AUSTRALIA
ECU
EDITH COWAN UNIVERSITY

Climate Initiative Taskforce Report

Acknowledgement

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Preface

Recent scientific evidence shows that major and widespread climate changes have accelerated; in fact, extreme shifts have occurred in the last decade, or less[1]. This has been acknowledged through hundreds of climate emergency declarations by local governments, scientists and professional and community groups, calling for action to at least slow, if not reverse, the climate change that is adversely impacting our global community and the ecosystem. The role of the education sector, particularly higher education, as a fundamental driver and agent for addressing the climate emergency is widely acknowledged. There is mounting evidence that an environmentally focussed higher education institution not only meets social responsibility and organisational sustainability expectations from the community, but it also enhances the organisational appeal to the environmentally conscious generation. Such a focus also aligns with contemporary intellectual and civil perspectives of students, staff and alumni.

As a thought leader, ECU is playing, and could increasingly assume, a key role in tackling the present climate emergency. In the highly competitive environment of higher education, both in domestic and international markets, a key area that appeals to potential students is that of an environmentally conscious and sustainable university[2].

Just as ECU's Vice-Chancellor, Professor Steve Chapman, gives the charge to the University's graduating students at each ceremony, to leave the environment through which they move just that bit finer than it was before, his commitment to this cause was further consolidated in early 2020, when Professor Chapman proclaimed to the ECU community:

> *"The ECU community can and should do as much as we can to ensure our own operations are in keeping with the world's sustainability goals."*

In February 2020, the ECU Climate Initiative commenced, and a Taskforce subsequently established with the mandate to audit the University's current carbon footprint and recommend achievable ways by which it can be reduced. The work of the ECU Climate Initiative Taskforce has resulted in this Report, which provides an evidence-based assessment of ECU's sustainability audits to date and using the United Nations Sustainable Development Goals as a framework, identifies gaps and charts potential directions for ECU.

While ECU has reduced its carbon footprint by approximately one third overall in the last decade, there is much more we can do.

The recommendations and projections in this Report are based on our understanding of climate change research and trends, and independent annual carbon footprint auditing.

In the Report, the Taskforce proposes a range of options including, but not limited to;

- Seeking an increase in the visibility of ECU's strategic commitment to safeguarding the environment;
- Embedding environmental sustainability across the University to the point where 'new' practices become integrated into existing functions and everyday operation;
- Consolidating our sustainability work and bolstering the external face of this work to forge new, and strengthen existing, collaborations and partnerships to progress a shared vision and agenda; and
- Investigating ECU's capabilities and options to mitigate the University's carbon footprint through the generation of clean on-site energy, and potentially contributing to the regional grid.

Professor Cobie Rudd, Chair
ECU Climate Initiative Taskforce

24 September 2020

[1] The Commonwealth of Australia's, Department of Foreign Affairs and Trade - Climate Change Action Strategy, October 2019 - https://www.dfat.gov.au/sites/default/files/climate-change-action-strategy.pdf
[2] https://www.qs.com/portfolio-items/sustainability-in-higher-education/?utm_source=website&utm_medium=blog&utm_campaign=newyear

Executive Summary

Terms of Reference: The initial phase required the Taskforce to:

1. Build on existing sustainability audits to better understand past and current activity and actions aimed at reducing ECU's carbon footprint, under one umbrella of the ECU Climate Initiative;
2. Identify any gaps from assessing the comprehensive auditing and undertake some preliminary scoping for ECU's possible future attention;
3. Consider the governance structure to progress the Climate Initiative, that will focus on identifying achievable ways to reduce ECU's carbon footprint, beyond the Taskforce; and
4. Compile a report with recommendations for consideration by the Vice-Chancellor and University Executive for ways to do achievable change.

The Taskforce comprises students, professional staff, 'climate' researchers, and education/curricula experts and sustainability-specialist staff.

Methodology

To commence, the Taskforce agreed that the 17 United Nations Sustainable Development Goals (SDGs), with their corresponding targets and unique indicators, provided a comprehensive framework to structure the Taskforce's work. Consultation across the University resulted in targets categorised and revised to make them more ECU-centric. The draft product resulted in 15 Taskforce Targets in 7 categories, namely:

- Biodiversity;
- Energy and Technology;
- Social and Education;
- Transport;
- Waste;
- Sustainable Resource Management; and
- Water.

A comprehensive Sustainability Audit (360 Environmental, 2020) was to build on previous audits such as ECU Digital and Campus Services' paper titled *Sustainability at ECU* (2019), and to provide the Taskforce with a tool to highlight areas of improvement in ECU's sustainability performance and identify gaps and opportunities.

360 Environmental proceeded to conduct a series of interviews with ECU experts across the University's campuses.

Outcomes and Recommendations

A potential pathway to greater reductions that could lead to carbon neutrality is proposed.

