VICTORIA UNIVERSITY OF WELLINGTON
TE HERENGA WAKA

ZERO CARBON PLAN

CAPITAL THINKING. GLOBALLY MINDED.
MAI I TE IHO KI TE PAE

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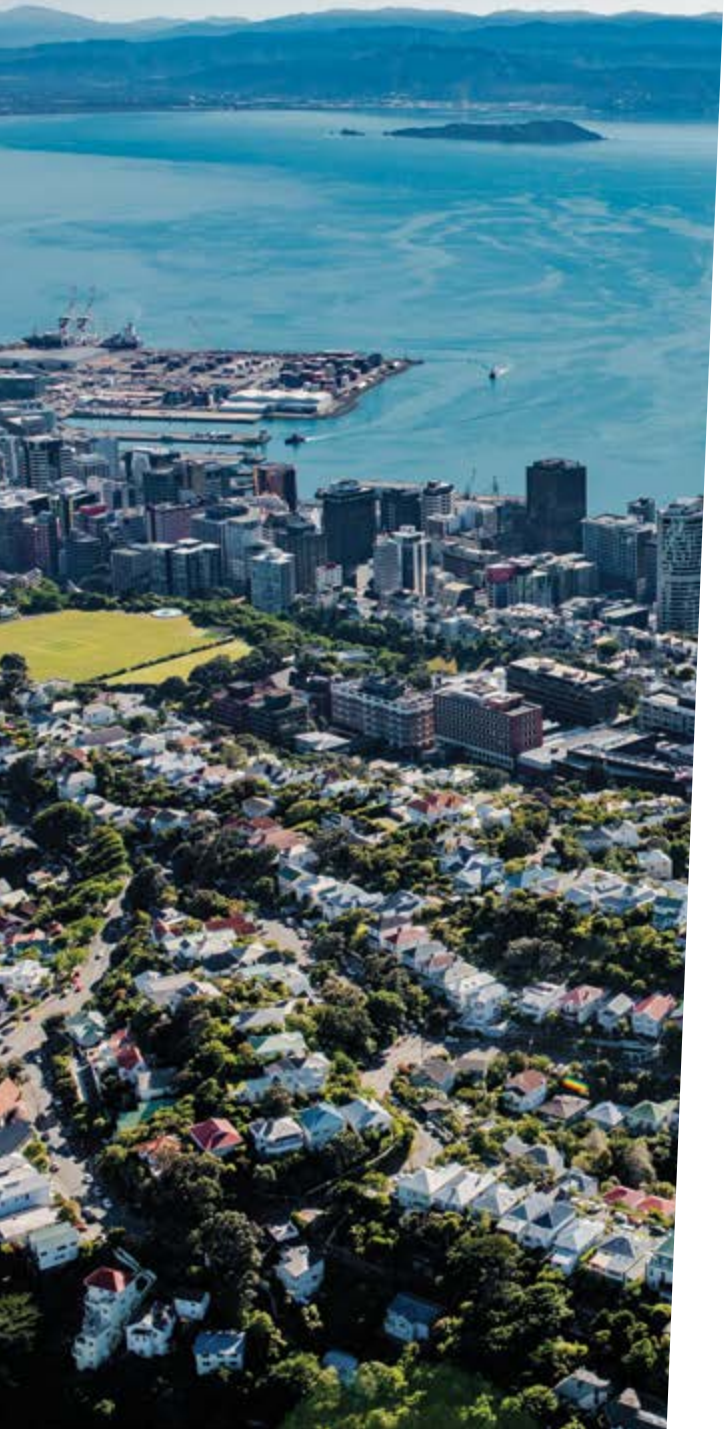


VICE-CHANCELLOR'S INTRODUCTION

Climate change is the most significant challenge facing our planet. The greenhouse gas emissions generated by human activities and land-use changes are producing alarming changes to our climate and terrestrial and marine ecosystems, and will become catastrophic if left unchecked.

