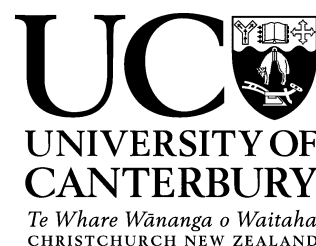


# COVER SHEET



<b>To:</b>	<b>Ki:</b>	SLT
<b>From:</b>	<b>Nā:</b>	Professor Jan Evans-Freeman
<b>Date:</b>	<b>Rā:</b>	5 <sup>th</sup> March 2021
<b>Subject:</b>	<b>Kaupapa:</b>	<b>UC Sustainability Strategy</b>

## Recommendations:

- 1) That the University of Canterbury produce a single report on specific data on our performance against each of the 17 SDGs, in time for the next submission in late 2021 to the THE Impact Rankings
- 2) That the University of Canterbury clearly identify and record alignment of some programmes or courses with some of the SDGs, and publicise them through the Sustainability Hub website
- 3) That the remainder of the report is noted

## Purpose:

To update SLT across a range of actions being considered and undertaken to achieve our net carbon neutral goal and to frame them within a national context, and to make two recommendations.

## Executive Summary:

When the new UC Strategy 2020-2030 was adopted, one of the seven strategic themes was a clear commitment to ensuring a more environmentally sustainable campus, and a target for UC to be carbon (net) neutral by 2030. In the last twelve months there has been considerable progress and an enhanced understanding of the many options we have to achieve this goal. This paper presents the current position of several different projects, together with government updates that may impact us in the future.

## Key Points/Strategic fit:

This report is concerned with one of the major themes of the University Strategy 2020-2030

## Financial implications:

We may need temporary FTE resource to produce the above reports if the recommendations are accepted

## Attachments:

Auckland's Single SDG report 2020 for noting

## Documents on Sharepoint for information:

## Paper Progress:

<b>To:</b>	<b>Date:</b>	<b>Decision:</b>
PFRC/RAC	n/a	

SLT	9 <sup>th</sup> March 2021	
FPRC/ARC		
COUNCIL		

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## UC Environmental Sustainability update March 2021

### Executive Summary

When the new UC Strategy 2020-2030 was adopted, one of the seven strategic themes was a clear commitment to ensuring a more environmentally sustainable campus, and a target for UC to be carbon (net) neutral by 2030. In the last twelve months there has been considerable progress and an enhanced understanding of the many options we have to achieve this goal. This paper presents the current position of several different projects, together with government updates that may impact us in the future.

Some of the topics are for noting and general discussion but for two of them in particular, 5.a and 5.b, we are seeking the views of SLT and are therefore for decision. **The recommendations** from these two topics are

- 1) That the University of Canterbury produce a single report on specific data on our performance against each of the 17 SDGs, in time for the next submission in late 2021 to the THE Impact Rankings
- 2) That the University of Canterbury clearly identify and record alignment of some programmes or courses with some of the SDGs, and publicise them through the Sustainability Hub website

## 1. Sustainability Hub website

The concept of UC having a University of Canterbury virtual Sustainability Hub was proposed to SLT in 2020 and well received. The Hub is essentially a small focussed “knowledge commons” showcasing everything related to sustainability at UC, where the knowledge available online will be widely accessible and used to create new projects, networks and activities. A brief internet search reveals that we will be at the leading edge with this concept, with only a handful of European universities having similar websites and currently none in NZ.

Therefore in late 2020 the starting point was to create the website and detailed content will be worked on by the Sustainability Programme Board early in 2021. The front page is finished and is shown below.

Content in the drop down links to be confirmed are in Research, Recognition (i.e. awards). The link to the Campus Projects goes directly to the FM and the Sustainability Office website, Events and Networking go through to Comms and other links, and there is a direct link to the UC Strategy 2020-2030. The Networking link will also be promoted to interested student bodies to set up events of their own. Discussions on populating the links will commence at the Programme Board, and then move into Colleges/departments as relevant. PVCs have already agreed the Degrees page.