The underlying intent is to establish a timeline on how this might be achieved for ECU and contemplates 4 key features:

1. A proposed reduction in carbon footprint from a known starting point (2019);
2. 6 sub-projects targeting the large carbon output sources;
3. An estimated Capital Investment profile; and
4. Estimated financial savings over a 10-year period.

The Taskforce notes the proposed future of the Mount Lawley campus, namely its closure and relocation of functions to the Joondalup and Perth City campuses, resulting in a reduction to ECU's carbon footprint. Investments to address additional carbon reductions on the Joondalup campus will likely generate the greatest returns for the University.

These recommendations, therefore, propose the implementation of 6 key projects, namely:

- Installation of rooftop solar (PV) panels;
- Solar Shade Parking;
- Heating, Ventilation and Air Conditioning (HVAC) Conversion and Upgrades (Optimisation Package);
- LED Lighting Conversion;
- Behavioural Change; and
- Carbon Offset Initiatives.

The Taskforce believes a pathway to carbon emissions reductions is possible between 2021-2030.

Carbon emissions can be reduced from the estimated annual carbon output for the Joondalup campus (2019 baseline of 16,371 tonnes) by 40% per year for the first 4 years (2021-2024), to an estimated 9,823 tonnes. Thereafter, the campus could reach carbon neutrality by 2025 and maintain it through to 2030. However, the process may take longer to achieve should ECU wish to limit or stagger its initial capital investments.

A schedule for the potential implementation of recommendations is produced for each of the Taskforce Key Areas.

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1. Introduction and ECU Climate Initiative Taskforce mandate

Early in 2020, ECU's Vice-Chancellor, Professor Steve Chapman, confirmed his personal commitment to safeguarding our environment in his global message to the ECU community on 6 February 2020. In that message, he addressed the topic of climate change, heightened by the bushfire devastation in Australia at the start of the year, and the role Edith Cowan University (ECU) can and should play in confronting the realities and consequences of climate change.

Figure 1:

> "**Climate change**
>
> *While we're on the topic of global challenges, I'd like to use this opportunity to remind us all that universities have a critical role to play in addressing the realities and consequences of climate change. Political debates aside, climate change presents real and present dangers for Australia and the world and it will take the brightest minds and boldest decision-makers to turn this ship around. Many of those minds exist within our university sector, not just in the sciences but right across the academic spectrum. Many of them are at ECU and we've heard their voices during recent media commentary around the bushfires.*
>
> *In addition to lending our experts to the cause, ECU can and should do as much as we can to ensure our own operations are in keeping with the world's sustainability goals. For this reason, I am this year establishing a working group to effectively audit our current carbon footprint. With this knowledge, we can then look at achievable ways to reduce this footprint. Ideally this will be a very inclusive, all-of-university project involving both staff and students. There'll be more information and an invitation to become involved in an upcoming edition of ECU Matters."*
>
> Message from the Vice-Chancellor to the ECU community, 06 February 2020

As part of his commitment, Professor Chapman established an internal ECU group, led by Professor Cobie Rudd, Deputy Vice-Chancellor (Strategic Partnerships) & Vice-President, to progress this work.

The ECU Climate Initiative Taskforce's mandate was endorsed by the University Executive on 18 March 2020. Accordingly, the ECU Climate Initiative Taskforce was formed (see section 1.1).

Shortly thereafter, a delegation of ECU staff met with the Vice-Chancellor and the Deputy Vice-Chancellor (Strategic Partnerships) on 27 March 2020 in respect to a proposal from 122 ECU academic and professional staff members seeking ECU commitment to net zero emissions by 2030.

1.1 ECU Climate Initiative Taskforce

The purpose of the ECU Climate Initiative Taskforce was to audit the University's current carbon footprint and recommend to the Vice-Chancellor, and University Executive, achievable ways by which it can be reduced. The Taskforce's work was grounded in the Vice-Chancellor's message to the ECU community on 6 February 2020.

The initial phase required the Taskforce to:

1. Build on existing sustainability audits to better understand past and current activity and actions aimed at reducing ECU's carbon footprint, under one umbrella of the ECU Climate Initiative;
2. Identify any gaps from assessing the comprehensive auditing and undertake some preliminary scoping for ECU's possible future attention;
3. Consider the governance structure to progress the Climate Initiative, that will focus on identifying achievable ways to reduce ECU's carbon footprint, beyond the Taskforce; and
4. Compile a report with recommendations for consideration by the Vice-Chancellor and University Executive for ways to do achievable change.

The Taskforce comprises students, professional staff, 'climate' researchers, and education/curricula experts and sustainability-specialist staff.