The climate is already changing. To avoid the irreversible impacts of climate change, a large reduction in carbon emissions is needed in relatively little time. The intent of the Zero Carbon Bill and the growing call for action from communities around the world require the University to respond with a comprehensive plan of action.

As a values-based university, with academic expertise in climate science and climate solutions, we have a moral imperative to take strong climate action.

Reducing carbon emissions is a cornerstone of our commitment to sustainability. Despite increased student and staff numbers, the University has reduced its carbon emissions by 15 percent over the past decade. However, if the world is to deliver on the Paris Climate Agreement and protect life as we know it on the planet, we need to be more ambitious. This zero-carbon plan sets a path to deliver on that ambition. It is a path that will be honed along the way by cutting-edge research on climate change emanating from this, and other, universities.

The purpose of this plan is to establish a clear target of net-zero carbon emissions by 2030, with a further 40 percent reduction in gross carbon emissions. Our aspiration is that this is a path other organisations will follow.

Professor Grant Guilford
Vice-Chancellor

TARGETS

Our primary target is to reduce net greenhouse gas emissions to zero by 2030. It is an ambitious target that reflects the University's intent to lead on climate action. The initiatives that will achieve the target will also deliver co-benefits to the community and the University.

The University's carbon goals are to:

- achieve net-zero greenhouse gas emissions by 2030
- reduce gross greenhouse gas emissions by a further 40 percent by 2030, compared with 2017.

The co-benefits are to:

- grow public recognition of the importance of sustainability
- enhance engagement with mātauranga Māori
- develop formal partnerships with external stakeholders to deliver and grow climate action
- develop practical initiatives that foster relationships between the University and the city
- attract external scholarship funding to support students in researching climate solutions
- respond to the expectations of staff and students for climate action and provide them with opportunities to contribute
- utilise the university's campuses as a 'living lab' to provide a test bed for climate action research
- reduce the risk of interruptions to campus energy supply and changes to energy price
- generate operational cost savings.

To ensure there is ongoing commitment to deliver on these targets, the Zero Carbon Plan will be incorporated into the University's Annual Management Plan, with specific projects put forward to receive strategic funding each year. The progress on achieving the carbon targets will be reported publicly each year.

