

CLIMATE ACTION PLAN

2021 – 2030



Contents

Vice-Chancellor's Statement.....	3
Leading the Transition to a Low Carbon Future	4
Low Carbon Leadership Across the University	5
Net Zero Carbon 2030.....	7
GHG Emissions Footprint.....	7
Reducing Emissions	8
Buildings and Energy	8
Transport.....	10
Farms	12
Waste	13
Compensating for GHG Emissions.....	15

From the Vice-Chancellor

As research continues to gather evidence and the world experiences extreme weather events at an alarming frequency, there can be little doubt that we are facing a global challenge, the likes of which we have not seen before.

Measurements tell us that the average temperature of the Earth is rising, but despite the popularity of the term ‘global warming’, that’s not the only way we can tell the climate is changing. Higher temperatures have also led to more droughts, shrinking of sea ice, melting of glaciers and the warming of our oceans; as well as more intensive storms, changes to rain and snowfall patterns and an increase in ocean acidity – long-term impacts that we are perhaps yet to realise the true impact of.

As a nation built on our primary industries, sustainability is a critical issue for New Zealand – environmentally, economically, culturally, politically, and socially. We are highly efficient in production systems, allowing us to export produce globally, and succeed in some of the world’s most competitive markets. However, we need to learn how to live smarter and to continue to reduce our impact on the environment so that our natural resources will be around for future generations. Universities have a role to play in developing the solutions that will allow us to do more with less.

Massey University has a strong record of teaching, research and engagement around sustainability-related matters. Our Master of Sustainable Development Goals, a unique qualification in Australasia, provides students an advanced grounding in the theory, practice and application of the United Nations Sustainable Development Goals (SDGs) in one of four areas: Business and Sustainability, Disaster Management, Global Development, and Environmental Sustainability.

Over recent years the university has recognised the need, not just for action, but for urgent and significant action with respect to climate change. We are committed to creating a prosperous low carbon future underpinned by kotahitanga (solidarity, collective action) and kaitiakitanga (environmental stewardship).

Our 2019 target of Net Zero Carbon by 2030 is ambitious, but one we are striving to achieve through developments and decision making when it comes to our energy, building, transport and waste emissions, as well as the operation of our farms (currently the source of 27% of our total emissions).

Being net zero carbon, or carbon neutral, means balancing our carbon emissions released with an equivalent amount sequestered or offset through enough carbon credits. This approach includes a focus on moving away from fossil fuels as much, and as quickly, as possible. It will also require us to collaborate with our stakeholders to address multiple steps in our supply chain, and importantly, to work with our students as partners on our zero-carbon journey.

In December 2020, the Minister for Climate Change, the Hon. James Shaw, declared that the country was facing a climate emergency and signalled that there would be more ambitious plans to reduce emissions in the coming years. As a university, Massey has a legal obligation under Education and Training Act (2020) to take up a role as critic and conscience of society. This means the university has a responsibility to work for what they view as the good of society, including challenging society with uncomfortable truths, such as the urgency in which we must act to stave off the potentially irreversible impacts of climate change.

The actions presented in this document are not a silver bullet. The challenges we face are beyond the actions of any single institution. However, by approaching climate change in a multi-dimensional way, drawing on the knowledge of natural and social sciences, humanities, mātauranga Māori and the creative arts, we are better placed to design the systems, technologies and behaviours required to succeed as a university, as well as provide for the country and our planet.

Jan Thomas
Vice-Chancellor, Massey University

Leading the Transition to a Low Carbon Future

Massey University is committed to the development of a prosperous low carbon future where individuals and communities thrive. The values of kotahitanga (solidarity, collective action) and kaitiakitanga (environmental stewardship) underpin our approach to developing a just transition to a low carbon future.

As a university Massey University has a responsibility to address the issue of climate change in what and how we teach; the research that we undertake; and through our engagement with students, mana whenua, iwi / Māori, industry and our cities and regions.

We recognise that to understand climate change in a multi-dimensional way we need to draw on knowledge developed through the natural and social sciences, the humanities, mātauranga Māori and the creative arts.

