Climate action in Tasmania

A Submission on Tasmanian Government's Draft Emissions Reduction and Resilience Plans for the Energy, LULUCF, Agriculture, and IPPU sectors

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UNIVERSITY of TASMANIA

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Acknowledgment of Country

The University of Tasmania pays its respects to elders past and present, and to the Tasmanian Aboriginal community that continues to care for Country. We acknowledge the profound effect of colonial settlement on this Country and seek to work alongside Tasmanian Aboriginal communities, respecting their deep wisdom and knowledge as we do so. The palawa/pakana belong to one of the world's oldest living cultures, continually resident on this Country for 42,000 years.*

We acknowledge this history with deep respect, along with the associated wisdom, traditions, and complex cultural and political activities and practices that continue to the present.

The University of Tasmania also recognises a history of truth that acknowledges the impacts of invasion and colonisation upon Aboriginal people and their lands, resulting in forcible removal, and profound consequences for the livelihoods of generations since. The University of Tasmania stands for a future that profoundly respects and acknowledges Aboriginal perspectives, culture, language and history, and continued efforts to realise Aboriginal justice and rights, paving the way for a strong future.

* Members of the Tasmanian Aboriginal community identify with a range of terms, including palawa, pakana, Pallawah, Aboriginal, Aborigine, Indigenous, Traditional Owners, First Nations, and First Peoples. In this report, we use the term Tasmanian Aboriginal people and communities, while recognising that there are several other ways Tasmanian Aboriginal people may choose to refer to themselves.

Acknowledgments

We would like to acknowledge the numerous colleagues from across the University and partners who have contributed to this Submission and the TPE's climate change research and policy analysis which underpins it.

The University of Tasmania is No. 1 for Climate Action

The University of Tasmania is committed to promoting ambitious, evidence based climate action, and has been voted the No. 1 university globally for Climate Action in the Times Higher Education Impact Rankings for three years running, from 2021 to 2023.

About the Tasmanian Policy Exchange

The Tasmanian Policy Exchange (TPE) was established in 2020 to enhance the University's capacity to work with government and community partners to make timely and informed contributions to policy issues and debates which will shape Tasmania's future.

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The TPE's recent policy analysis includes:

- Tasmanian forests and the carbon market: Barriers and opportunities (August 2024)
- Tasmanian greenhouse gas emissions update (June 2024)
- Modelling Australia's bushfire emissions (February 2024)
- Energy in Tasmania: Submission to the Legislative Council Inquiry into Energy Prices in Tasmania (October 2024)
- Shaping a strategic partnership for Western Tasmania
- Cutting Tasmania's transport emissions

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The views expressed in this submission are the views of the authors, and not necessarily the views of the University of Tasmania.

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Executive Summary

The University of Tasmania is committed to supporting ambitious, evidence-based climate action informed by scientific targets. To this end, we have engaged deeply with the development of Tasmanian climate policy over several years and support the broad aims of Tasmania's *Climate Change Action Plan.*

Having previously prepared a detailed submission on the draft Emissions Reduction and Resilience Plan (ERRP) for the Transport Sector, this submission draws on our recent research and analysis to present priorities for the Energy, IPPU, Agriculture, and LULUCF sectors, which together account for approximately 78% of Tasmania's absolute emissions.

There is a need for urgent climate action and a more concerted, systematic approach to emissions reduction in Tasmania. The reality is that Tasmania's absolute emissions (excluding LULUCF removals) haven't declined over the past 30 years, putting at risk our 'net-zero' status and reputation for being a leader on climate action. Perhaps more importantly, unless we can achieve meaningful progress toward the decarbonisation of the Tasmanian economy over the next five years and provide the additional renewable electricity this will require, there is a very real risk of significant decline in energy-intensive industries.

Given the urgency of the transition to a zero-emissions future and the profound environmental, social, and economic consequences of failing to act, all ERRPs should include clear sectoral emissions reduction targets to increase accountability and measure progress. Consistent with international reporting standards (ISSB) and recent Commonwealth legislation, emissions from all major Tasmanian firms and operations should also be reported as part of the ERRP process. In summary, we must commit to clear targets and greater transparency.

Drawing on extensive research and analysis, this submission identifies a number of abatement priorities for the Energy, IPPU, Agriculture, and LULUCF sectors. Specific priorities include:

- **Energy:** There is an urgent need to increase renewable energy generation in Tasmania to support the decarbonisation of the Tasmanian economy and low emissions industries of the future (Section 2).
- **IPPU:** Industrial emissions are difficult to abate but the development of innovative biofuels from sustainable carbon sources could reduce energy and industrial emissions in Tasmania and beyond. The development and production of such fuels can also become a major industry in its own right (Section 3).
- **Agriculture:** Support the development and deployment of *Asparagopsis* feed supplements to reduce livestock emissions (which account for almost 25% of Tasmania's total emissions). The development and production of *Asparagopsis* supplements in Tasmania could become a significant green industry in its own right (Section 4).
- **LULUCF:** Tasmania is enjoying a carbon windfall from the significant expansion of the hardwood plantation estate in the late 1990s and early 2000s and the decline of our native forest harvest. The challenge now is to maximise carbon storage in our forests, expand the plantation estate where appropriate, and maximise soil carbon sequestration. Where possible, credible carbon credits (ACCUs) should be used to support these initiatives (Section 5).

Tasmania's ERRPs are innovative in that they promote both sectoral emissions reduction *and* resilience within these sectors in the face of climate change. To this end, important programs to assess and respond to the impact of climate change on communities, the natural environment and agricultural systems have been established, although there is much work to do.

The somewhat neglected area of resilience planning which requires urgent attention is the inevitable and significant impact of decarbonisation on the Tasmanian economy and communities that depend on it. The implications of the transition from fossil fuel-dependent economy to a low-carbon future over the next two decades will be profound and will pose both challenges and opportunities. Yet many Tasmanians are apprehensive about, or even hostile towards, renewable energy projects due to a lack of timely community engagement and credible information about options, alternatives and opportunities associated with the transition to a low emissions future.

