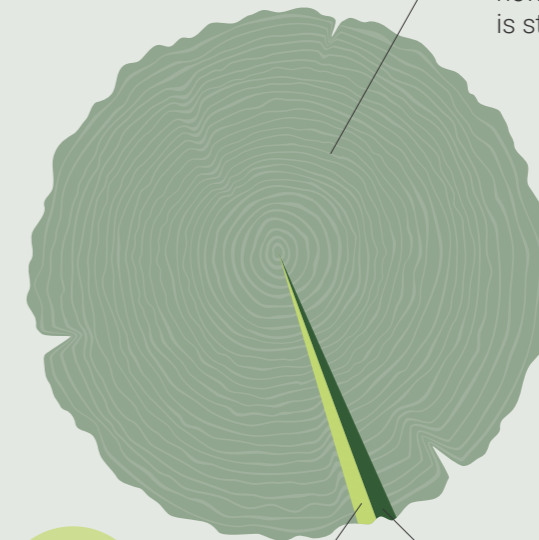


Carbon stocks

Carbon is stored in wood in all its forms, serving as nature's carbon bank. Wherever wood exists, whether in thriving forests, products in everyday use, or materials reaching the end of their lifespan, it retains carbon captured from the air.



Managed native production forests and commercial plantation forests currently store **14,263 MtCO₂e**. For every **1,000 Ha** of new forest plantation, **0.4 MtCO₂e** is stored long term.



Wood products in landfill currently store **290 MtCO₂e**



Wood products in use currently store **326 MtCO₂e**



Three pathways for carbon outcomes

The baseline assessment tells us that our industry is already delivering very well for Australia, balancing the emissions as a result of wood processing and disposal against the substantial amount of carbon being removed from the atmosphere through sequestration. In the next section we explore three future pathways for the Australian forest and wood products industry.

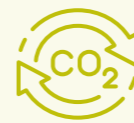


Baseline: Reflects ongoing operations with no significant strategic changes. This pathway shows a continuing fall in emissions from the already low baseline, predominantly driven by changing market conditions.



Beyond Net Zero: Builds on the Baseline pathway but shows how the industry can further cut emissions. This can be achieved by using biomass (organic material such as wood and wood waste), which is a renewable resource, as a carbon-neutral fuel in wood processing facilities to replace fossil fuels.

Additionally, the pathway assumes that the Australian Government achieves its targets for decarbonising the electricity grid, allowing the forest and wood products industry to benefit from less carbon-intensive electricity.



Building a Low-Carbon Future: Combines emissions reductions and an increase in the use of wood products. An increase in the use of timber in houses, offices, and factories means the industry is contributing to more removal of carbon than it generates while providing materials needed for construction.