We aim to integrate our strengths in academic endeavours around climate change with the operation of our campuses and business activities so that there is a close alignment of our 'talk' with our 'walk'. Students are partners as we work towards our Net Zero Carbon goal.

We will develop collaborative relationships with our cities, regions, communities and those who want to partner with us, around creating a prosperous and just low carbon, regenerative future.

How will we achieve our goals?

The Climate Action Plan focuses on:

- Using our strength as a university to teach and research about climate change, and to connect with students and our communities to work towards a just low carbon future
- Reducing our emissions
- Compensating for those emissions we cannot eliminate

Massey will achieve GHG emissions reduction goals through a Carbon Management plan that includes:

- Reporting on our GHG emissions annually, and using data and its visibility to drive change
- Using formal university processes and policies to ensure that our low carbon goals are embedded into the business of the university (Campus Development Plans, Ten Year Capital Plan, Investment Plan, Capital Asset Management, Business Case development, Procurement and contracts)
- Focusing on culture and practice transformation (e.g. Staff and student 'Green Teams', education campaigns around waste, energy and transport)



Low Carbon Leadership Across the University

LOW CARBON LEADERSHIP GOALS

TEACHING & LEARNING

Develop graduates who are environmentally aware

Curriculum includes inter- and trans-disciplinary knowledge systems, and mātauranga Māori

Curriculum innovation that engages students around sustainability

RESEARCH

Develop a productive inter- and trans-disciplinary research culture

Support research that works with mātauranga Māori and other cultural knowledge systems

Produce innovative research that generates transformative low carbon solutions

CULTURE AND PRACTICE TRANSFORMATION

Enable staff and students to be proactive sustainability problem solvers, communicators and agents of change in their spheres of influence

Create living labs to connect teaching and research to regenerative and low carbon management of our campuses

Develop future sustainability leaders

EXTERNAL ENGAGEMENT

Develop active collaborative partnerships with tangata whenua, business, government and communities around critical real world challenges

Communicate and showcase sustainability solutions developed through collaboration with internal and external partners

MASSEY UNIVERSITY
NET ZERO CARBON 2030
NZC 2030 GOAL

Understand Massey's GHG emissions profile

Reduce GHG emissions

Remove carbon through sequestration and carbon offsets

Teaching, Learning and Research

The need to develop capabilities that can help students and staff understand, research and engage with others around complex issues such as climate change is recognized by the university in its teaching and learning, and research strategies (*Paerangi* and *He Rautaki Rangihau*). Both strategies have commitments to develop multi-, inter-, and trans-disciplinary capabilities in staff and students and to provide them with the opportunities to develop creativity and enterprise skills. These skills are essential to solving the complex problems associated with climate change

There is ongoing work to embed climate change within current courses as well as develop new courses and qualifications to meet the demand for climate scientists, 'carbon management' workers (e.g. carbon accounting, management of GHG emissions in business, industries, cities) and broader policy, design and creative work around low carbon futures.

Massey is investing in the development of transdisciplinary research capability through internal research funds:

- Strategic Investment Fund supports projects that contribute to solving contemporary societal challenges/wicked problems (up to \$150,000 per project)
- Strategic Research Excellence Fund offers the opportunity for researchers to establish novel, high-functioning collaborations and/or develop new multidisciplinary and interdisciplinary platforms (up to \$20,000 per project)

Culture and Practice Transformation

This is a new area of focus for the University, launched with the 'Walking the Sustainability Talk' initiative early in 2020. It builds on the work already instigated by the Library Sustainability committees from 2015, the Vet Green Team in 2020 and CoCA's Kākāriki group. Over the next three years Massey will establish an organisation-wide network of staff and students actively engaged in transforming the way we utilise resources, provide services and embody kaitiakitanga. Such engagement will integrate academic expertise and student innovation in creating a wealth of knowledge, practices and outcomes fundamental to leadership in the sustainability space and embed an holistic approach to daily choices and decision-making throughout the organisation.