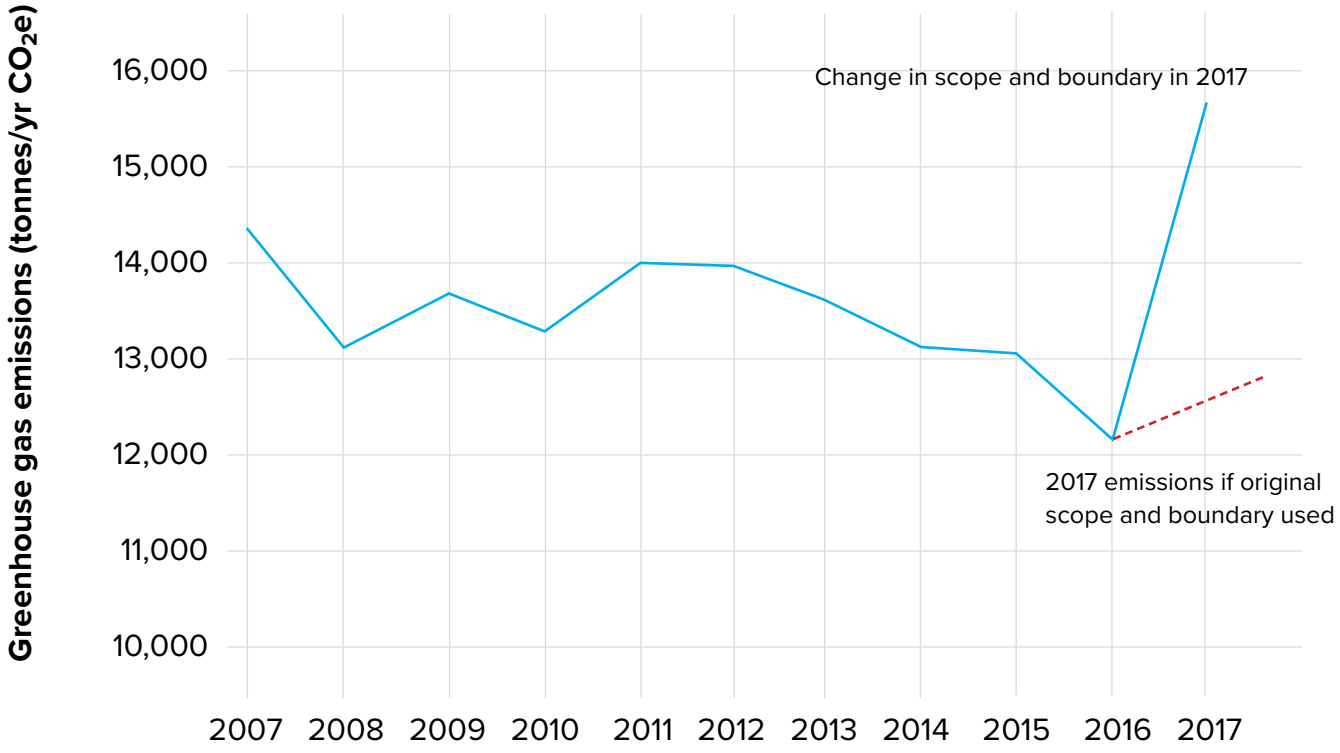
MEASUREMENT AND SCOPE

We have been measuring and reporting our carbon emissions since 2007. Over that time, we have made significant improvements in reducing parts of our carbon footprint, but there is still a lot more work required. As we embark on the Zero Carbon Plan, we have also reviewed our measurement practices and expanded the scope of carbon emissions we are capturing as part of the University's footprint.

PROGRESS TO DATE

Between 2007 and 2016, our total measured carbon emissions reduced by 15 percent, as shown in Figure 1. During the same period, we added about 600 additional equivalent full-time students and 300 additional full-time equivalent staff, plus additional building space to accommodate them.

FIGURE 1: HISTORIC ANNUAL CARBON EMISSIONS



Much of this improvement has been driven by improvements in the energy consumption of our buildings. Energy efficiency (of electricity and natural gas) has improved by 30 percent over that period. Emissions from commuter travel, waste, and land transport stayed relatively steady, while emissions from air travel increased by 425 tonnes per year (12 percent). Air travel remains a very challenging source of emissions for us to manage.