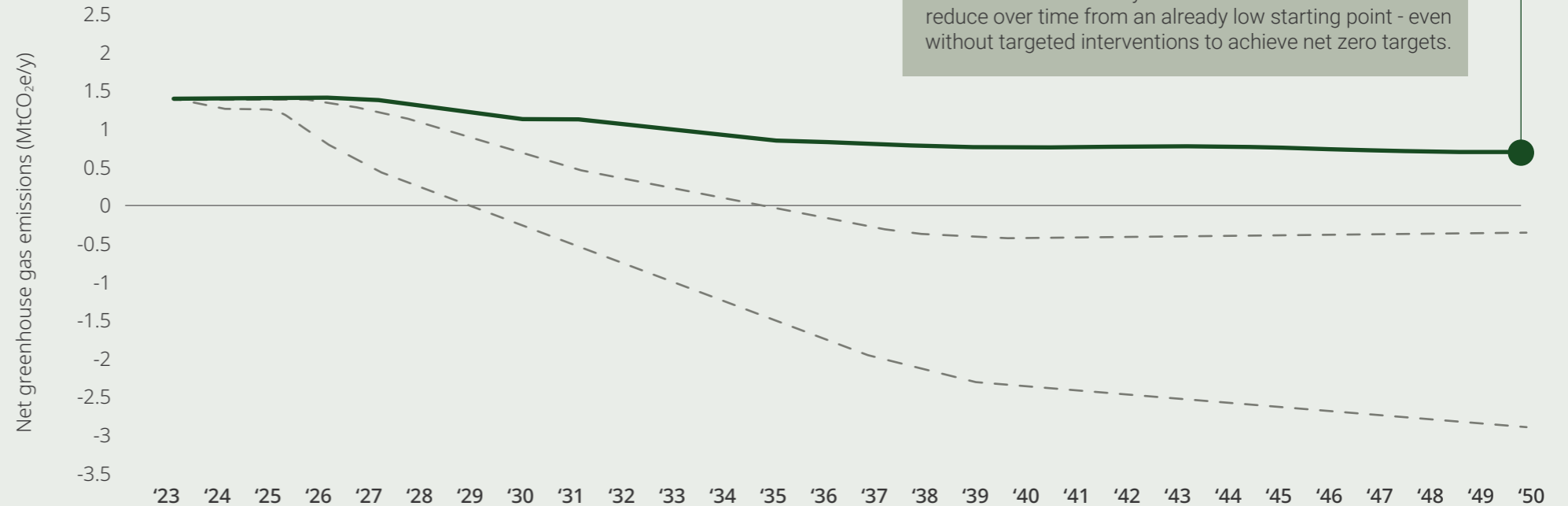
Baseline Pathway

This pathway shows how the industry's net emissions are expected to change through to 2050, based on current trends and practices without targeted interventions.

It shows steady reductions in net emissions over time, largely driven by broader national trends. A key driver is Australian Bureau of Statistics (ABS) household projections, which reflects the changing nature of the housing market. For example, there will be less detached housing in favour of more multi-residential homes which currently use less timber. Because of this, the forest and wood products industry will likely produce less and therefore release fewer emissions.

By 2050, the slight decline in housing construction along with other factors such as cleaner electricity are expected to reduce the industry's net emissions by 0.6 MtCO₂e/y compared to 2023. This is equivalent to the annual electricity use of 100,000 households.

While this pathway reflects continued emissions reductions, it is happening because the industry is expected to produce less. This may have wider implications, particularly for regional economies or rural areas where the industry provides stable jobs and helps the community financially.



Other factors affecting a decrease in emissions:

Renewable energy

As Australia's electricity grids continue to decarbonise, operations like processing and manufacturing wood products benefit from lower energy-related emissions.

Efficiency improvements

Transport fleets, machinery, and other operational equipment are becoming more efficient over time, leading to gradual reductions in emissions from harvesting, transportation, and production.

Recycling and reuse

With steady progress in recycling rates and practices, fewer wood, paper, and packaging products are sent to landfill, reducing emissions at the disposal stage.