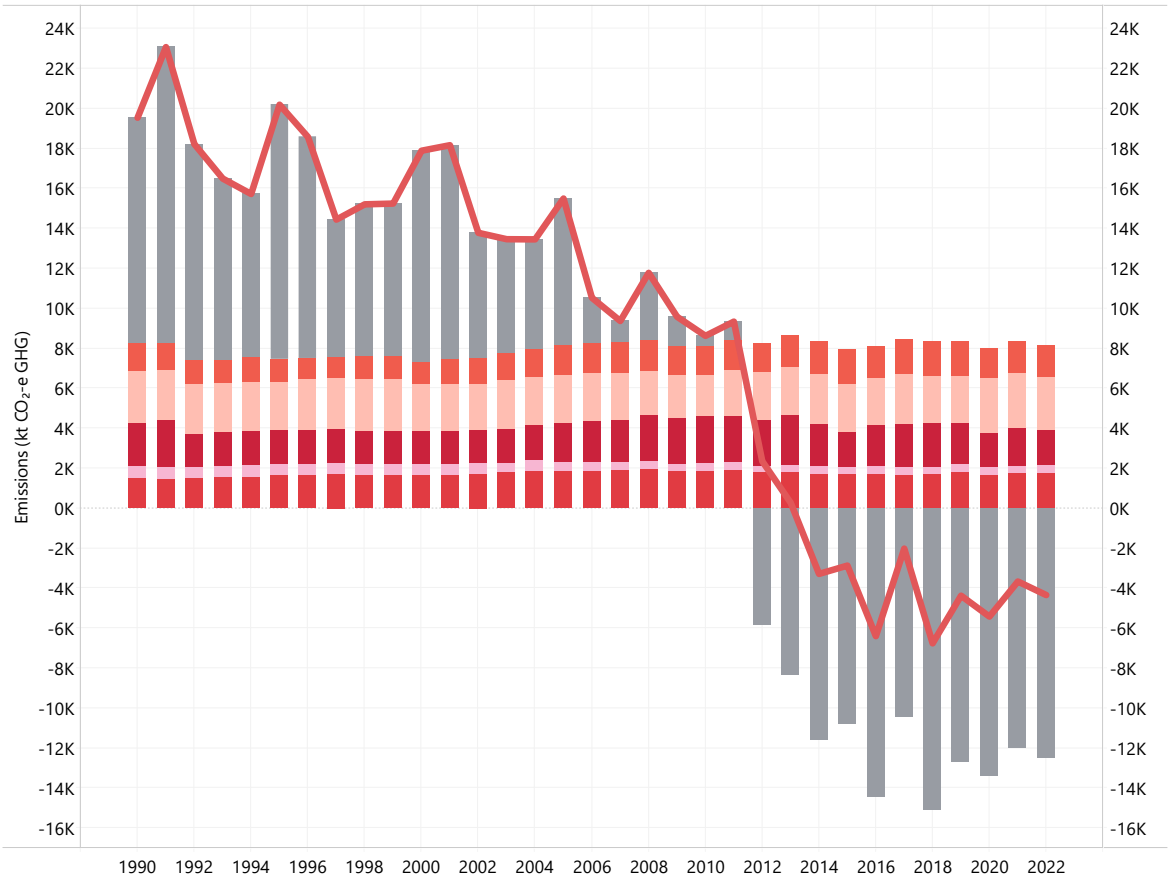
International evidence and our research suggest that successful socioeconomic transformations depend on empowering and informing communities to actively shape their future. A new model is needed where communities, government, and industry work together as informed and equal partners to develop long-term, inclusive regional transition plans.

1 Introduction and background

Tasmania is one of the few developed jurisdictions on earth to have achieved net-negative emissions (at -4,338 kt in 2022). This enviable status is due almost entirely to our abundant forest resources and historical investment in hydroelectric power generation. While many other jurisdictions have been working hard to decarbonise, Tasmania's absolute emissions (i.e., excluding removals and sequestration) have remained unchanged for three decades. Some sectors have even increased their emissions during this time. If Tasmania is to put its emissions profile on a sustainable, environmentally responsible footing, much more needs to be done.

Tasmanian Government action on climate change is legislated via the *Climate Change (State Action) Act 2008* ('The Act'). In addition to an emissions reduction target of net-zero emissions or lower from 2030,[1] The Act requires the Government to produce Emissions Reduction and Resilience Plans for all emitting sectors every five years. We support this commitment, though we have previously argued that the urgency of the climate challenge requires the Government to go further and include legislated, science-based sectoral emissions reduction targets in addition to these plans to improve accountability and demonstrate a clear commitment to credible climate action.

Figure 1: Tasmanian Greenhouse Gas Emissions by Sector, 1990-2022. Source: Australian State and Territory Greenhouse Gas Inventories 2022

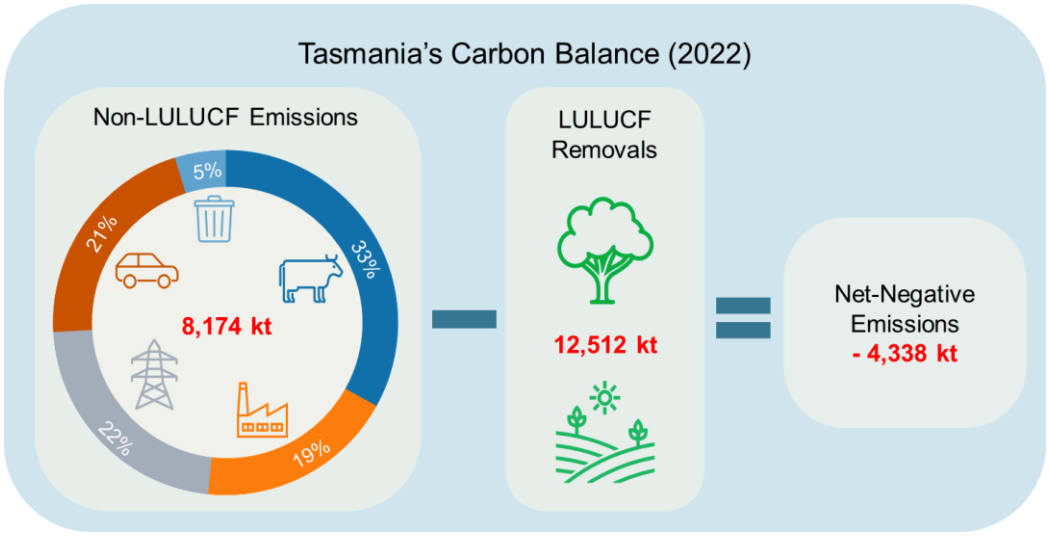


[1] It is important to note that, given Tasmania's emissions are already more than 4000 kt below net-zero, the government's legislated target actually provides ample room for the state to considerably increase its emissions, making it by far the least ambitious Australian state or territory target.

In 2022, Tasmania's absolute emissions equated to approximately 8,174 kt CO_2-e, broken down into five different sectors:

Sector	Absolute Emissions (kt CO_2-e)	Absolute Emissions (%)
Agriculture	2,697.4	33
Energy	1,798	22
Transport	1,716.5	21
Industrial Processes and Product Use (IPPU)	1,553.1	19
Waste	408.7	5
Total	**8173.7**	**100**