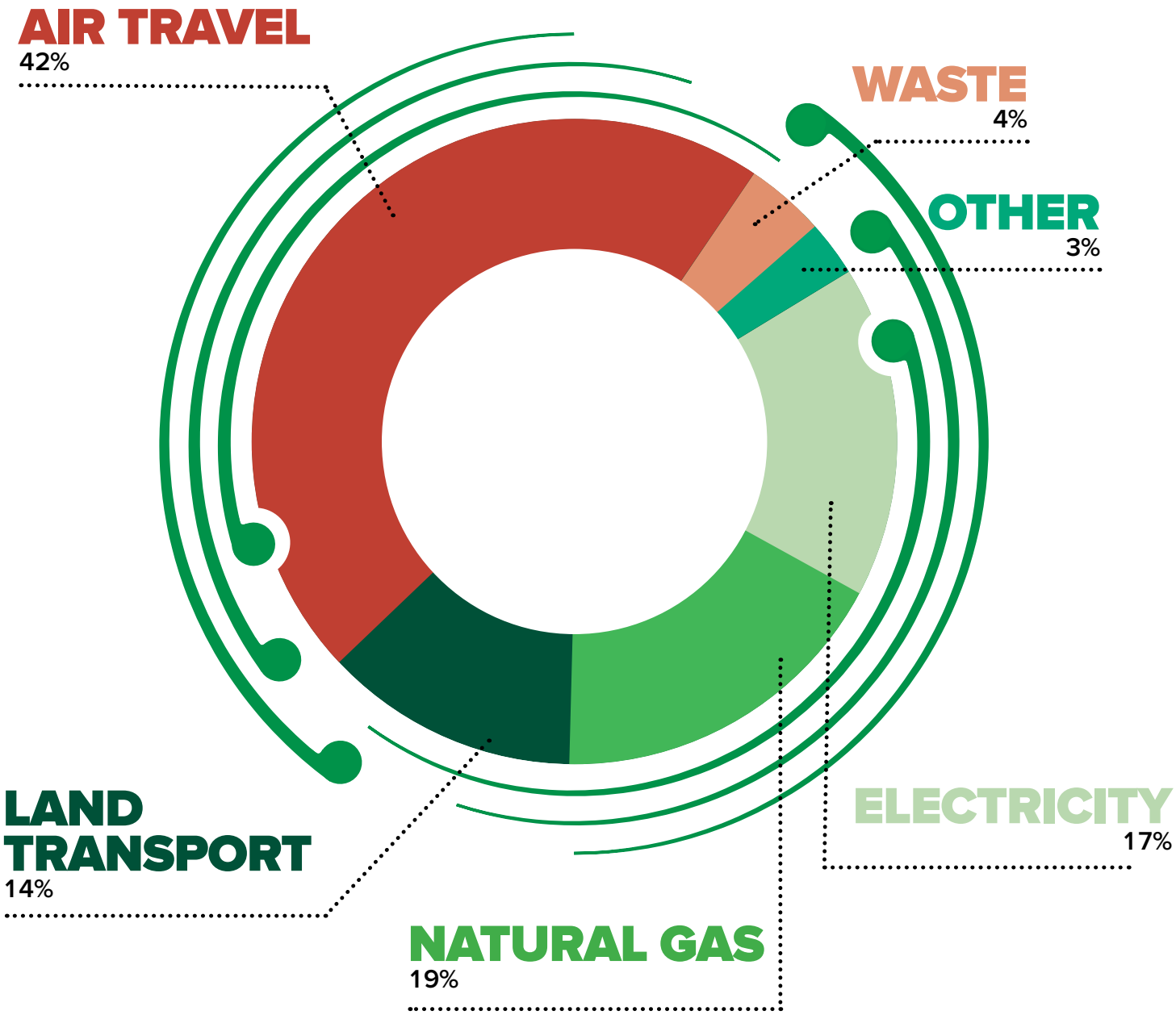
CARBON FOOTPRINT SCOPE AND BOUNDARY

As part of compiling the carbon inventory for 2017, the University engaged external consultants, AECOM, to review our carbon measurement methodology (established 10 years earlier), make any necessary adjustments to align with best practice, and incorporate changes in our organisational structure and operational practices, so we are accountable for all emissions reasonably attributable to the University.

Our carbon footprint was calculated in conformance with the Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (GHG Protocol) (World Resource Institute, 2004) and the Corporate Value Chain (scope 3) Accounting and Reporting Standard (WRI, 2011). The GHG Protocol is the widely accepted methodology for organisational carbon accounting and is supported by ISO 14064 (2006).