Beyond Net Zero Pathway

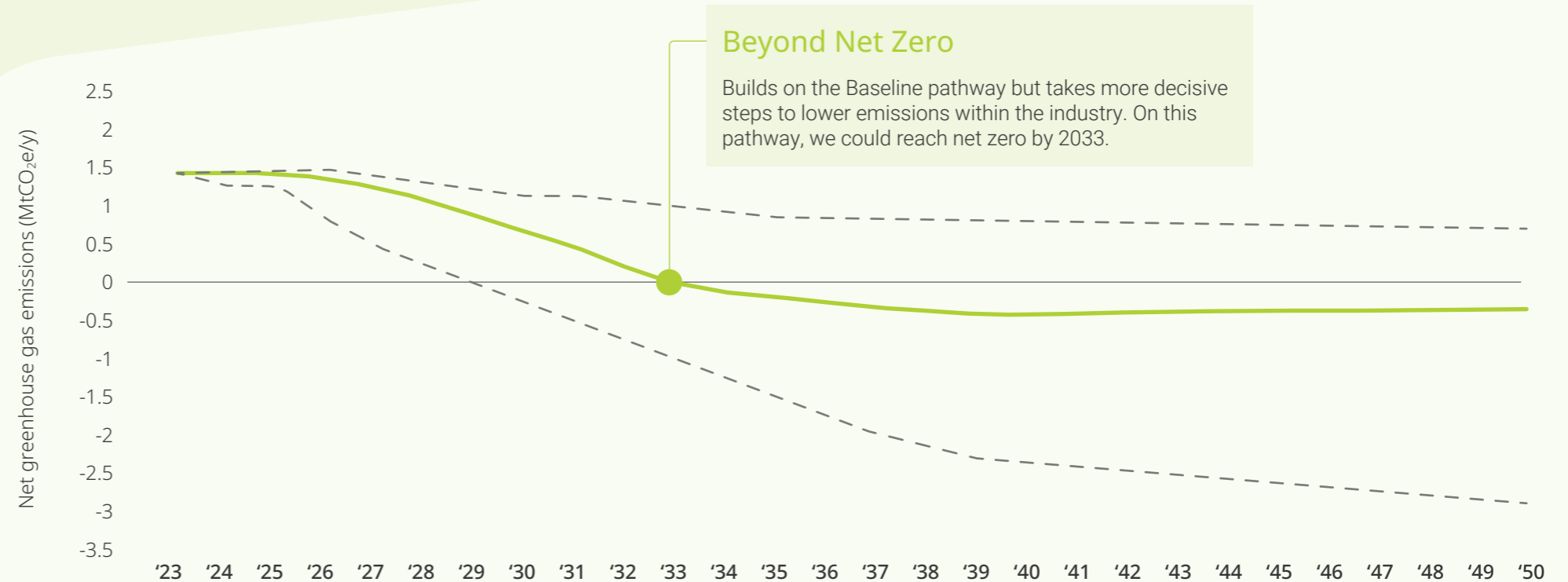
A practical route to net zero and beyond

The Beyond Net Zero pathway outlines how the industry can reach net zero by 2033 and start removing more carbon from the atmosphere each year than it emits. Targeted interventions and supportive government policies can help the industry contribute to Australia's ambitious climate goals, delivering results beyond the reach of other sectors.

The key to cutting emissions in this plan is replacing at least half of the natural gas and coal used in wood processing facilities with biomass (e.g. wood residues) by 2050. This approach maximises the use of renewable resources, such as forestry residues, which might otherwise go unused. Here's how it can be achieved:

- Using biomass boilers which use heat from the burning of biomass to create energy rather than the burning of fossil fuels, and
- Improving recovery of biomass that would otherwise go to waste.

This pathway is realistic and achievable. It builds on the industry's natural strengths in sustainable forestry, renewable materials, and wood handling.



Other factors driving a reduction in carbon emissions on this pathway include:

Cleaner energy from the grid

Like most manufacturing industries, the forest and wood products industry requires energy for product transformation. As Australia transitions to cleaner energy sources, wood processing operations will benefit from lower-carbon electricity over time.

Innovations in transport

Emissions from heavy machinery and transport fleets can be reduced through fuel efficiency improvements and by adopting hybrid or diesel-electric technologies.