A co-curricula programme is also helping to develop students as future sustainability leaders. MU is developing an enterprise strategy and student development platform that engages students to help them make an impact in any situation or community. Student enterprise work looks to capture value across all types of enterprise, including civic, social, commercial and indigenous, which will bring new value and strengths to help solve complex societal and environmental problems. The Student Development programme includes a focus on Active Citizenship that will help students connect on both a local and global scale and understand the interconnectedness of communities. The key mechanisms to explore active citizenship and enterprise are the Campus Co-labs on each campus, student enterprise studios and entrepreneurial training and support across campuses through the eCentre.

External Engagement: Collaborating on Climate

Massey will draw on the research strengths of staff to develop further engagement opportunities in relation to climate change. In particular the following two opportunities are aligned with Massey's strengths:

Low Carbon Cities

Using our academic strengths around transport, urban planning, waste, geoinformatics, engagement with Māori communities etc we will collaborate with local authorities to help develop roadmaps to low carbon cities. We already have a strong relationship and Living Lab funding agreement with the Palmerston North City Council, and an agreement with them to work on their planned Low Carbon Roadmap for the city.

Climate Smart Farming

Given our strengths around agriculture, and significant farm holdings, we will develop an engagement strategy working with academics, industry and the public to demonstrate how agriculture can transition to a low carbon future.

Net Zero Carbon 2030

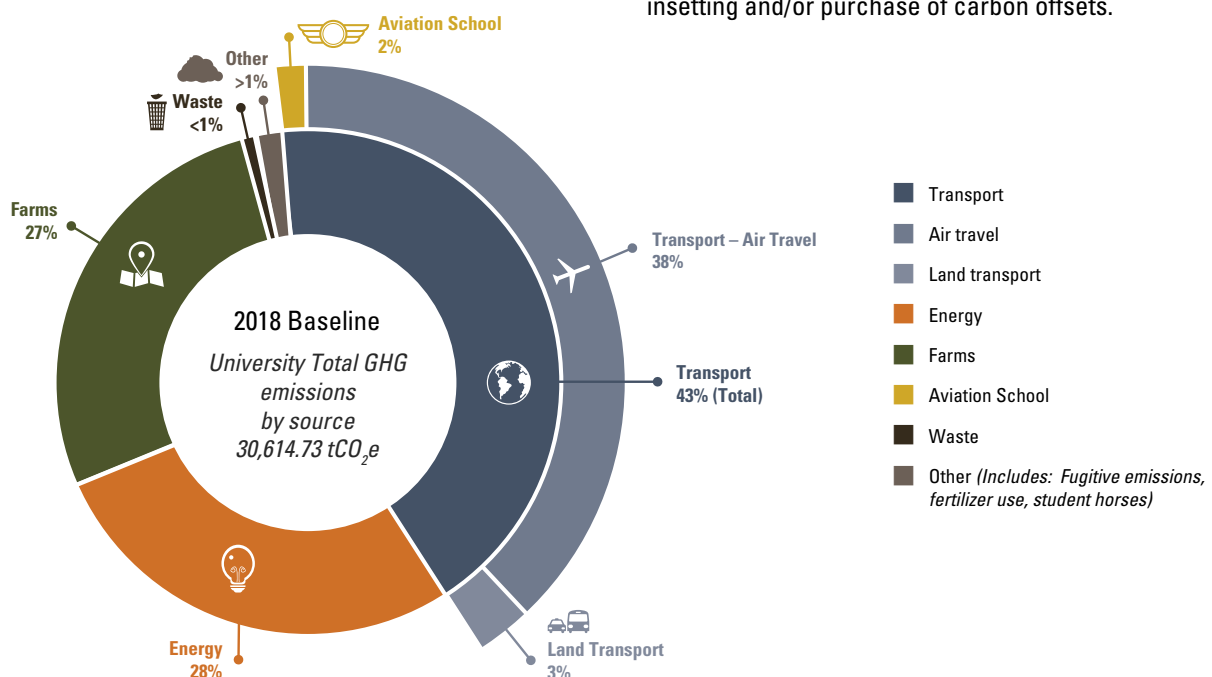
Massey is committed to be Net Zero Carbon (NZC) by 2030. Being NZC refers to achieving net zero GHG emissions by balancing GHG emissions generated with an equivalent amount of emissions sequestered (for example through trees) or offset through the purchase of third-party carbon credits.