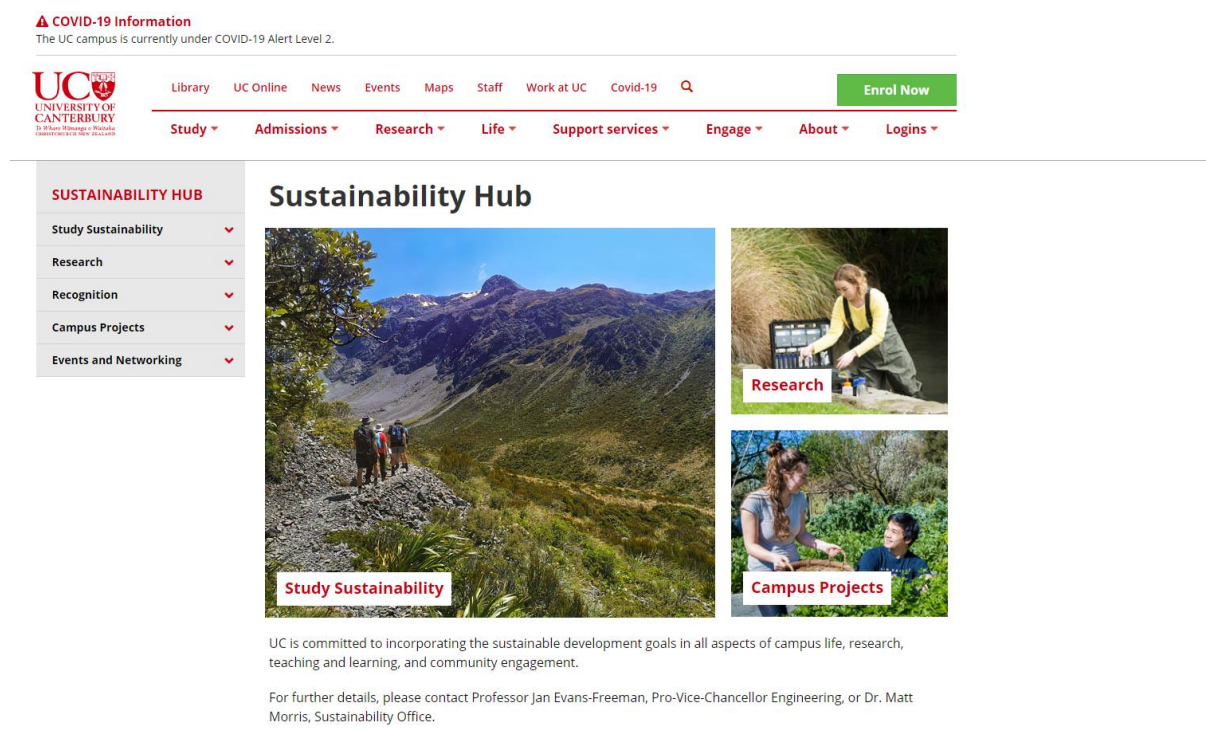


Figure 1. Front page of the new UC Sustainability Hub

## 2. Government announcement 2<sup>nd</sup> December 2020

After announcing a Climate Emergency, the NZ government also announced that the Carbon Neutral Government Programme will require public sector agencies to measure and publicly report on their emissions, and to offset any they can't cut, by 2025. This is five years earlier than originally proposed and does not match our current Strategy. The programme is backed by the \$200 million State Sector Decarbonisation Fund that will finance the replacement of public sector coal boilers, with the largest and most active the immediate focus.

The list of public sector agencies to be included can be found [here](#). Although the list includes all eight universities and NZIST, we are not solely a public sector agency<sup>1</sup>.

There is not yet a clear *directive* to universities, rather we are “encouraged”. Currently the key areas of focus for public sector agencies are described as *replacing coal boilers and introducing electric vehicles*, both of which we have done or are in process of doing, with the exception of the Dovedale Boiler. The latter likely need to be addressed before end 2025 (subject to the future of that campus).

Although our boiler upgrade to wood-waste fuel (biomass) is approved and part funded by EECA, it is not the sole solution to UC achieving a carbon net neutral status, and we have a further strategies to sequester carbon through planting new forests, introducing ground source heat pumps in the longer term future into upgraded buildings (not discussed in this paper) and reviewing our air travel requirements, described below.