Table 1: ECU Climate Initiative Taskforce members

Name	Title	Division
Professor Cobie Rudd *(Chair)*	Deputy Vice-Chancellor (Strategic Partnerships) & Vice President	Chancellery
Ms Elsa Chew	President	ECU Student Guild
Ms Rochelle Lyle Gotico *(End date: 31 August 2020)*	Environmental and Sustainability Officer	ECU Student Guild
Mr Jamil Ali *(Start date: 1 September 2020)*	Environmental and Sustainability Officer	ECU Student Guild
Dr Naomi Godden	Vice-Chancellor's Research Fellow	School of Arts and Humanities
Professor Pierre Horwitz	Professor	School of Science
Mr Vito Forte	Director and Chief Information Officer	Digital and Campus Services
Mr Kerry Devine	Manager	Campus Operations and Support Services
Mr Jason Barrow	Cultural Awareness Officer	Kurongkurl Katitjin
Professor Daryoush Habibi	Executive Dean	School of Engineering
Professor Rowena Harper	Director	Centre for Learning and Teaching
Dr Mehran Nejati	Director of PRME and Sustainability	School of Business and Law
Mr Phil Holley	Director	Business Growth and Development
Ms Kylie Davies	Acting Corporate Relations Manager	Brand and Marketing

1.2 United Nations Sustainable Development Goals (SDGs) as a theoretical framework to guide auditing

At its inaugural meeting, the Taskforce agreed that the 17 United Nations Sustainable Development Goals (SDGs), with their corresponding 169 targets and 231 unique indicators, appeared to provide the most comprehensive framework to structure the Taskforce's work.

The United Nations Sustainable Development Goals are a universal call to action to end poverty, protect the planet and improve the lives and prospects of everyone, everywhere. The goals were adopted by all UN member states in 2015, of which Australia is one, as part of the 2030 Agenda for Sustainable Development which set out a 15-year plan to achieve the goals (United Nations, n.d.).

The Sustainable Development Goals are considered a "blueprint to achieve a better and more sustainable future for all" as "they address the global challenges we face, including those related to poverty, inequality, climate change, environmental degradation, peace and justice" (United Nations, n.d., About the Sustainable Development Goals).

Figure 2: United Nations Sustainable Development Goals (United Nations, n.d.)

1.3 Taskforce Targets

In an effort to tailor the SDGs, so that the Taskforce could hold true to its mandate, members agreed to contribute to an initial review of SDG targets and indicators, to agree on a bespoke, concise, pragmatic, and achievable set of SDGs specific to ECU for the purpose of auditing and reducing the University's carbon footprint.

Reviewing each SDG or indicator relied on a response of *"Yes"*, *"No"*, or *"Maybe"* to identify whether a target or indicator adhered to the Taskforce remit. "Relevant-to-ECU" SDGs were identified by removing all SDGs or associated indicators that had a clear *"No", "Maybe",* or *"Yes"* with no consensus. SDGs with a clear *"Yes"* were selected where overwhelming consensus was that the targets or indicators clearly contributed to the Taskforce Terms of Reference, that would inform the audit of ECU's carbon footprint and sustainability practices.

Consultation resulted in targets categorised and revised to make them more ECU-centric. The draft product then circulated among Taskforce members for input, resulting in 15 Taskforce Targets in 7 categories, namely:

- Biodiversity;
- Energy and Technology;
- Social and Education;
- Transport;
- Waste;
- Sustainable Resource Management; and
- Water.

In addition to their alignment with the SDGs, the Taskforce Targets (see Appendix A) included columns to list *ECU Experts*, *ECU Actions to Date*, and *Identified Gaps*. After another round of consultation, the Taskforce provided ECU experts they believed are already, or could provide input during further consultation, or to list ECU actions they believed already met the targets listed.

The recommendations in this report are aligned to the Taskforce Target categories and are staged in terms of timing for which identified gaps can be best addressed (see section 6.5).

1.4 Sustainability Audit - 360 Environmental

As part of the auditing, the Deputy Vice-Chancellor (Strategic Partnerships) engaged *360 Environmental* (external consultants) to augment existing sustainability audits, using the Taskforce's targets as a frame of reference (10-20 August 2020). An external and independent analysis was deemed the most transparent way to assess any gaps in ECU's past auditing practices.

The purpose of this comprehensive Sustainability Audit (360 Environmental, 2020) was to build on previous audits such as ECU Digital and Campus Services' paper titled *Sustainability at ECU* (2019), and to provide the Taskforce with a tool to highlight areas of improvement in ECU's sustainability performance and identify gaps and opportunities.