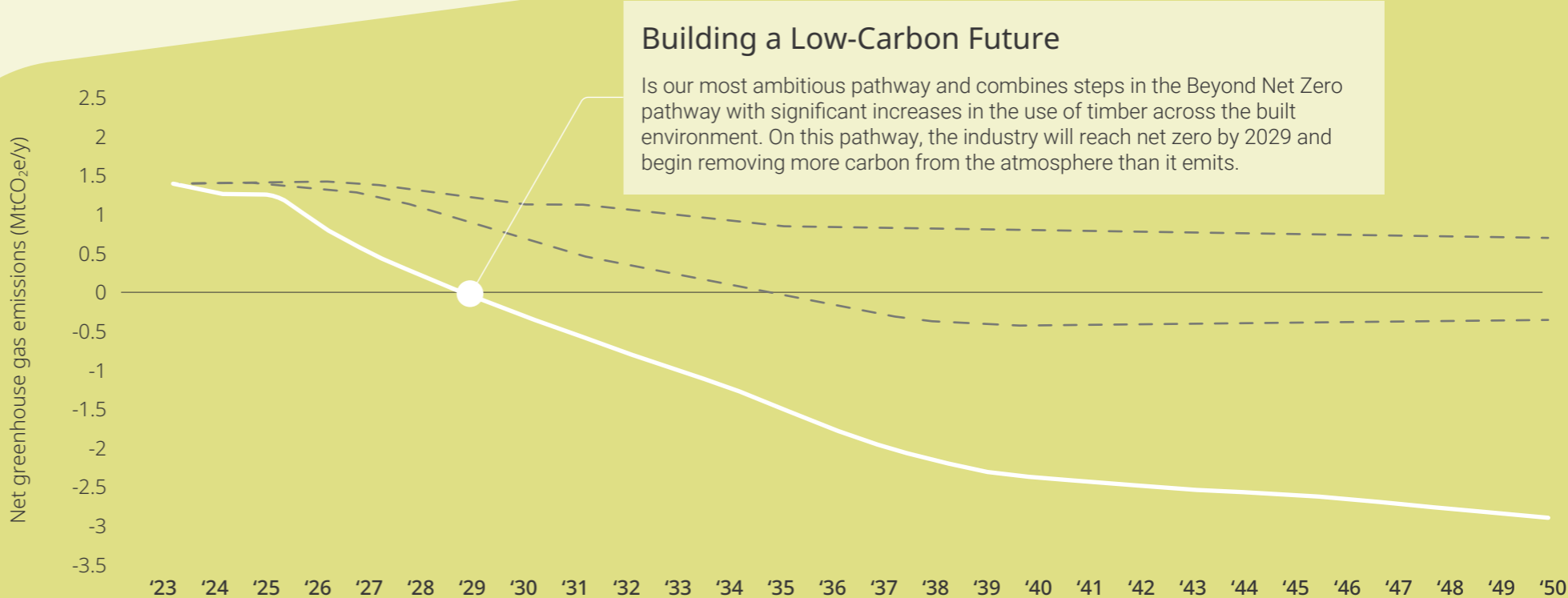
Recycling and circular economy growth

By recycling and reusing more wood and paper, we reduce emissions from product disposal.

Building a Low-Carbon Future


The lifecycle of wood-based products in the previous pathway, from growing trees right through to end of life, removes more carbon from the atmosphere than it releases. On the Building a Low-Carbon Future pathway, we increase the use of wood products in our homes, offices, and factories to speed up this carbon vacuum.

The more wood products are used, the more trees are grown and regrown, the more carbon is captured and stored, making it a powerful solution for combating climate change while housing the nation.



By increasing the use of wood products, Building a Low-Carbon Future offers a practical and scalable approach to supporting Australia's climate goals while contributing to the homes and buildings we live and work in every day.

It's time to put wood products, and the forests that create them, at the heart of Australia's sustainable future.

A row of large rolls of white paper or fabric in a factory setting. The rolls are stacked and extend into the distance, creating a sense of depth. The lighting is bright, highlighting the texture of the material.

Going Beyond Net Zero requires supportive policy

To make this pathway work, supportive policy changes are important. Key areas for consideration include:

- **Incentives for biomass use**

Policies that encourage the adoption of biomass technology, making it easier for companies to make the switch to bioenergy. This will help them stop using fossil fuels and consider the use of wood waste and other renewable materials instead.

- **Innovation and research and development (R&D) funding**

Research into advanced wood processing and energy-efficient technology will unlock new ways to reduce emissions and maximise the value of renewable resources.

- **Cleaner transportation**

Helping companies to switch to low-emission trucks and heavy machines.