Our Carbon Management Plan will ensure Massey meets the NZC goal by:

- producing annual verified updates to our GHG emissions inventory. Annual certified Emissions Inventory Reports are available from the Toitū website
- implementing GHG emissions reduction strategies in buildings, energy, transport, farms and waste
- compensating for GHG emissions we have not been able to eliminate

GHG Emissions Footprint

Massey University is responsible for generating green house gas (GHG) emissions from the energy we use, the fossil fuels we burn, the travel we take, the waste we produce, and from our farms. Like most Australasian universities, a large proportion of those emissions come from international long haul air travel.



However, Massey's GHG footprint is different from most other New Zealand universities because of our farms – they generate around 27% of our total emissions, largely from methane produced by cattle and sheep.

Since 2019/20 these farm-related emissions have been measured through Overseer and will in future be reported separately from other university emissions through Toitū to allow a greater level of management of these biological emissions.

Verification of our GHG emissions inventory by Toitū gives us assurance that we have accurately accounted for all mandatory emission sources. This inventory provides baseline data against which we will measure our progress in reducing our emissions.

Recent changes to ISO standards for reporting GHG emissions will be incorporated into our reporting from 2021.



Target

- To reduce absolute emissions 30% by 2030 from baseline of 30,614 tCO₂e.

In 2030 actually remaining GHG emissions (~21,430 tCO₂e) will be compensated through either carbon inseting and/or purchase of carbon offsets.

Reducing Emissions: Buildings and Energy

Goal: Low Carbon Buildings and Energy

Massey aligns itself with the World and New Zealand Green Building Councils' goals that 100% of buildings must operate at net zero carbon by 2050; and that all new buildings must operate at net zero carbon by 2030. Net Zero Carbon buildings are highly energy efficient buildings that are fully powered from on-site and/or off-site renewable energy sources and offsets.

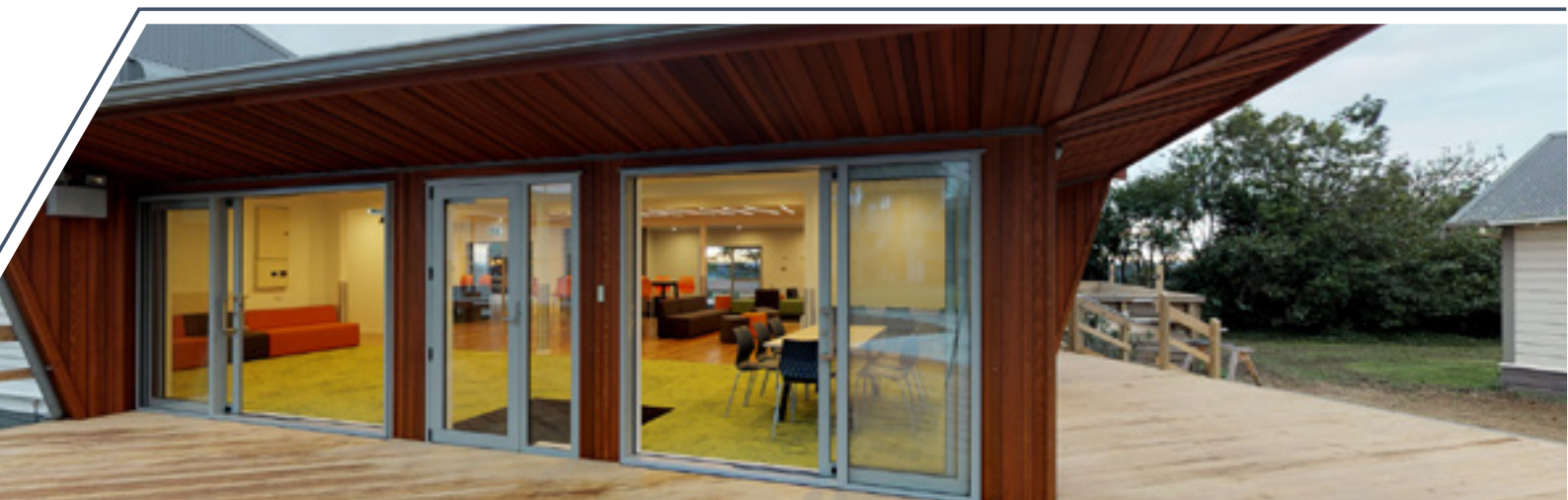
We aim to reduce and eventually eliminate fossil fuels from buildings and also to reduce carbon emissions from construction (for example by using low emissions concrete and reducing or eliminating where possible the use of steel or other materials that have high levels of embodied carbon).