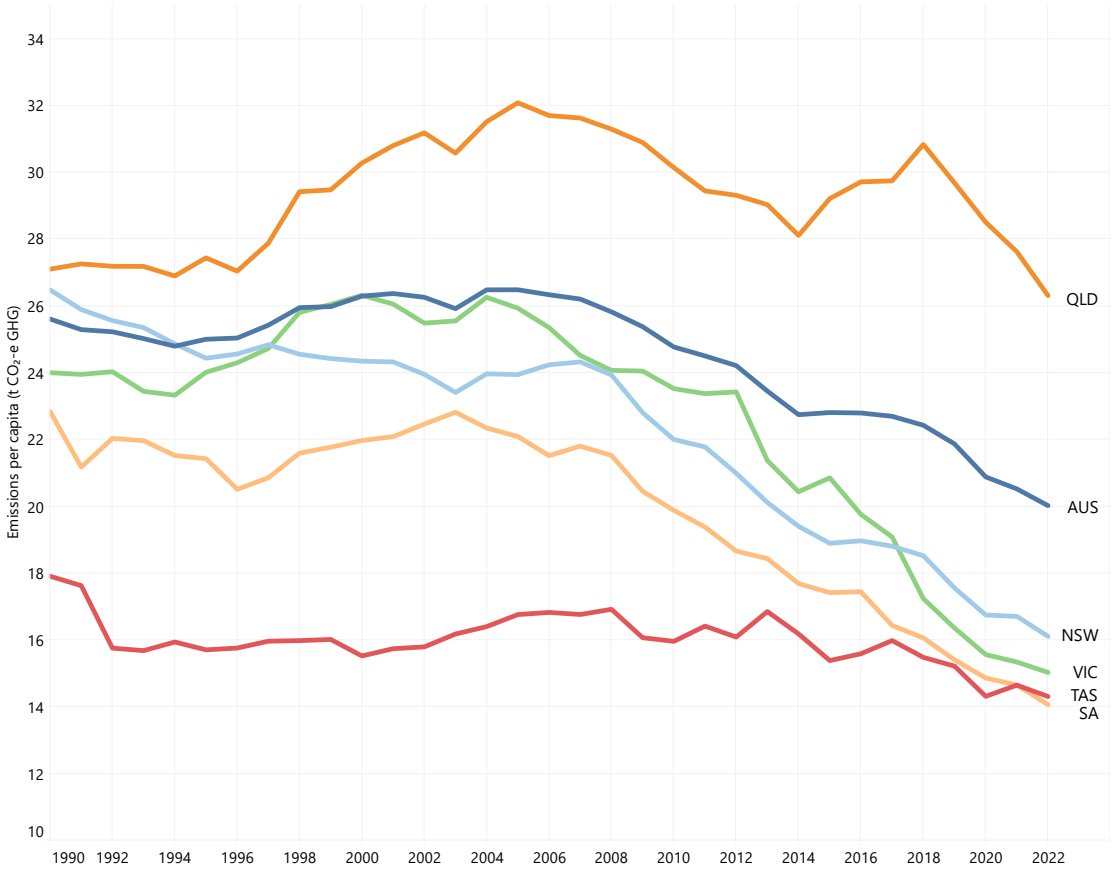
Figure 2: Tasmania's 2022 carbon balance. Source: Australian State and Territory Greenhouse Gas Inventories 2022.



The most recent *State and Territory Greenhouse Gas Inventories* reveal that, for the first time in 30 years, Tasmania has given up its lead in absolute emissions per capita to South Australia. On current trends, Victoria will overtake us in the 2023 or 2024 inventories, and New South Wales will not be far behind. Over the past 20 years, Victoria has decreased its absolute emissions per capita by 41%, South Australia has achieved a 37.4% reduction, and New South Wales a 32.8% reduction.

Over the same time period, Tasmania has managed to reduce its absolute emissions per capita by just 9.4%.

Figure 3: Absolute (non-LULUCF) emissions per capita, 2012-2022. Source: Australian State and Territory Greenhouse Gas Inventories 2022.



The approaches to sectoral emissions reduction being adopted in other states offer a number of pathways for Tasmania to improve its absolute emissions reduction performance.

In South Australia, for example, the *Climate Change and Greenhouse Gas Emissions Reduction Act 2007* empowers the relevant Minister to set binding emissions reduction targets for specific industries or enterprises, sectors of the economy, or particular communities. Additionally, the Minister may enter into a sectoral agreement with a particular person, entity, industry, or business group on a voluntary basis to help them meet their targets.

Meanwhile, Victoria has taken the approach of utilising emissions reduction pledges for emitting sectors. The Victorian *Climate Change Act 2017* requires sector pledges to include (amongst other things) a reasonable estimate of the emissions reductions that are expected to occur as a result of the actions outlined.[2] For instance, in the energy sector – the largest single source of emissions in Victoria – the Government estimates that the actions in the energy sector pledge would result in a reduction of emissions in Victoria of 2.2Mt $CO_{2\text{-}e}$ in 2025 and 3.7Mt $CO_{2\text{-}e}$ in 2030 (with total reduction across the National Energy Market of 4.1Mt $CO_{2\text{-}e}$ and 7.5Mt $CO_{2\text{-}e}$ in 2025 and 2030, respectively). The pledges have not yet taken the step of setting specific reduction targets beyond the required estimates, but they do define clear goals and actions for both government and businesses within each sector.

[2] The transport and agriculture sector pledges do not yet include this calculation.

Learning from jurisdictions like Victoria and South Australia could help make Tasmania's approach to sectoral emissions reduction not only more effective but also more transparent and accountable.

In the remainder of this submission, we apply lessons from interstate and international best practice, as well as from our own research, to the four Emissions Reduction and Resilience Plans currently open for consultation, starting with the stationary energy (i.e., excluding transport) sector.

2 Energy

Tasmania's stationary energy emissions in 2022 amounted to around 1,798 kt CO_2-e, (22% of our absolute emissions) which is relatively low both in absolute terms and on a per capita basis. Our strong performance in this sector is largely due to historical investment in hydroelectricity infrastructure, which continues to deliver a large volume of renewable electricity.

However, without investment in new renewable generation, Tasmania's edge in the stationary energy sector will decline over time. Indeed, our claims to self-sufficiency in renewable electricity are already coming under strain. In four of the past five calendar years (2019 - 2023), Tasmania was a net importer of electricity, which means that we are no longer generating enough renewable electricity on-island to meet our own needs. Electricity demand is forecast to increase in the coming decades, which means that our shortfall will only grow unless we can rapidly increase renewable generation capacity.

2.1 Where does Tasmania's energy come from?

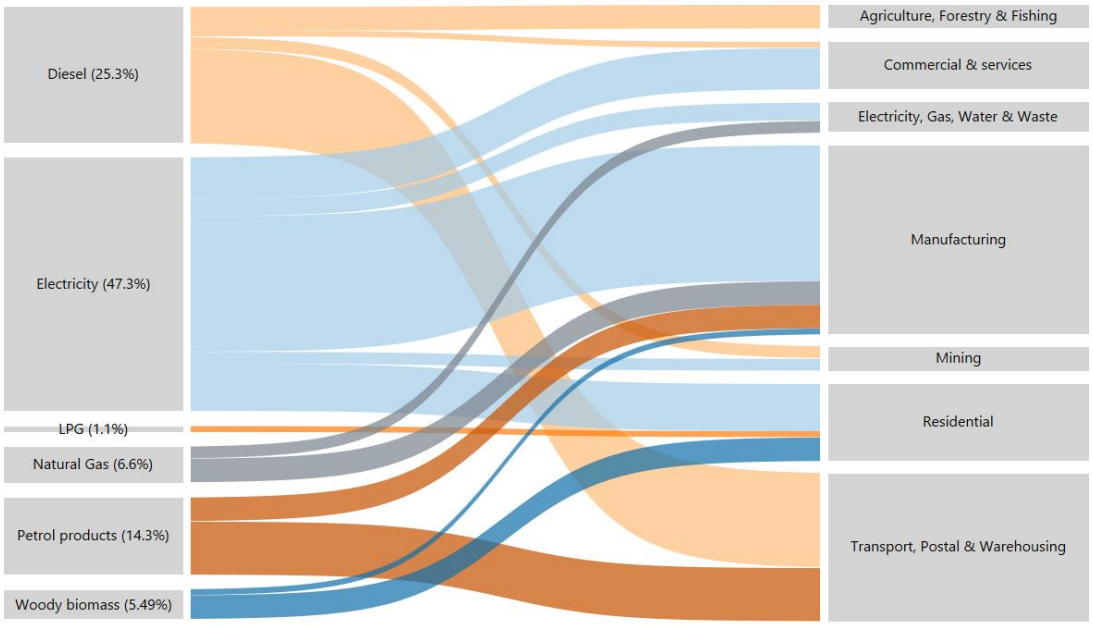
Tasmania meets most of its current electricity demand from renewable sources but most of the state's broader energy needs continue to be met from fossil fuels (Figure 4). As Tasmania transitions towards a zero emissions economy, we will require a significant increase in renewable electricity generation to replace fossil fuels and support decarbonisation. Tasmania's current energy needs are met from a wide range of sources, including:

- Diesel and petrol (39.5% of total consumption)
- Electricity (47.3% of total consumption – 32% hydroelectric and 15.3% from other sources)
- Gas (liquid natural gas and liquid petroleum gas, 7.7% of total consumption)
- Wind generation (7.1% of total consumption)
- Black and brown coal[3]
- Woody biomass (5.5% of total consumption)[4]

The manufacturing sector is Tasmania's largest energy user by some margin, with four 'major industrial' users responsible for the bulk of consumption. The second largest user is the transport, postal, and warehousing sector, which relies almost exclusively on diesel and petrol. Households rank third, using around 15% of the State's total energy and some 19% of its electricity. Further information on abatement opportunities in the transport sector can be found in our submission to the transport sector ERRP.

[3] Coal and aviation fuels are not reported by source in Figure 4 because confidentiality requirements imposed under the *Clean Energy Regulator Act 2011* and the *Privacy Act 1988* prevent publication of information that could allow the attribution of energy or emissions data to individual businesses or facilities.
[4] While some of this is used in manufacturing processes, the large share of woody biomass in Tasmania's energy mix is mostly due to our large number of residential wood heaters.

Figure 4: Energy use in Tasmania, 2021-2022. Data source: Australian Energy Statistics.



Further decarbonisation of our energy sector is essential for combatting dangerous climate change, but it's important for other reasons too:

1. Electricity price volatility is likely to increase across the NEM as other states transition to renewable energy generation, creating opportunities and challenges for Tasmania.
2. After years of relative stability, on-island electricity demand in Tasmania will increase significantly over the next decade even without new industries (AEMO predicts a 48% demand increase) due to the decarbonisation of transport and industrial processes.

This means that a long-term strategy to reduce our energy sector emissions by increasing on-island renewable electricity generation will have the important co-benefit of providing more affordable and reliable electricity in Tasmanian households.

2.2 Major abatement opportunities in the stationary energy sector

Tasmania enjoys a considerable head start in energy sector emissions reduction due to our hydroelectricity assets. In the final ERRP for this sector, we should aim to capitalise on this advantage by pursuing three key abatement opportunities.

1. **Expanded investment in new, on-island renewable energy generation projects**.

As already noted, emissions reduction is just one among many benefits associated with increasing our renewable electricity generation capacity. We believe that these benefits would be amplified by expanded interconnection via Marinus Link, assuming a reasonable cost allocation and ownership model can be negotiated. The importance of new on-island renewable generation projects is discussed at greater length in our submission Energy in Tasmania: Submission to the Legislative Council Inquiry into Energy Prices in Tasmania.

2. **Electrification and/or fuel substitution in energy-intensive industrial processes**.

Despite our low energy sector emissions overall, Tasmania does have some very large individual industrial emitters. For example, a single facility – Cement Australia Railton – currently emits more $CO_{2\text{-}e}$ greenhouse gases each year than every car and light commercial vehicle on Tasmania's roads combined. Covered emissions for Tasmania's six Safeguard Mechanism facilities (Cement Australia Railton, the Rio Tinto Bell Bay aluminium smelter, Liberty Bell Bay's ferromanganese smelter, the Norske Skog Boyer Paper Mill, Grange's Resources' Port Latta iron ore plant, and Grange Resources' Savage River mine) summed to more than 2150 kt $CO_{2\text{-}e}$ in 2022-23, which is equal to around a quarter of Tasmania's total absolute emissions.

Some of the most promising opportunities for reducing these hard-to-abate industrial energy emissions lie in electrification and the use of substitutes like e-fuels, woody biomass, or even waste products like old tyres in industrial heat processes. Ongoing Commonwealth-funded fuel substitution upgrades at Cement Australia Railton are a good example of how this can be done. A similar green cement decarbonisation project is currently being undertaken in South Australia. This would involve heating up and drying up to a million tonnes a year of lower-carbon substitutes for clinker.
Hydrogen and feedstock have also been cited as potential biofuels that could be used for decarbonising industry. While e-fuels and biomass typically have a lower emissions factor than fossil fuels, it is still important that they are produced sustainably.

For example, an enormous volume of water and renewable electricity is required for the creation of green hydrogen, and biomass would need to be sustainable. Additional considerations (for all biofuels) include supply, transportation and logistics, and cost. Tasmania currently has a 'Green Hydrogen Hub Vision' to produce green hydrogen for both export and domestic use. This has recently received $70 million in funding from the Australian Government. However, several proponents (including Woodside, Origin, and Fortescue Future Industries) have announced that they no longer intend to proceed with green hydrogen projects in Bell Bay.

3. **Energy efficiency upgrades and smart systems for households and businesses**.

The bulk of Tasmania's housing stock is not appropriately insulated, draught-sealed, or heated for our cold winters. As a result, Tasmanian households use considerably more power than the national average. Programs like the Tasmanian Energy Saver Loan Scheme should be continued and expanded to help households invest in insulation, double glazing, and energy efficient appliances. While existing initiatives are a good start, they are not accessible to very low-income homeowners or to renters. Our research has shown that Tasmania's poorest households proportionally spend over three times as much of their income on energy than do higher-income households. We should also promote the adoption of smart energy systems in both domestic and commercial settings to manage demand, incentivise batteries and short-duration storage, and maximise the value of rooftop PV systems.

Priority Actions

- Ensure sufficient new energy generation to support industrial decarbonisation (i.e., through electrification) and the development of new industries in Tasmania. More generation capacity, increased interconnection, and more sophisticated demand management will help us to reduce our reliance on gas-fired power for firming and shore up our claims to 100% self-sufficiency in renewable energy.

- Improve the efficiency of homes and buildings to help manage energy demand and ensure that vulnerable consumers and those often unable to access energy efficiency upgrades (i.e., renters, lower-income families – likely pensioners) are not left behind.

- Invest now in the skills and training needs required for Tasmania's future renewable energy workforce to ensure that major renewable energy projects can be constructed and staffed by Tasmanians, not fly-in/fly-out workers from interstate.