- **Better regulation**

By removing regulatory roadblocks like building with timber maximised solutions.

These targeted interventions could provide the framework for success - not just for the forest and wood products industry, but for other industries too as Australia shifts toward a cleaner, low-carbon future.

The forest and wood products industry is the only major industry that has a practical pathway to remove more carbon from the air than it emits, helping Australia to meet its climate goals.

***But the journey doesn't stop here.
We can do even more!***

To build a low-carbon future we need to use more wood

Building a low-carbon future rests on the following foundations:

- Expand our existing contribution as the major building material provider for Australian housing. By 2050, more than a third of all new houses and townhouses are built using **'timber maximised' designs**, significantly increasing the amount of carbon stored in residential construction.
- By 2050, **more than 10 per cent of all new multi-residential, commercial, and industrial buildings** use mass timber construction, such as cross-laminated timber (CLT) and glue-laminated timber (GLT).
- Innovative technologies are able to be scaled up which enables low-grade logs to be converted into structural engineered wood products.

By embracing more timber and engineered wood products in construction, we also unlock opportunities to:

- **Create sustainable housing options**
Using renewable materials like timber enhances the sustainability of the homes and buildings we create.
- **Contribute to national climate leadership**
Highlighting timber's potential showcases Australia's commitment to innovative and renewable solutions.

This pathway leads to net emissions of **-3MtCO₂e/y** by 2050, **3.8MtCO₂e/y** lower than the Baseline Pathway.



This is equivalent to the electricity use of **830,000** households! And with the right policies, innovative ideas, and strong collaboration, timber use could expand well beyond these projections to deliver even more carbon removal for Australia.

Growing our future

For every **1,000 Ha** of new forest plantation, **0.4 MtCO₂e** is stored long term. By establishing new softwood plantations, the industry can increase the long-term average carbon stock in plantation forests and strengthen the industry's ability to meet future timber demands.

A clear pathway to climate leadership for Australia

By significantly increasing the amount of wood products used through the nation's forest economy, we can unlock its full climate potential. Every timber floor, recycled cardboard box, panel, or beam is a practical opportunity to fight climate change and provide sustainable, renewable solutions for Australian communities.



Call to action

Australian wood industry members, we have a collective responsibility to drive sustainable change and secure a net zero future for Australia. The Beyond Net Zero pathway demonstrates our industry's potential to lead the way. Let's collaborate to implement these strategies, leverage government support, and showcase the Australian wood industry's commitment to this future.

Join the movement and play your part in achieving Australia's climate goals.



Methodology

Data sources

The study was built using a combination of data from industry stakeholders, statistics from the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), the Australian Bureau of Statistics (ABS), and assumptions aligned with the Australian National Inventory Report's 'Harvested Wood Products' section. Wherever practical, methodologies were made consistent with these established reporting practices.

Industry engagement

The study group engaged with member organisations from Forest & Wood Products Australia (FWPA), Australian Forest Products Association (AFPA), and Engineered Wood Products Association of Australasia (EWPAA). Contributions included sharing data on production, energy demand, and materials, as well as participating in two key advisory groups:

- **Technical Working Group (TWG):** 22 representatives provided technical input.
- **Steering Committee (SteerCo):** 7 representatives guided high-level decisions.

This collaboration ensured the study reflected real industry conditions and practices.

Carbon and material flows

To create a credible carbon footprint for the industry, the baseline used the principle of carbon balance. This accounted for carbon sequestered in forests, emissions across the supply chain, and at product end of life.

Harvested logs were categorised into pulplogs, sawlogs, and veneer logs based on industry averages. Log production from plantation forests was estimated using sustainable yield data derived from ABARES, and log production from native forests came directly from ABARES based on the most recent year's data.

The carbon in these logs was tracked through the value chain until and including end of life.

Biogenic emissions from degradation and combustion of wood and wood-based products were included, adjusting for any carbon retained in long-term stocks.