GHG protocol reporting category	Activity/emission source	kg CO_2e in 2017
Scope 1: Direct emissions from owned or controlled sources		
Stationary combustion	Diesel generators: campus and operated accommodation	815
	Natural gas: campus and offices	2,273,661
	Natural gas: student accommodation (university owned and operated)	784,113
Mobile combustion	Petrol: fleet vehicles	69,938
	Diesel: fleet vehicles	21,584
Fugitive emissions	Refrigerants (HFC): campus	307,021
Scope 2: Indirect emissions from purchased energy		
Electricity	Campus and offices, including assets leased to third parties but operated by the University	2,378,673
	Student accommodation (operated by the University)	445,334
Scope 3: Indirect emissions in our value chain		
Purchased goods and services	Print and paper	43,597
	Water (campus)	7,027
	Student accommodation (not owned or operated by the University): electricity and gas	156,676
Fuel and energy-related activities	Transmission and distribution losses for electricity consumed	230,192
	Transmission and distribution for gas consumed	360,943
Upstream transportation and distribution	Student commute	1,645,272
	Student inter-campus travel	8,890
Waste generated in operations	Landfill waste	507,409
	Recycling	191,872
Business travel	Taxi	46,415
	Rentals	72,984
	Staff public transport	1,103
	Air travel (including radiative forcing)	8,154,683
	P-card fuel purchases	16,462
	Private mileage	15,825
Employee commuting	Public transport	247,548
	Private vehicle	633,855
Upstream leased assets	Campus spaces leased from third party	190,551
Downstream leased assets	Office and campus space owned by the University but operated by tenants	406,069
Total emissions		19,218,513

FIGURE 2: 2017 GREENHOUSE GAS EMISSIONS, BY SOURCE



EMISSION MANAGEMENT ACTIONS

To achieve zero carbon, we need to be much more ambitious than our previous business-as-usual progress to reduce emissions. While we plan to grow as a university, we need to substantially reduce the emissions we produce. There are opportunities to make significant reductions in our emissions by 2030, but it is unrealistic to reduce our gross emissions to zero within that time frame. We will need investment in carbon sequestration to achieve net-zero carbon by 2030 and to provide more time for technological developments and socio-economic changes to occur that will enable our gross emissions to be eliminated.

To keep it simple, the plethora of potential mitigation initiatives have been narrowed down to five key actions.

NATURAL GAS DISPLACEMENT

Most of our large buildings have space heating and hot water provided from boilers that burn natural gas. Natural gas is fossil fuel with nearly twice as many carbon emissions per unit of energy than electricity in New Zealand.

We engaged Beca to undertake a feasibility study of alternative heat sources for our existing buildings. A review of all potential heat sources concluded that medium temperature air-source heat pumps to replace the boilers, while retaining the existing heat reticulation, was the best solution. Beca designed a mechanical solution for the first of our boiler systems due for renewal, where the bulk of the heating needs could still be met by the heat-pump system, while providing a return on the capital investment through cost savings over the 30-year life of the system. Although this study was a preliminary design and feasibility study only, it provides us with the confidence that it is achievable. From now on, when our boilers reach the end of their life, our services engineers will be briefed with the design objective to not use fossil fuels.

RENEWABLE POWER GENERATION

In New Zealand, about 80 percent of electricity generation is from renewable sources. The current national target is to boost this to 90 percent by 2025. That means that for the foreseeable future, purchased electricity from the national grid will still be a source of some carbon emissions, but not a huge opportunity for savings as in in many other countries. Generating electricity on site from renewable sources (of which photovoltaic panels are currently the most viable), could significantly reduce the demand for purchased electricity and provide increased resilience in case of mains power failure.

A conservative assessment of the potential for power generation from our available roof space was estimated at about 1.2 megawatts. The power generated can be used on-site, with very few occasions where we would have more supply than demand. On-site renewable generation also provides a valuable research and learning tool for our staff and students in the Engineering, Science, and Architecture faculties, as well as reducing pressures on the capacity of the electricity supply network and giving us some more energy resilience.

Initially, we plan to start with a small site through an agreement with Meridian Energy, which will supply and install the equipment, and we will buy the power generated from the panels and then own the equipment at the end of the term. If that proves successful, we will scale-up to larger buildings.

AIR TRAVEL MITIGATION

Air travel is our largest single source of carbon emissions. Eighty-two percent of our air travel emissions is from international flights (beyond Australia).