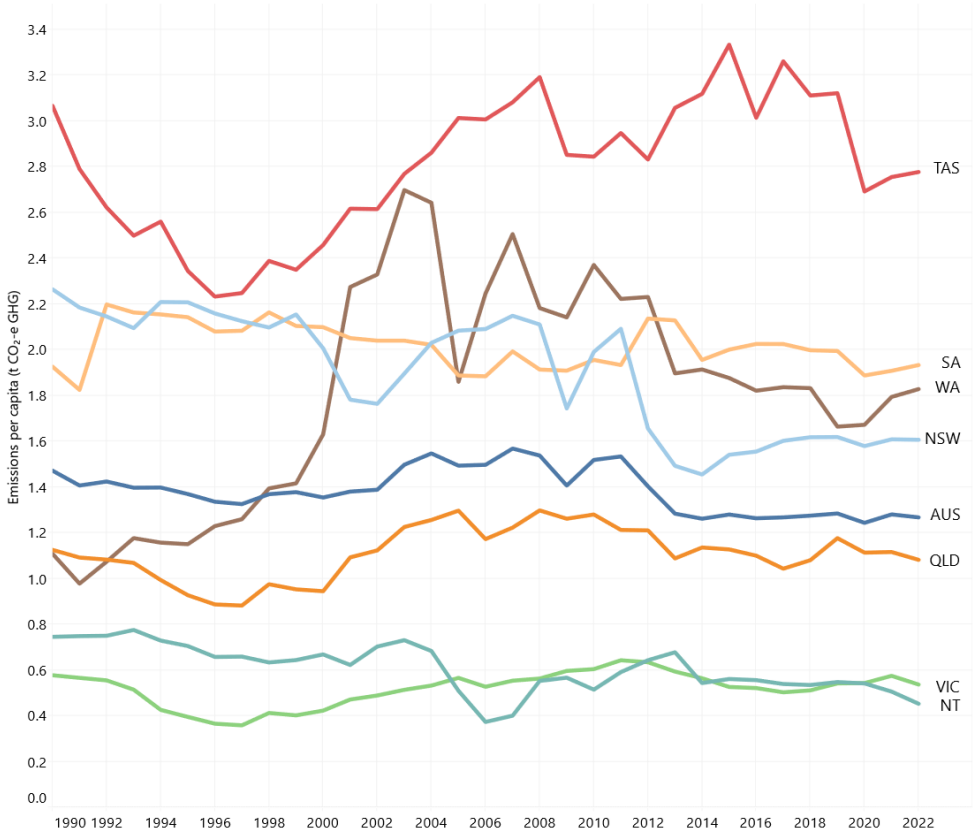
3 Industrial Processes and Product Use (IPPU)

3.1 Industrial Processes and Product Use (IPPU) Sector in Tasmania

Tasmania's industrial operations make a significant contribution to the Tasmanian economy, with manufacturing accounting for 64% of Tasmanian exports and employing 20,676 Tasmanians directly (around 30,000 indirectly). The IPPU sector also makes a significant contribution to Tasmania's emissions, accounting for almost a fifth (19%) of total emissions (excluding the land-use sector). Tasmania has the highest per capita IPPU emissions in the country (Figure 5), and we have had very little success abating them over the past 30 years.

IPPU sector emissions are greenhouse gases released during industrial production, excepting those resulting from combustion (which are reported in the energy sector). For example, this sector includes (but is not limited to) emissions from chemical reactions when creating cement and metals, as well as gases released from manufacturing products like as aerosols and anaesthesia. As noted, it does not include the energy used in industrial process such as heating kilns or boilers, for instance, but it does include fossil fuels if they are used for purposes that are not energy-related, such as lubricating machinery.

Figure 5: Per capita emissions from industrial processes by State and Territory, 1990-2022. Source: Australian State and Territory Greenhouse Gas Inventories 2022.



It is likely that Tasmania's highest IPPU emitters are a small number of large facilities in the minerals processing, metals, cement, pulp and paper, and manufacturing industries. Six of

these such facilities are covered by the Safeguard Mechanism, because each operation is responsible for more than 100,000 tonnes of $CO_{2\text{-}e}$ greenhouse gas emissions per year.[5]

One major difficulty with providing informed and credible analysis on emissions abatement in this sector is the fact that almost half of Tasmania's IPPU emissions are not reported due to 'commercial sensitivity' considerations. Secrecy provisions in the *Clean Energy Regulator Act 2011* and the *Privacy Act 1998* mean that emissions data are made confidential if their publication could lead to the identification of an individual firm or facility. When preparing the State and Territory Greenhouse Gas Inventories (STGGI), the department conceals data for any subsector in which:

- There are fewer than three facilities responsible for that subsector's emissions;
- One facility is responsible for more than 50% of the subsector's emissions; or
- Publication could potentially allow the derivation of a confidential data point that meets either of the two conditions above.

This means that emissions totals at the sectoral level are accurate, but that emissions are not correctly attributed at the subsector level. As a result, it is not possible to derive an accurate understanding from the STGGI of which activities are causing the sector's emissions or even which gases are being emitted in the IPPU sector. This is also a major problem in the Energy sector.

As Tasmania is a relatively small jurisdiction, these provisions impact our state-level inventories disproportionately. Indeed, around half of Tasmania's emissions in the IPPU and stationary energy sectors are not correctly attributed due to commercial sensitivity considerations.

The policy of not attributing emissions in this way is particularly confounding given that most of the relevant facilities are already subject to public emissions reporting under the safeguard mechanism. Moreover, in the coming years a growing number of firms will be required to report emissions under both established International Sustainability Standards Board (ISSB) standards and recently legislated Australian standards. Given these requirements, we fail to see how accurate subsector attribution of emissions data already in the public domain presents a level of commercial risk that outweighs the public importance of transparency and accountability for our most significant contributors to climate change.

We understand the importance of not unnecessarily disadvantaging industrial facilities in smaller jurisdictions like Tasmania, but we are concerned that these provisions are too sensitive to commercial and reputational considerations. We do not believe that the government's single most important emissions reporting mechanism should be functioning in practice as a fig leaf for our largest industrial emitters.

3.2 Abatement opportunities in the IPPU sector

IPPU emissions are among the most difficult to abate given the enormous expense of upgrading large industrial facilities and the relative absence of feasible, accessible low-emissions technologies in many industrial processes. Nevertheless, initiatives are currently underway that will contribute emissions reduction in this sector (as well as in the energy sector), including the following recent Commonwealth Government grants:

[5] The Safeguard Mechanism is part of the Australian Carbon Credit Unit Scheme (ACCU Scheme) and requires facilities that emit more than 100,000 tonnes of CO2-e to reduce their emissions below a set baseline, or purchase ACCUs to offset their emissions that are above the baseline.

- $52.9 million to Cement Australia to upgrade their kiln and increase the use of alternative fuels, such as old tyres;
- $5 million for fuel switching at Port Latta within Grange Resources Iron Pellet plant;
- $700,000 to undertake an alternative fuel trial at Liberty metals manufacturing site at Bell Bay.

Priority Actions

- E-fuels and biofuels will play a vital role in the decarbonisation of this sector. It is becoming increasingly recognised that fuels that have carbon from sustainable sources will be an important fossil fuel alternative. Given Tasmania's forest resource, we are well-placed to develop these fuels. Although they are not considered 'renewable' per se, they can be net emissions neutral and often these fuels have a lower emissions factor than other equivalent fuels.
- The Tasmanian Government should continue to engage with businesses and organisations to understand and support their emissions reduction strategies.
- Work with businesses to ensure they understand and are preparing for increased carbon disclosure and carbon pricing and the impacts this will have on their markets and operating environment.