### 3. Update on key UC Projects to achieve Net Zero Carbon, near term

In 2019 UC operated at about 25,000 tonnes of emitted CO<sub>2</sub> annually. We believe that by implementing the first three of the projects below, we will be left to offset 6000 CO<sub>2</sub> per year, from 2031. The current fixed price of CO<sub>2</sub> is NZ\$35 per unit (tonne of carbon) but this could change in 2021 depending upon when auctioning commences<sup>2</sup>.

- a. The upgraded boiler
- b. Carbon sequestration
- c. Air travel
- d. Off-setting by buying units

#### a. Update on boiler options

We are no longer proceeding with the new biomass boiler option due to commercial issues with the supplier. Although the boiler strategy has changed, the long term strategy to remove all combustion fuels from the Ilam Campus is unchanged. A new option has become viable as a result of new information received from Consultant Surveys carried out for the Ilam Campus Building Programme Business Case in Q2 and Q3 2020. This allows the upgrade of heating systems to low temperature hot water without first undertaking a thermal upgrade of a building. The ability to separate heating and thermal upgrades was not understood at the time of writing the Ilam boiler business case. The ongoing plan is still to progressively convert all buildings to Ground Source Heat Pumps (GSHPs).

Council approved this change of direction in late November as confirmed by their minutes. They approved the termination of the Preconstruction Services Agreement with the boiler supplier, and noted the engagement of the existing consultant team to prepare a concept design and business case for alternative options. Subsequent design and implementation work would be procured through a process approved by the UC procurement team. A paper on an alternative option to achieve the goals of the project was provided at the February 2021 Council meeting. A further paper was provided to the March PFRC meeting advising the outcome of a Peer Review Report on heating options for the Ilam Campus. This report was prepared by Aurecon as independent specialists in heating technology. Following PFRC endorsement, the UC project team are now proceeding to engage Consultants to

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<sup>1</sup> From the Public Services Commission website: Public Service departments are close to Ministers (part of the legal Crown), while Crown entities are stand-alone corporate bodies and operate at arm's-length. Most Crown entities are part of the State services, but Tertiary Education Institutions are part of the wider State sector.

<sup>2</sup> <https://www.mfe.govt.nz/reforming-nzets-price-controls>

develop the Business Case for Boiler upgrades and GSHPs to Group 4 buildings (Central Lecture Theatres, RSIC, Beatrice Tinsley, Von Haast). The Business Case will be submitted for review in the July Council cycle.

Summary of actions to date are:

- We terminated the new Biomass Boiler contract with the boiler supplier on 1 December 2020
- We are currently exploring alternative options for boiler heating until the Ilam Campus is converted to GSHPs.
- As part of a revised procurement strategy we have completed a peer review of the options to satisfy Council we have considered all options.
- Options include modifying the existing boilers to burn pellet fuel and accelerating progress on the GSHPs. Benefits would be an increase in carbon reductions from 9,000 to 11,000 tonnes less per annum by end 2023 and acceleration of the GSHP strategy.
- EECA have confirmed their commitment to \$6.24m funding subject to UC achieving the 9,000 tonnes reduction in net carbon emissions by end 2023. NB A submission for a funding top up is planned for March 2021 to recognise the target change from 9,000 to 11,000 tonnes per annum carbon reduction.

#### b. Carbon sequestration



The NZ Emissions Trading Scheme provides opportunities for landowners to earn carbon credits (NZUs) by planting new forests that absorb carbon dioxide as the trees grow. These credits can be used to offset emissions, or can be sold to other emitters in the New Zealand market.

We have identified some options to sequester carbon by way of establishing forests either at Mount Barker or at Cass, and currently there is a project between Forestry, the field stations team and FM to understand these options and recommend a way forward to SLT. Three options being considered in more detail are: plant radiata pine and manage it for carbon and timber at Mount Barker; or plant radiata pine as a permanent carbon forest at Mount Barker; and/or establish native species at Cass. Radiata pine managed for timber and carbon would sequester less carbon than a permanent carbon forest, but would provide financial returns on the timber harvested. We would need to replant after

harvest. At Mt Barker radiata pine would be more desirable from a regulatory viewpoint than the current forest, because of a much lower risk of wilding spread.