There are already processes in place to manage the approval of air travel, and good technology in place to provide an alternative to air travel. However, we believe we can still incentivise better use of those alternatives and better manage the demand for air travel.

Because our research and engagement activities currently rely on air travel, and because zero-carbon air travel is still a long-term prospect (which the team at Robinson Research Institute is working on making a reality), the option of purchasing carbon offsets for our air travel is the only short-term solution.

We will be introducing an internal 5 percent carbon fee on all flights booked and paid for by the University. Travellers will need to cover the cost of the carbon fee from their cost centre or research grant. Half of the budget generated from the carbon fee will be used to centrally purchase carbon credits in bulk, and the other half of the budget will be used for a contestable fund that staff can access to support sustainability initiatives. The carbon fee will increase the visibility of the carbon impact of air travel, create an incentive to use alternatives to air travel, establish additional funding to lower carbon emissions further, and neutralise the carbon impacts of travel that is required.

CAMPUS DEVELOPMENT

The most effective time to include low carbon features (for both operation and construction) into our facilities is at the very start of design for new buildings and refurbishments. As the University grows, more new buildings and refurbishments will be planned as part of the Campus Master Plan. Our current campus-design guidelines include low-carbon considerations, but we intend to make this a much greater focus.

One project in particular—the Living Pā (the proposed redevelopment of the Te Herenga Waka marae precinct)—is an important step in increasing our expectation of what can be achieved with campus development projects. Not only will the Living Pā be a flagship for mātauranga Māori and sustainable design (through applying the Living Building Challenge framework), the process of developing the business case for the project is articulating the value and potential of designing for zero carbon (and sustainability more generally) that will then be applied to other campus development projects.

FOREST

The cumulative impact of the initiatives above to reduce emissions will still leave us well short of our zero-carbon target. In the short to medium term, it is not viable to transform our campus infrastructure, our business practices, and wider social norms to the extent necessary to eliminate carbon. To reach net-zero carbon, carbon offsets will be required. Rather than purchasing them all from a third party, we plan to generate carbon offsets ourselves through reforestation.

We will seek to expand significantly our tree-planting relationship with Wellington City Council to increase the reforestation of the Outer Green Belt with indigenous trees. Our staff and students will continue to plant trees, providing an opportunity to connect further with the city and engage with both ecological restoration and carbon sequestration.

We will also seek to use additional land further afield to become a carbon sink through planting a forest with high-carbon sequestration ability—in particular, the recreation of the great tōtara forests of old.

Both forest projects will be used as the basis for research and applied teaching.

LEARNING, TEACHING, AND RESEARCH

At Te Herenga Waka—Victoria University of Wellington, we are fortunate to have access to the expertise and innovation of our staff and students, and this has helped to shape this plan. Equally, this plan will provide additional academic opportunities for staff and students as we call upon them to continue finding new solutions to our carbon challenges.

Many of the initiatives proposed provide opportunities for staff and student participation, applied learning or case studies to be included in teaching content, and new technology, processes, or resources that offer long-term research interest. Additionally, the contestable fund, generated from the internal carbon fee, provides a new funding mechanism to encourage the innovation of our brightest minds in finding solutions that support a sustainable university.

Lastly, the challenges we face in transitioning to a zero-carbon future will be shared by many other organisations in New Zealand and around the world. In developing this plan, we think we have some of the answers, but there are many more questions on how to best reduce our emissions. We are seeking support from community partners, who may have similar questions in their own context, to provide postgraduate scholarships to enable the research into potential solutions. Email development-office@vuw.ac.nz for more details.

The University itself will become a living lab for climate action in Wellington. We hope to share our zero-carbon journey and our academic expertise through collaboration with key partners to help New Zealand achieve its zero-carbon aspirations.

GET IN TOUCH

Go to www.victoria.ac.nz/sustainability or email sustainability@vuw.ac.nz for more information on how to get involved with this Zero Carbon Plan and what you can do to support a zero-carbon future or our other sustainability initiatives.

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