Energy use on our campuses is recognised as a very large component of total GHG emissions. Decarbonising energy will be achieved by progressively replacing natural gas with electricity. Total energy use can also be reduced through energy efficiency projects thereby reducing CO₂ from purchased electricity, which is currently approximately 85% renewable.

Baseline Measures

Campus	Electricity		Natural Gas		Total energy	
	kWh	CO ₂ e	kWh	CO ₂ e	kWh	CO ₂ e
Auckland	7,328,045	770.18	2,098,915	408.76	9,426,960	1,178.94
Manawatū	20,269,926	2130.36	20,027,176	3900.21	40,324,102	6,030.57
Wellington	4,731,621	497.29	4,072,805	793.16	8,804,426	1,290.45
Total	32,329,592	3,397.83	26,198,896	5,102.13	58,528,488	8,499.96

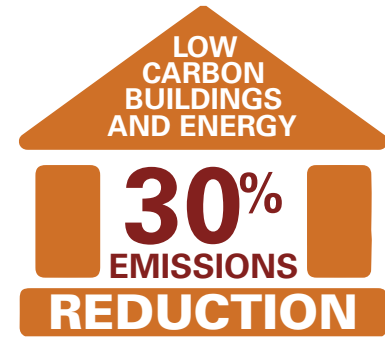
Table 1: 2018 Energy use and related emissions





Target

- 30% reduction of energy related emissions by 2030




Initiatives

2021 – Development of an Energy Management Strategy and Implementation Plan (2022–2024)

2022 – Development of Pathway to Net Zero Carbon Buildings

EMISSIONS REDUCTION STRATEGIES	INITIATIVES	INITIAL MILESTONES
Improving business intelligence	Increased metering and sub-metering of electricity and gas	2021 – Electricity and gas metering in all buildings
	Analysis of energy use	Ongoing Energy Management Systems providing real time monitoring of electricity use 2021 - 2023 – Building tuning programme on all campuses
	Space utilisation and modelling	2020 - 2022 – Finance and Facilities studies will deliver better utilisation of space in current buildings
Reducing energy use	Replacement of energy inefficient lighting with LEDs	2021 - 2023 – LED Replacements implemented
	Culture and practice transformation	2021 – Establish Unit-level network of staff and students to implement new energy-saving practices 2021 – Establish progressive framework and toolkit of trackable energy-saving practices and measures
Switching from fossil fuels to renewable energy sources	Natural gas boilers progressively replaced with non-fossil fuel options	2021 - 2030
	Electricity supply to be from largely renewable sources	2021 – Procurement of new electricity contract to ensure highly or fully renewable electricity supply 2021 – Investigation of on-site renewable energy options
Embedding high levels of environmentally sustainable design (ESD) principles throughout the whole design phase of building works	All new buildings to achieve 5 Green Star rating or equivalent	2021 – Ongoing
	All capital projects to be assessed through energy and carbon performance review	2021 – Ongoing 2021 - 2023 Library – Transformation project demonstrates low carbon and energy solutions
Include cost of carbon in business cases for major capital works	Develop method to include cost of carbon in pricing capital works	2021 – Developed method for including cost of carbon in capital projects

Reducing Emissions: Transport

★ Goal: Low Carbon Mobility

Vehicle fuels and air travel are significant components of global, national and university GHG emissions. Some of the staff travel undertaken, both domestically and overseas, for teaching, research and other university business is essential. However we can reduce the impact of these movements by avoiding unnecessary travel and by shifting from high to low carbon modes of travel.