Native trees grow much more slowly and so sequester carbon at a much lower rate than fast growing exotics. However in an environment such as Cass, where the long term objective is the restoration of the native (mountain beech) forest that existed prior to settlement of the land for farming, we are investigating options to accelerate this restoration process, on land that would be eligible to earn carbon credits (so-called post-1989 forest land).

One emission unit, the New Zealand Unit, represents one metric tonne of carbon dioxide or carbon dioxide equivalent (i.e. the amount of another greenhouse gas that does as much damage as one tonne of carbon dioxide). The Government gives/credits eligible foresters and growers units for carbon dioxide that is absorbed by their trees or shrubs. UC could therefore establish new forests to reduce the number of credits needed to be purchased in the future, to become net carbon neutral.

The School of Forestry already has teaching and research programmes related to carbon forestry, and planting trees to offset UC's carbon emissions could be integrated into those teaching and research programmes. We also had a plan to take advantage of the One Billion Trees initiative by way of subsidies available, however MPI recently announced that this opportunity has closed due to oversubscription. Preliminary modelling of radiata pine by UC shows that we could be carbon net zero by 2030 if we plant radiata on previously unforested land. The trees can be felled and sold (for profit), or left growing. The result for native species is not as fast as this however, as they grow slower, hence absorb less carbon per year. Native establishment is also much more expensive, and would be regarded as permanent forest, hence there is no income on felling and replanting. However we may have an opportunity at Cass to do this.

The project is in its early stages as we understand what area of land might be potentially available at different sites, what species to establish and the expected yield (in tonnes of CO<sub>2</sub>e), what it will cost, what regulatory and management issues we might encounter, what financial assistance might be available from the government, and how to offset the most carbon. There are three possible options being considered:

- Radiata pine timber forestry (i.e. felling and on-selling), with sequestration converted to credits and used to offset UC emissions (i.e. surrendered rather than sold). Forest would be a viable investment (6%-8% returns, depending on land value). Planting a total of 900ha until 2048 required. Ongoing planting of 100ha every four years thereafter.
- Radiata pine permanent carbon forest, with sequestration converted to credits and used to offset UC emissions (i.e. surrendered rather than sold). Management and land both incur costs to UC. We would need to plant 330ha in 2021 and 2023. Recent legislation (2020) has creating a new permanent forestry activity in the NZ Emissions Trading Scheme.
- Indigenous permanent forest, with sequestration converted to credits and used to offset UC emissions (i.e. surrendered rather than sold). Forest establishment and management would be a cost to UC. We would need to establish 1050ha of forest by 2050 and a further 250ha every 8 years in perpetuity. Cost > \$6m and no income (permanent forest).

We are currently looking at options at Cass for establishing native forest to offset the long term gross emissions, and establishing fast growing exotics (i.e. non-native) at Mt Barker to assist UC in achieving net zero by 2030 at minimum cost. Other UC properties that could also be considered are Craigieburn, Grasmere, Glenthorne, Coleridge, Acheron, Greendale and Otaio.

### c. Air travel

Flying is one of the most emissions-intensive activities we can do. A single return flight from Auckland to Los Angeles emits 4.4 tonnes of carbon dioxide – just over half what the average person in an OECD country produces heating their home, driving their car and disposing of waste in a whole year<sup>3</sup>. This will always be a difficult conversation, and worldwide, universities are challenging themselves over this issue. The activity is often justified on the basis that international conferences and travel are important to the production of new knowledge. As such, travel brings researchers into contact with new ideas, allows them to share and refine their own ideas and therefore improves the quality of their research. However, it has been found in one study, using the University of British Columbia as a case study, that beyond a certain level there was no clear relationship between the amount of travel undertaken by academics at UBC and the quality of their research in terms of productivity and the production of high-quality papers.<sup>4</sup> This was the case even when accounting for department, position and gender; no relationship was found between how much academics travel and their total citation count or their h1a (a version of h-index adjusted for academic age). In the same study, it was found that, surprisingly, academics studying subjects like climate change or sustainability not only had the same level of emissions from air travel as their peers, but they were indistinguishable in the category of "easily avoidable" trips as well. This was supported in a 2020 article by British and Swedish researchers<sup>5</sup> that shows climate researchers actually took up to 50% more flights than other academics, pre covid.