To align with national carbon stock calculations, imported products were credited for their embedded carbon, and exported products had their carbon removed from the national stock.

This approach ensured that no carbon went unaccounted for – every tonne of carbon flowing from the atmosphere into logs was traced through till its eventual release, transfer out of the country, or move to a long-term stock.

Industry data use

Data shared by industry representatives allowed the study to calculate average energy intensities from various energy sources, as well as select material quantities and transport emissions per tonne or cubic metre of raw material going through the industry. The use of average intensities per unit of input was chosen to allow these emissions to be scaled up or down based on changing production levels in the forward projections.

Using this industry data ensured that each industry was represented as accurately as possible both in the baseline, and in the projected pathways.

Forward projections

Starting from the established baseline, domestic consumption and production pathways were created for each product. For the baseline year, domestic consumption was calculated as production plus imports minus exports for every product.

With input from the Technical Working Group (TWG) and Steering Committee (SteerCo), forward indexes for each product were developed to project future trends. Wherever possible, these indexes were based on official projections from trusted sources. For instance, structural timber consumption was modelled using household projections from the Australian Bureau of Statistics (ABS). The index was

then adjusted to account for the fact that not all structural timber is used in residential applications - some is allocated to commercial and industrial uses.

Once forward consumption pathways were established for each product, corresponding production pathways were created. This process involved close industry engagement through data submissions and guidance from TWG participants. Using the difference between domestic consumption and production pathways, future imports and exports for each product were calculated.

The projected production volumes for each product were then used to determine log demand over time. To calculate domestic log production, plantation forest area was held static while incorporating expected productivity improvements over time. By comparing calculated log production with log demand, the resulting difference informed log trade flows over the modelling period.

Pathway modelling

The three pathways of the study were developed by applying assumptions related to changes in market conditions, innovation and research, public and private sector decarbonisation initiatives, as well as industry long-term strategies. This allows each pathway to showcase the possible impact of a particular set of assumptions.

The **Baseline** pathway was modelled using the principles described above in 'Forward Projections' without any additional interventions. A modified, more conservative version of Department of Climate Change, Energy, the Environment and Water (DCCEEW)'s electricity grid decarbonisation pathway in 'Australia's emissions projections 2024' was adopted. Minor improvements to sustainable log yields and incremental improvements to mobile and stationary fuel combustion efficiency were also incorporated.

The **Beyond Net Zero** pathway was built on top of the assumptions from the **Baseline** pathway, adding intra-industry initiatives to convert coal and gas boilers to burn biomass, improve recovery of forestry wood waste, and establish a supply chain for biomass to feed the converted boilers. Additionally, this pathway used the un-modified electricity grid decarbonisation pathway from DCCEEW's 'Australia's emissions projections 2024', assuming sufficient funding and policy pressure would accomplish the planned grid decarbonisation.

The **Building a Low-Carbon Future** further built on the **Beyond Net Zero** pathway, adjusting the projected housing commencements to contain a larger proportion of wood, as well as modelling mass-timber implementation in new commercial and industrial buildings. This results in a significant increase to structural timber demand within the pathway. In order to meet these levels of production, advanced wood processing industries were added to the pathway, establishing the ability to produce structural-quality timber from lower grade logs.

Intergovernmental Panel on Climate Change (IPCC) emission factors

While the modelling aimed to broadly maintain alignment with the Australian National Greenhouse Accounts (NGA), the study group decided to replace the overly conservative NGA default factors for degradation of wood and paper products with more specific IPCC-adopted values, based on Australian research. The NGA default factor has 10% of carbon in wood being degradable in landfills. In contrast, the more specific IPCC factors have only 1.4% of carbon in wood being degradable in landfills.

Climate change-related considerations

No modelling was undertaken to factor in the possible impacts on harvest quantities or forest areas resulting from climate-related events such as increased rates and magnitudes of wildfires or severe storms, or higher atmospheric CO₂ levels leading to changes in forest productivity.