Baseline Measures

		Unit	CO ₂ e
Land transport	University Vehicle fleet	225,262 kms	573.72
	Rental cars	966,407 kms	199.87
	Taxis	287,990 - \$	21.52
	Private car	270,123 kms	72.46
Air travel	International	51,865,426 kms	9,327.00
	Domestic	8,053,938 kms	2,402.65
	Aviation School	266,275 litres	593.47
Total emissions			13,190.69

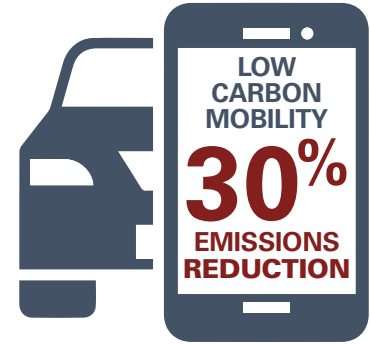
Table 2: 2018 Transport-related emissions





Targets

- 30% reduction of air travel related emissions by 2030
- 30% reduction in land transport related emissions by 2030
- Increase of EVs in fleet to 90% of total vehicles by 2030




Initiatives

Since July 2020 we've been inviting people across the organisation to explore the purpose and benefits of international air travel, via meetings with senior managers, a survey to all staff and doctoral student researchers, and a series of small focus groups. This work will inform the development of an approach to reducing GHG emissions from air travel, while at the same time ensuring the university continues to be globally connected.

2021 – Development of Sustainable Transport Action Plan (2022 - 2024)

EMISSIONS REDUCTION STRATEGIES	INITIATIVES	INITIAL MILESTONES
Reduce unnecessary travel	Reducing international air travel	<p>July - November 2020 – engagement with staff and doctoral research students through survey and meetings</p> <p>2021 – Consult with staff in evaluating the purpose and output of travel practices and develop a set of guiding principles for essential travel</p>
	Improve videoconferencing to support university, research and external engagement meetings	<p>2021 – Additional Zoom meeting rooms on each campus</p> <p>Ongoing – supporting Webinar training and trials; and trialling different VC equipment for different spaces</p>
Shift mode of transport from higher emitting transport modes to lower emitting ones	Travel behaviour survey of staff and students (to inform the development of active and sustainable commuting plan)	Semester 2 2021
	Explore car pooling and ride sharing opportunities for staff and students	2021
	Development of cycling and active transport plans in conjunction with Campus Master Planning process	2022
	Culture and practice transformation	2021 – Facilitate shift with series of promotional activities and campaigns
Electrify our vehicle fleet	Optimisation study of fleet utilisation to guide divestment of vehicles and replacement of ICE with EVs	October 2021
	Replacement of ICE with EVs	<p>2025 – 60% EVs</p> <p>2030 – 90% EVs</p>
Reduce carbon footprint of the Aviation School	Feasibility study of electric powered aircraft	2021 – 2022

Reducing Emissions: Farms

Goal: Leading Climate Smart and Sustainable Agriculture

Massey's farms are intricately linked to delivering a research, teaching and engagement platform for agricultural, horticultural and environmental sciences at the university. In addition to reducing emissions Massey farms will focus on opportunities for new research, education and engagement activities. A collaborative, transdisciplinary and stakeholder process will be undertaken to develop two linked documents:

- high level roadmap with vision and goals – 'where do we want to be'?
- Transition Pathway Action Plan – 'how do we get there'?

A Low Carbon Farms Steering Group has been established to develop the Roadmap and Action Plan. This includes animal production researchers, Massey Agricultural and Horticultural Enterprise managers, environmental researchers and the Sustainability portfolio.