4 Agriculture

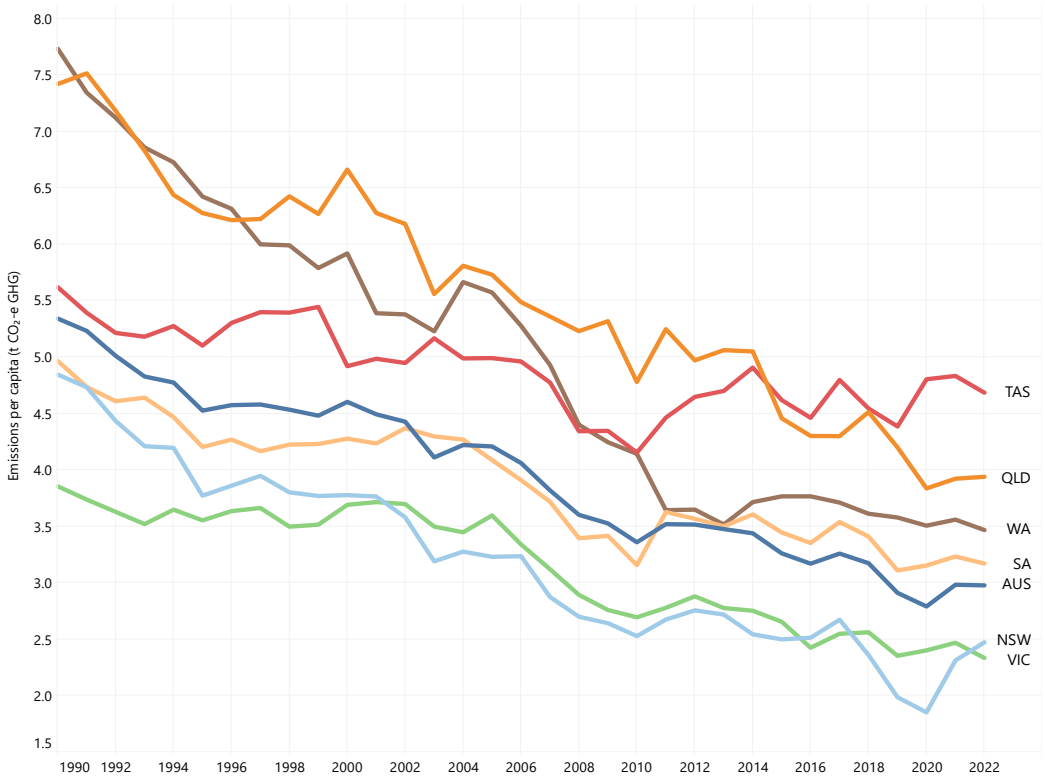
4.1 Agriculture in Tasmania

Agriculture is a vital contributor to the Tasmanian economy, both in terms of being a large employer (9th in the state) and a major export industry. This sector also accounts for around a third of Tasmania's non-land use emissions, the majority attributable to enteric fermentation in ruminant livestock. Tasmania's agricultural emissions remain the highest in the nation excepting the Northern Territory (the structure of the NT's agriculture sector and small population make direct comparison somewhat misleading).

Source	Emissions (Kt CO_2-e and % of total)	Description of source
Enteric fermentation	2,018 (75%)	This is a natural process that occurs in the digestive tract or rumen of an animal (including cows and sheep). As food is digested, methane (CH_4) is produced as a by-product.
Agricultural soils	409 (15%)	Emissions from application of various organic and inorganic fertilisers as well as decomposition of crop residues left behind after harvest.
Manure management	164 (6%)	As part of the digestive process, nitrogen is released in the manure which is then turned broken down into methane and nitrous oxide.
Liming	51 (2%)	Lime is used on soil to help maintain the right pH for crop and agricultural production.
Urea application	33 (1%)	Urea is a fertiliser that helps replenish nutrients in soil that have been lost due to agricultural production.
Field burning of agricultural residue	1 (0.04%)	Burning of agricultural residue in open fields releases greenhouse gases such as carbon dioxide, nitrous oxide and methane to the atmosphere.

Tasmania's agricultural output has grown very significantly over the past decade, which has contributed to our high emissions per capita. However, other states have been able to increase production while cutting emissions. The gross value of agricultural output in WA (adjusted for inflation) grew even more than Tasmania's in the ten years to 2022, while their emissions per capita fell by 16.3% over the same period. Tasmania's agricultural emissions per capita, on the other hand, grew by 13% in that time.

Figure 6: Per capita emissions from agricultural processes by state territory, 1990-2022. Source: Australian State and Territory Greenhouse Gas Inventories 2022.



Emissions in the agriculture sector do not include fuel consumption from operating agricultural equipment, the use of electricity, and the clearing of forest land for the purpose of creating cropping and pastureland. These are counted within the Energy and LULUCF sectors, respectively.

4.2 Abatement opportunities in the agriculture sector

As noted above, the vast majority of Tasmania's agriculture sector emissions are from enteric fermentation, and this should therefore be the primary focus of emissions reduction initiatives. However, other abatement opportunities (notably in management of emissions from agricultural soils) cannot be ignored. We believe the abatement priorities outlined in the draft ERRP are broadly appropriate and offer several important opportunities for emissions reduction across the sector. Priority opportunities that should be explored in Tasmania include:

1. **Feed supplements and additives, including Asparagopsis seaweed.**

Feed supplements made from *Asparagopsis* seaweed (a red seaweed native to Tasmania), have been shown in trials to be capable of reducing enteric methane emissions for ruminating livestock by as much as 98%. There is currently only one company in Tasmania producing the seaweed to be used as a feed supplement, Sea Forest. However, the IMAS team are currently undertaking research and data collection to help investigate areas for further cultivation of, or if there are any other different genetic strains that have a similar emissions-reduction potential.

Whilst some trials in open grazing systems have been successful, others have been less positive. The use of *Asparagopsis* poses several challenges, including how to ensure that grazing cattle on open pastures are ingesting the correct amount of *Asparagopsis*,

verification of the emissions abatement, and producing the amount of *Asparagopsis* required in a sustainable manner. As such, further research will be vital.

There have been several grants and research projects investigating livestock emissions abatement, including a $4 million grant from the Commonwealth to support a large-scale trial of *Asparagopsis* as a feed supplement for both dairy and beef cattle. This grant involved TasFarmers as the successful applicant, in collaboration with the Tasmanian Institute of Agriculture (TIA), Fonterra, Annadale Dairy Farm, Sea Forest, and Tasmanian feedlot AEON.

2. **Carbon farming and Agricultural Emissions**

Carbon farming is the management of carbon content in soils. Soil Organic Carbon (SOC) is fundamental to carbon farming initiatives, wherein farmers and land managers are incentivised to adopt practices that enhance carbon sequestration and increase the SOC levels. Regenerative agriculture and Biochar application have garnered interest and attention of policymakers, farmers, and investors for their potential ability to increase soil carbon sinks while improving the resilience of agricultural systems to the impacts of climate change. Specific initiatives include:

- **Biochar Application and composting**: biochar is residue from organic matter that has undergone pyrolysis while composting refers to adding a mixture of organic matter that has undergone decomposition to the soil.
- **Regenerative agriculture**: Increasing soil carbon sequestration through regenerative agriculture, including reduced- or no-tillage farming, agroforestry and cover cropping.