Demonstrating an international profile, attending or chairing international conferences and publishing in them is often a criteria for promotion or a new academic appointment. There are several direct references to international standing and conference planning in UC's Guidelines for Applicants. A recent comment in Nature<sup>6</sup> (from Otago University) crystallises ideas that several researchers are proposing about how to hold conferences, post covid, to reduce air travel and hence associated carbon emissions. Conference series would become less frequent, care would be taken about their location, and regional hubs would be set up to minimise the distance travelled to network and participate.

Air travel is not just about research. A study at the University of Montreal showed that over 5000 of their 33,000 students participated in study abroad or exchange and contributed significantly to the carbon emission of that university.<sup>7</sup>

We are using Orbit and Tribal data to understand our and travel patterns, although of course this was significantly different in 2020, and will be in 2021. In particular our detailed air travel activity (prior to covid) relative to other universities in New Zealand will then form the basis of a campus wide conversation to be led by the Sustainability Programme Board. Interestingly, although Tribal tell us that we are spending a higher % of our total travel costs on "staff travel" than others, this is not predominantly air travel. We have asked further questions around this data. Figure 3 shows the travel cost breakdown as a % of total university cost in NZ universities, and Figure 4 shows air travel costs as a % of staff travel costs in NZ. We assume some of this is related to (land based) field trips with or without students.

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<sup>3</sup> <https://www.toitu.co.nz/calculators>

<sup>4</sup> <https://www.natureindex.com/news-blog/do-best-academics-researchers-scientists-fly-travel-more>

<sup>5</sup> <https://www.sciencedirect.com/science/article/pii/S0959378020307676>

<sup>6</sup> <https://www.nature.com/articles/d41586-020-02057-2>

<sup>7</sup> <https://iopscience.iop.org/article/10.1088/1748-9326/ab33e6>



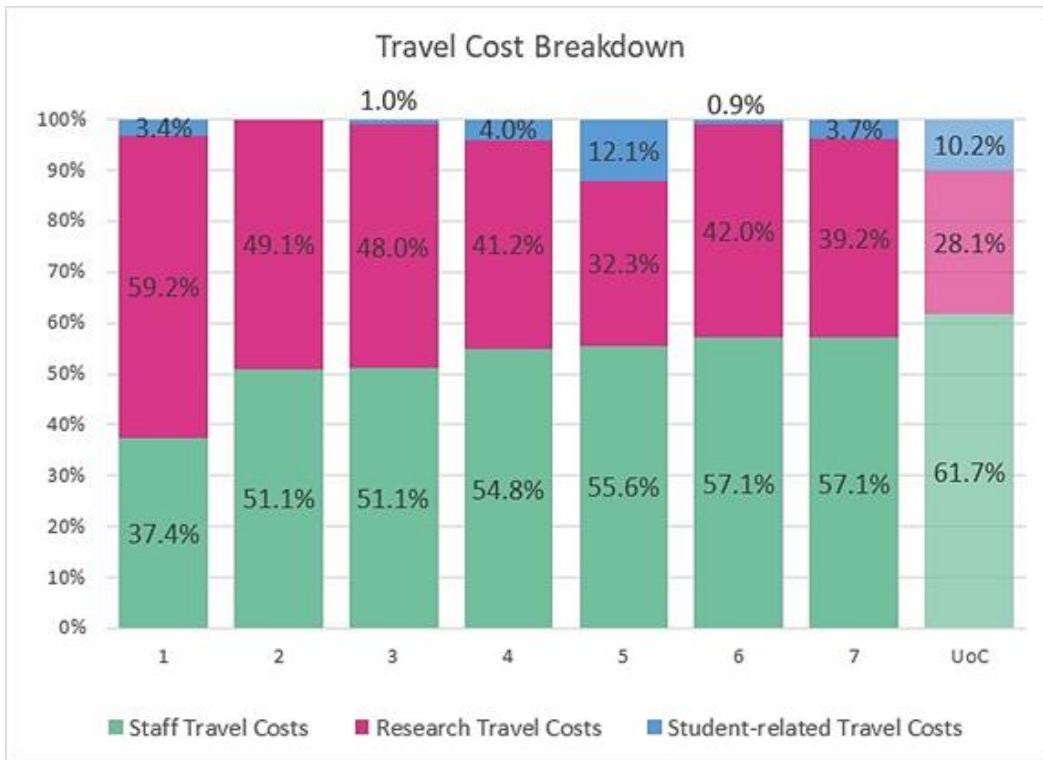


Figure 3. Costs associated with moving staff and students around and those attached to research (from Tribal)