Current work is focused on:

- options for the farms to provide a more 'mission-led' approach to research and engagement on-farm;
- the development of specific objectives and targets in relation to GHG emission reductions, carbon sequestration, renewable energy, water use, nitrate leaching, financial sustainability, soil conservation, farmer quality of life, and biodiversity.

It is recognized that GHG emissions are just one dimension of the environmental impact of agriculture and horticulture. Massey will continue its work around water and soil quality as part of our wider concern to lead in the development of an environmentally sustainable food production sector in Aotearoa New Zealand and globally.

Baseline Measures

Massey farms' GHG emissions are comprised of 94% methane (CH₄) which is produced through manure management and enteric fermentation (i.e. the digestive processes associated with ruminants) and 6% nitrous oxide (N₂O) produced through manure management and fertiliser use. Different farming systems produce different amounts of GHG emissions reflecting their size, stocking rates and intensity of production.

Farm unit	Dairy 1	Dairy 4	LATU	PCRU	Riverside	SBCDRU	Tuapaka
CH ₄	795.3	1,892.9	136.8	204.4	2,464.2	565.1	1,392.8
N ₂ O	173.6	251.5	0	19.3	0	159.9	109.0
tCO ₂ e	968.9	2,144.4	136.8	223.7	2,464.2	725.0	1,501.9

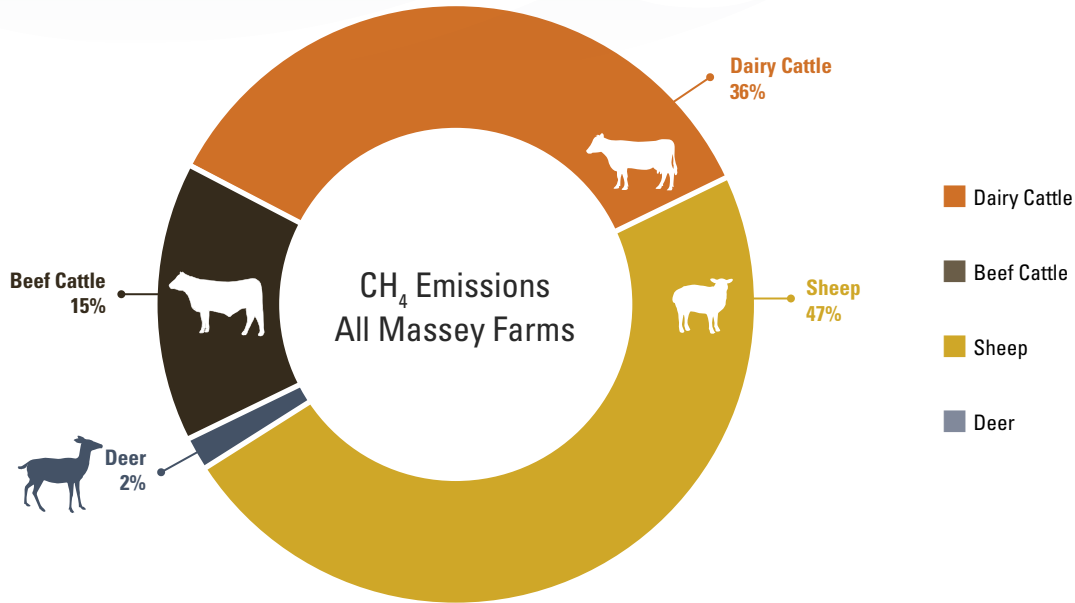
Note: N₂O & CH₄ are expressed in CO₂e units

LATU – Large Animal Teaching Unit

PCRU – Pasture and Crop Research Unit

SBCDRU – Sheep, Beef Cattle and Deer Research Unit

Table 4: 2018 Farms-related emissions



Targets

New Zealand legislation states that the 2030 target for methane reduction is 10% below 2017 baseline. Nitrous oxide, a GHG that is produced through manure management and fertiliser use, is expected to be net zero by 2050.

Massey's target for methane reduction is in development.

Initiatives

Management of the farms already includes initiatives to manage manure and effluents, reduce fertiliser use, and manage pastures and plants to reduce the negative impact of nitrate leaching on water quality. Some of these measures also help to mitigate GHG emissions.