These initiatives, incentivised via carbon credit schemes, are integral to broader climate mitigation strategies as well as enhancing the productivity and sustainability of the sector. These and other carbon farming strategies could also potentially support further investment to increase the resilience of Tasmania's agricultural sector (initiatives include the Farm Business Resilience Program and Regional Drought Resilience Program in the Emissions Reduction and Resilience Plan). These and other similar projects could be incorporated as part of the priority areas (especially relevant priority area 2 and 3) in the next iteration of Tasmania's Climate Action Plan.

3. **Balancing competing uses of land**

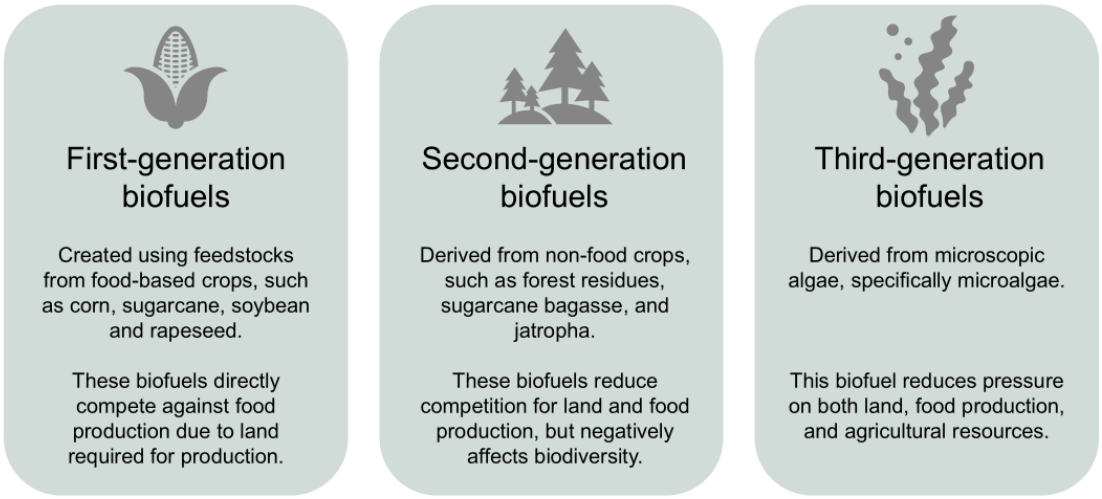
The path to a zero-emissions economy will increase competition for land suited to energy production, carbon sequestration and storage (i.e., through forests) and biofuel and biomass production. The Sector Pathways Review highlights the importance of balancing these competing interests and stresses the need for clear strategies to ensure land can be used for multiple distinct purposes. It is possible to run livestock or grow crops on land that is used for, say, windfarms. The Australian Farm Institute notes that accommodations are already made between Australian farmers and energy, infrastructure, and environmental uses (including carbon sequestration), with varying levels of success. As such, the Tasmanian Government will need to support farmers and primary producers to plan for and make the best decisions when it comes to utilising land for multiple purposes. Local context and planning will be vital.

The agricultural industry will need to be able to develop resilience to aspects of climate change (including varied rainfall and weather conditions) to ensure that the land used for agriculture is appropriately productive. Work is already being done in this respect, with industries already working to better understand, manage, and prepare for the impacts of climate change. For example, crop selection changes and improvements to water efficiency

have been undertaken as a response to changes in rainfall and weather patterns. The Australian Government has taken steps to support on-farm climate resilience through funding initiatives.

Land use planning will need to be carefully managed and, where possible, less land- and resource-intensive technologies and systems should be developed. For instance, certain biofuels and biomass are land-intensive (i.e., first-generation biofuels), whilst others require little to no land to produce (i.e., second- and third-generation biofuels) (see Figure 7).

Figure 77: Different types of biofuels. Source: Malik, et al.



Tasmania should embrace the opportunity for a second- and third-generation biofuel industry, which would help meet increasing biofuel demand without placing additional pressures on agricultural production. Tasmania does not currently operate biomass plants for the production of electricity using forest biomass. There are, however, three wood pallet manufacturing facilities used for small scale domestic heating. Given Tasmania's abundance of forest biomass, there are substantial opportunities for investment (see Table 1). There are several bioenergy hubs being developed to generate bioenergy from biomass waste streams, however this may have implications on land-use changes and feedstock sustainability. Tasmania's coastal areas provide an opportunity to create third-generation biofuels given the abundant area suitable for algae cultivation. This option minimises land-use conflicts associated with first-generation biofuels and offers higher productivity with fewer environmental impacts.

The potential to sustainably use biowaste to produce carbon-neutral fuel in Tasmania is significant (Table 1) and could theoretically deliver as much as 33PJ of energy (around one third of Tasmania's total energy consumption).

Table 1: Potential annual supply of forest biomass for energy in Tasmania. Adapted from: Tasmanian Government – Tasmania Delivers

	Pulp grade total Mt (green)	Pulp grade for energy* Mt (green)	Residues for energy Mt (green)	Total energy wood		Energy equivalent PJ
				Mt (green)	Mt (bone dry)	
Native forests	1.1	0.5	0.5	1.0	0.5	9
Plantation hardwood	3.1	1.5	0.4	1.9	1.0	18

Plantation softwood	0.7	0.0	0.1	0.1	0.1	1
Wood processing	-	-	0.4	0.4	0.2	4
Total	**4.8**	**2.0**	**1.3**	**3.3**	**1.8**	**33**

*50% of hardwood pulpgrade was assumed to be available for energy use, softwood pulpgrade was assumed to be used for procession only. 1 petajoule = 1,000,000 gigajoules.

Priority Actions

- Given the largest portion of emissions is from enteric fermentation, the use of *Asparagopsis* provides a significant opportunity to reduce emissions in this sector. Tasmania in particular is well-positioned to promote and capitalise on this technology given the entire value/supply chain is captured within the state.
- The transition to a zero-emissions future will require increased production and use of sustainable biofuels. One challenge from an agricultural perspective will be the growing demand and possible uses for scarce productive land. The Tasmanian Government should investigate and look towards second- and third-generation biofuels where possible to maximise output and minimise impacts on agricultural land.
- Given the changing climate and the potential impacts upon agricultural output and production, sustainable farming practices and improving the productivity of land and agriculture will only become more important. As such, it is important that Tasmanian farmers are equipped with the right tools and knowledge to implement these practices appropriately. This should include support for increasing carbon sequestration in soils.

5 Land Use, Land-Use Change and Forestry

The land use, land-use change and forestry (LULUCF) sector includes emissions and removals from human-induced land-clearing for settlements or farmland, forestry activities, and afforestation or reforestation. It is the only sector that can be both an emissions source and a sink. The LULUCF sector ERRP focuses on sustainable land-use practices, forest management, and carbon sink maintenance strategies. The LULUCF sector will be essential in developing carbon sink capacity to offset emissions from other sectors such as transport, agriculture, and energy.