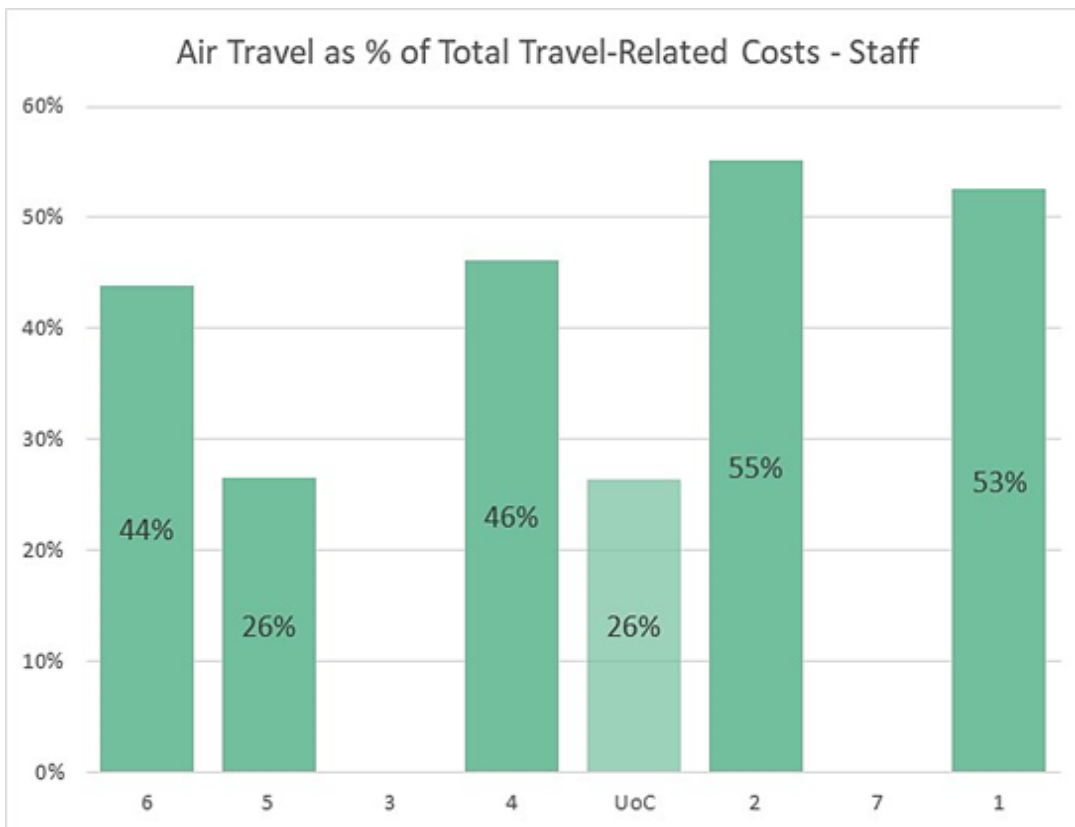


Figure 4. Air travel costs as a % of staff travel costs (from Tribal)

Orbit tell us that UC is not currently paying to offset against any air travel, although of course this has been minimal in 2020.

For context, Figure 5 shows the average annual worldwide carbon emission per person, not including flying, from eating, living and heating homes.<sup>8</sup> New Zealand is number 35. A single return flight from Auckland to Los Angeles is therefore approximately half our annual emission per person. In the Sustainability Policy UC has committed to establishing “*constraints for carbon emissions, including air travel. In doing so, the University will encourage creative, alternative modes of international engagement, which minimise travel and carbon emissions.*” Those conversations will start in 2021. Currently our Travel Policy does not include any comments on carbon emissions.