Additional actions that will be explored through the development of the Transition Pathway Action Plan and include the following:

- Reduction in herd size
- Methane emissions from Massey farm ponds captured for energy production
- Inversion tillage
- Plantain and fodder beet to reduce N leaching and N₂O emissions
- Adopting hyperspectral mapping to promote fertiliser efficiency
- The use of Spikey-R to identify urine patches and apply NitroStop to reduce N leaching and N₂O emissions

Reducing Emissions: Waste

★ Goal: Zero Waste Campuses

Zero Waste is a highly ambitious and aspirational goal. It relies on changes throughout the whole of the supply chain as well as in how Massey manages its own ‘waste’. The intention of Massey’s goal is to signal a commitment to a closed loop approach to waste where resources that we use are disposed of, so they have another life (e.g. through reuse, repurposing, recycling, upcycling or contributing to compost or energy).

Baseline Measures

Campus	Tonnes	CO ₂ e
Auckland	240.60	57.95
Manawatū	535.37	194.42
Wellington	142.79	34.59
Total	918.76	286.96

Table 3: 2018 Waste volumes and related emissions

2021 – Zero Waste Action Plan (2022 - 2024)

EMISSIONS REDUCTION STRATEGIES	INITIATIVES	INITIAL MILESTONES
Reduce resource use, particularly of non-reusable or recyclable items	Reduce the resource footprint of events	2021 – Zero Waste events guide developed
	Reduce the resource footprint of food outlets	2021 – Low carbon and sustainable food guidelines developed in conjunction with Compass
Promote and support reuse and recycling	New waste and recycling bins and signage	2021 – Campus ops and waste contractors
	Education about the waste hierarchy and use of waste and recycling facilities	Continuous improvements through Green teams (focus on specific building / location improvements)
Divert food and organic waste from landfill	Food and organic waste management implemented on each campus	2021 – Use pilots of worm farms and other organic waste management to test new scalable initiatives
		2022 – Management plan in place
Raise understanding of waste stream	Develop collaborative approach in implementing Massey-wide initiatives	2021 – 40% of units engaged in specific waste reduction practices

Targets

- 60% diversion from landfill by 2025
- 90% diversion from landfill by 2030



Initiatives

In addition to operationally focused initiatives, waste management will include culture and practice transformation at all levels of the waste hierarchy. New initiatives will draw on the energy and enthusiasm already being shown by Massey librarians, the Vet Green team, Kākāriki (CoCA staff), and students through Campus CoLab and Student Enterprise.

Compensating for GHG Emissions

It is recognised that current social and technological arrangements will not provide the means to reduce GHG emissions to zero by 2030. Achieving our net zero emission goal can be achieved through a combination of measures including for example:

- the annual purchase of carbon credits to offset air travel
- the creation of our own carbon insetting project, for example by investigating the feasibility of planting of a permanent forest that sequesters carbon
- the purchase, from 2030, on an annual basis of carbon credits to offset our remaining GHG emissions

Carbon insetting

A feasibility study undertaken by Ekos investigated the cost of developing a carbon insetting project of planting mixed exotic hardwoods and indigenous forest.

There are significant co-benefits of growing our own forest – potential site for university research, community education, increase of biodiversity outcomes as well as sequestering carbon. However the financial feasibility of this approach is still being assessed.

Purchased Carbon Credits

The university will investigate whether to continue purchasing carbon offsets for air travel on an annual basis, or to invest what might have been spent on offsets on initiatives to reduce GHG emissions.

Massey will only purchase credits in high value carbon offset schemes that meet the standards of the International Carbon Reduction and Offset Alliance through:

- storing carbon e.g. forestry projects creating a carbon sink
- avoiding carbon e.g. energy generation projects
- reducing carbon e.g. form of technology that reduces the usual amount of emissions produced e.g. solar cook stoves



The Solar Bowl in Auroville, India <https://commons.wikimedia.org/w/index.php?curid=7926896>



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