5.1 Land Use, Land Use Change and Forestry (LULUCF) sector in Tasmania

As already noted, Tasmania has made very little progress towards reducing absolute emissions over the past 30 years. This means that our transition from a net-positive to a net-negative emissions jurisdiction has been entirely due to changes in the LULUCF sector. The impact of removals and sequestration on our emissions profile is clearly positive, but we have argued previously that Tasmania has become over-reliant on LULUCF at the expense of absolute emissions reduction and that our LULUCF removals are therefore a dangerous source of complacency.

This complacency presents a major risk for two reasons. The first is that the rate of removals in our LUULCF sector will slow over time. As fast-growing young forests age, their sequestration productivity slows. Once mature, forest ecosystems reach a state of carbon balance in which emissions from decomposition and removals from new growth cancel each other out. In other words, our deeply net-negative LULUCF emissions are not a permanent buffer, they are a brief and closing window of opportunity. Unless we can rapidly reduce our emissions in other sectors, we will eventually return to net-positive emissions.

The second reason is that modelling LULUCF emissions is complex, difficult, speculative, and highly uncertain. They are also subject to change: every year, LULUCF emissions updates are revised to account for advances in modelling methods and scientific understanding. These revisions are applied retrospectively to previous years' tallies as well.

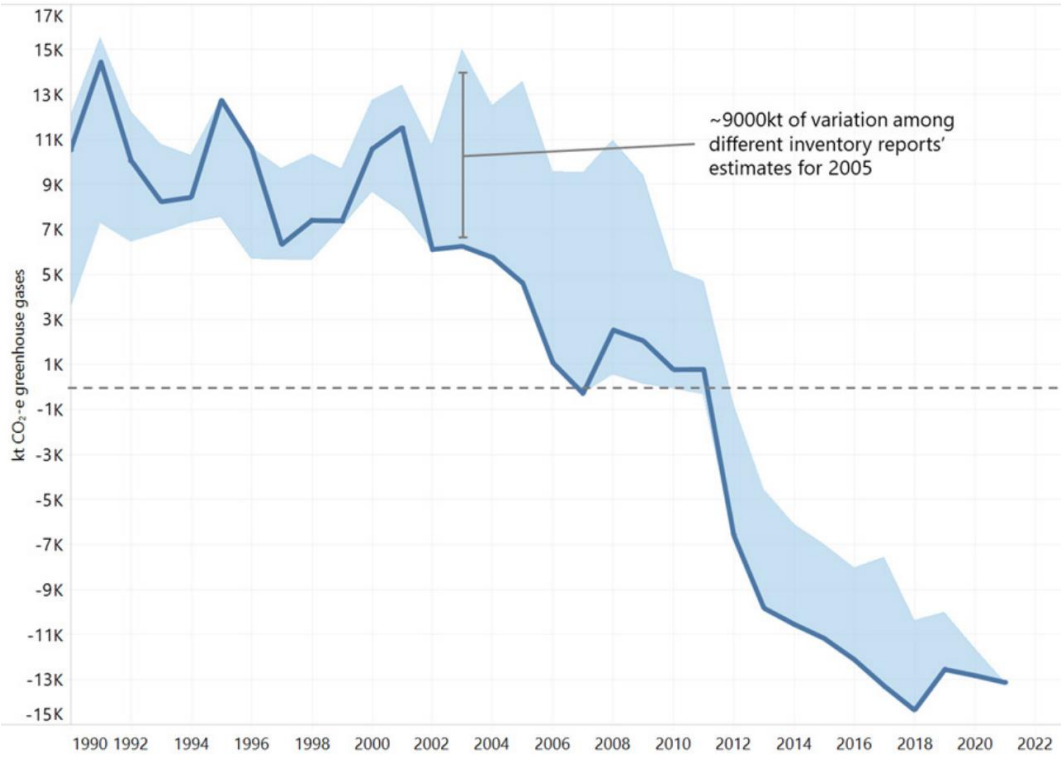
These year-to-year adjustments are usually minor, but they can still be consequential. For instance, in previous inventories, Tasmania was reported as having achieved net-zero emissions for the first time in 2013. However, the 2020 inventories revised this milestone to 2014, before it returned to 2013 in the 2021 inventories. The most recent edition revises this key milestone again – back to 2014. The impact of these minor revisions over time can be even more consequential. As Figure 8 below shows, for example, Tasmania's land-use emissions estimate for 2005 (a critical year given its use as a standard baseline in many emissions reduction targets) has since been revised by around 9,000 kt – more than all other sources of emission combined.

The only thing we can say for certain about the LULUCF emissions estimate published in the 2022 STGGI is that it will change over the coming years.

To be clear, these revisions show the system working exactly as it should: as new information becomes available and modelling methods improve, our estimates should change accordingly. Nevertheless, it is important to treat the resulting data cautiously and rather than rely on unpredictable and uncertain land-use removals, Tasmania must focus

more attention on reducing absolute sources of emission, which can be estimated with far greater certainty.

Figure 8: Comparing Tasmania's LULUCF Emissions as reported in STGGIs since 2008. Source: *Australian State and Territory Greenhouse Gas Inventories 2022*.



5.2 Abatement opportunities in the LULUCF sector

Despite the essential importance of lessening our over-reliance on LULUCF removals, this sector will inevitably remain an important contributor to our overall emissions profile. To this end, we should explore avenues to increase carbon storage in our forests and soils, especially where doing so can contribute to environmental conservation goals, protect biodiversity, sustainably meet demand for timber products, or enhance the productivity of our agriculture sector.

Overcoming barriers to participation in carbon farming/carbon credit schemes like the Australian Carbon Credit Unit (ACCU) scheme could help Tasmania sustainably increase its LULUCF removals. In addition to supporting plantation establishment on fallow or unproductive agricultural land, the Tasmanian Government should invest in supporting farmers to develop soil carbon and integrated farmland management (including agroforestry) projects.

6 Transition planning and place-based approaches

As the rest of the world focuses on emissions reduction, it is important that Australia – and Tasmania – are not left behind. With the introduction of policies like the EU's Carbon Border Adjustment Mechanism (CBAM), ensuring Tasmanian industries are on a clear path to a zero-emissions future will be vital to ensuring the future competitiveness of the state's economy and the communities that depend on it. This means that key industries and regional economies need to focus on reducing emissions as quickly and efficiently as possible. As the Sectors Pathway Review has highlighted, it is important that we act now to reduce emissions rather than relying on new technologies and methods to help us reach our goals.

Tasmania's transition to a zero-emissions future is both essential and inevitable and will provide opportunities for significant social, environmental, and economic benefits. Yet many Tasmanians are apprehensive about, or hostile towards, clean energy projects due to a lack of timely community engagement and credible information about options, alternatives and opportunities to contribute to a holistic transition plan to a low emissions future.

International evidence and our research suggest that successful socioeconomic transformations depend on empowering and informing communities to actively shape their future. A new model is needed where communities, government, and industry work together as informed and equal partners to develop long-term, inclusive regional transition plans.

The Tasmanian Policy Exchange is working with government, community, and industry partners to develop a long-term, place-based regional transition strategy in the Greater Launceston and Tamar Valley region. The project aims to support the Tamar Valley Region to achieve zero-emissions status and provide a model that other regions in Tasmania and beyond can replicate.

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