Our next step will take into account the sensitivity staff feel around not actually being allowed to travel out of NZ because of covid. We are designing a survey for academic staff to ask them how they have kept their international links productive, and how they have chosen to produce research outputs in the period during which they were unable to attend relevant conferences. We will use this to learn about behaviours during a period of “no” travel and commence a UC wide conversation based on the findings, about reducing air travel in the future once borders re-open.

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<sup>8</sup> <https://www.newshub.co.nz/home/new-zealand/2020/01/kiwis-have-already-emitted-more-carbon-in-2020-than-some-africans-will-all-year.html>

### Consumption Per capita (tCO<sub>2</sub>/person)

Rank	Country	tCO <sub>2</sub> /person
1	Luxembourg	40
2	Qatar	30
3	Trinidad and	27
4	United Arab	25
5	Kuwait	21
6	Singapore	20
7	Brunel	19
8	Saudi	19
9	United States of	18
10	Hong	16
11	Canada	16
12	Belgium	16
13	Australia	15
14	Switzerland	14
15	Estonia	14
16	Oman	13
17	Kazakhstan	13
18	South	13
19	Bahrain	13
20	Finland	12
21	Malta	12
22	Taiwan	11
23	Japan	11
24	Germany	11
25	Austria	11
26	Czech	10
27	Israel	10
28	Russian	9.4
29	Norway	9.3
30	Denmark	9.2
31	Netherlands	9.1
32	Slovenia	9.0
33	Slovakia	8.9
34	Ireland	8.9
35	New	8.6
36	United	8.3
37	Poland	8.1
38	Lithuania	8.1
39	Malaysia	8.1
40	Mongolia	7.9

#### d. Offsetting UC's Carbon Footprint

Currently UC's annual carbon emission is about 25,000 tonnes, but this will reduce by 11,000 tonnes by end 2023 when the boiler upgrades and GSHP conversion of Group 4 buildings is complete. Other measures outlined above, particularly planting pine, will also help to reduce this annual figure, and we believe that we can reach a new lower emission figure of 6,000 tonnes CO<sub>2</sub> per annum by 2030. However our modelling shows that we are unlikely to reach zero prior to 2050 without increased forest

planting, reduced air travel, introducing ground source heat pumps, and offsetting – i.e. buying carbon credits. The cost of doing the latter however is flexible based on market demand, because of the newly introduced cap on the total amount of NZ carbon credits. This cap is designed to enable NZ to reach its 2050 goal of having net zero emissions of all greenhouse gases other than biogenic methane. The cap is expected to decline over time as NZ emissions budgets reduce in line with NZ targets but there will be an option for the government to auction additional credits, hence future price is very flexible. Our initial aim to is to reduce our own costs below our current but very approximate estimate of \$400k annually to be carbon **net** neutral by 2030. We believe this is possible taking into account all the projects above.

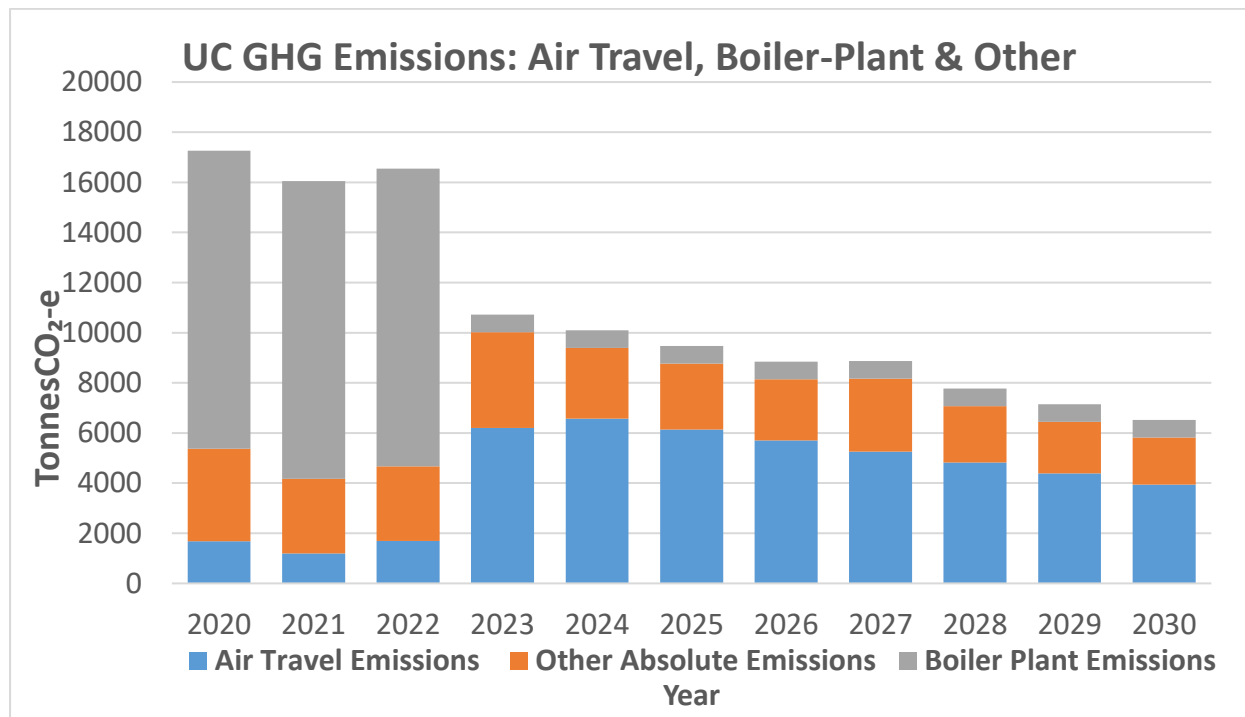


Figure 5. Draft modelled UC carbon emissions with various assumptions, showing net emission of approx. 6000 tonnes by 2030

### 5. Times Higher Impact Ranking submission in 2021

The ranking submission requested two things we were unable to provide easily for the 2020 submission.

- A single report on specific data on our performance against each of the 17 SDGs
- A commitment to meaningful education around the SDGs across the university, in some programmes or all programmes

When preparing our submission for 2020, we noted that it was not easy for UC to find specific data on our performance against each of the 17 SDGs in a single place, though generally the information does exist. However, it would be a significant advantage for us to publish this in one document, as Auckland have [here](#).

Our Strategy 2020-2030 includes the phrase “weave opportunities for students to learn and contribute to resolving the SDGs”, therefore we have the intent to do item 5b, as required by the THE Impact submission, but in 2021 we need to plan **what** we are going to do and **how**. The reasons for the

required action are twofold – to implement our Strategy and to report meaningful data to the Times Higher.

#### 6. Recommendations for decision

- That the University of Canterbury produce a single report on specific data on our performance against each of the 17 SDGs, in time for the next submission in late 2021 to the THE Impact Rankings
- That the University of Canterbury clearly identify and record alignment of some programmes or courses with some of the SDGs, and publicise them through the Sustainability Hub website

# Appendix 1

## Screenshots of Sustainability Hub website

### COVID-19 Information

The UC campus is currently under COVID-19 Alert Level 2.



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- Campus Projects
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## Sustainability Hub



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Research



Campus Projects

UC is committed to incorporating the sustainable development goals in all aspects of campus life, research, teaching and learning, and community engagement.

For further details, please contact Professor Jan Evans-Freeman, Pro-Vice-Chancellor Engineering, or Dr. Matt Morris, Sustainability Office.

### COVID-19 Information

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## Business and Sustainability



A project to cultivate native bee hives for organic honey was the winning idea of UC's 21 Day Challenge in 2015. 'The Bee Team' developed this solution to improve the wellbeing of the typhoon-hit community of Barangay Tarong, Philippines.

### Qualifications

- [Bachelor of Commerce](#)
- [Bachelor of Arts](#)
- [Bachelor of Science](#)
- [Bachelor of Sport Coaching](#)
- [Bachelor of Youth and Community Leadership](#)

### Overview

Sustainability is about meeting the needs of today without adversely impacting the needs of future generations. It involves looking at the entire business process from manufacture to end user, whilst being more efficient, using cleaner production methods, and maximising resources and minimising waste. For small businesses and large corporations, performance is no longer simply about

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