The scope of work for *360 Environmental* included:

- Audit ECU's existing sustainability practices on the Joondalup, Mount Lawley and Bunbury campuses against the Taskforce's Mapping Template, and:
    - Provide a gap analysis between current state and future state as it relates to the identified Targets within the mapping template.
    - Review existing measurement and reporting practices and provide recommendations identifying improvements, if any.
    - Recommend any additional actions and/or best practices that ECU may consider in addition to existing practices that would contribute to positive carbon footprint/sustainability outcomes.
- Advise ECU on available programs, schemes or grants (including relevant criteria) that may support ECU's current actions or recommendations provided.
- Highlight expected costs associated with recommendations should ECU choose to adopt them.

The Taskforce Members were asked to nominate ECU experts in sustainability, environment, and climate impact. Prior to interviews with these Taskforce-nominated ECU experts, a pre-audit review of relevant documents took place. Supported by Ms Lorna Viljoen, Manager Management Systems, Digital and Campus Services, 360 Environmental proceeded to conduct a series of interviews with ECU Experts across the university's campuses.

The following table reflects a list of ECU staff that were either interviewed or consulted for the Sustainability Audit (360 Environmental, 2020).

Table 2: Audit Interview/Consultation Participants

ECU Joondalup Campus		
School / Service Centre	**Name**	**Position**
Chancellery	Professor Cobie Rudd	Deputy Vice-Chancellor (Strategic Partnerships)
School of Engineering	Professor Daryoush Habibi	Executive Dean
	Dr Nando Guzzomi	Senior Lecturer
	Dr Stefan Lachowicz	Senior Lecturer
	Associate Professor Iftekhar Ahmad	Academic
	Associate Professor Mehdi Khiadani	Associate Dean, Research
School of Science	Dr Dave Blake	Lecturer, Environmental Science
	Dr Anna Hopkins	Senior Lecturer
	Dr Eddie Van Etten	Senior Lecturer
	Dr Rob Davis	Senior Lecturer, Vertebrate Biology
	Professor Pierre Horwitz	Professor
	Dr Kat O'Mara	Senior Lecturer, Environmental Management & Sustainability
School of Business and Law	Dr Mehran Nejati Ajibisheh	Senior Lecturer
	Dr Mohammad Iranmanesh	VC Research Fellow

	Associate Professor Ferry Jie	Associate Professor, Commerce
	Dr Reza Kiani Mavi	Senior Lecturer
	Assoc Prof Simone Domenico Scagnelli	Director, Accounting and Finance
	Dr Azadeh Shafaei Darastani	Research Fellow
	Dr Judy Lundy	Lecturer
Strategic Procurement	Mr Duane Redden	Manager, Strategic Sourcing and Contracts
Digital and Campus Services (Water and Energy)	Mr Kevin Hall	Manager, Buildings and Maintenance
Digital and Campus Services (Waste)	Mr Kerry Devine	Manager, Campus Operations and Support Services
School of Medical and Health Sciences	Professor Amanda Devine	Associate Dean, Public Health and OSH
ECU Mount Lawley Campus		
School / Service Centre	**Name**	**Position**
School of Education	Prof Mindy Blaise	Professor of Education
	Ms Julie Boston	Academic Coordinator
WAAPA	Mr Cameron Malacari	Production Manager
School of Nursing and Midwifery	Dr Fiona Foxall	Associate Dean, Teaching and Learning
Kurongkurl Katitjin - Centre for Indigenous Australian Education and Research	Mr Jason Barrow	Cultural Awareness Officer
ECU Bunbury Campus		
School / Service Centre	**Name**	**Position**
School of Arts and Humanities	Dr Naomi Godden	VC Research Fellow, Social Work
	Dr Marilyn Palmer	Lecturer
SW School of Science	Dr Sora Marin-Estrella	Academic

There has been some continued Taskforce engagement with sustainability, environment and/or climate experts within the University community.

2. Current State - Sustainability at ECU

2.1 Key Milestones

ECU has already made notable contributions addressing the realities and consequences of climate change in its sustainability practices. An audit of past and current practices captured the following key milestones:

a) **2005:** ECU signed an *Environmental Declaration*, a commitment to environmentally sustainable development, that acknowledged the scale and scope of the environmental challenges facing the world (Edith Cowan University, 2019).

b) **2008:** ECU completed its first *annual carbon survey* measuring its Carbon Footprint, a practice it has continued nearly every year since, resulting in a reduction of its carbon (Scope 1 and Scope 2 in National Greenhouse Energy Reporting) by 41% by 2018 (Edith Cowan University, 2019).

c) **2013:** ECU replaced its Environment Policy with a *Sustainability Policy* setting the strategic scope of ECU's commitment to sustainability in the appropriate management of the organisation and its operations, the engagement of students and staff in principles and applications of sustainability and the engagement of and collaboration with the broader community (Edith Cowan University, 2019).

d) **2017:** ECU's *Strategic Plan 2017-2021* includes promoting equality, diversity, and social responsibility, and specifically related to environment safeguarding:

- **Theme 5:** Promoting equality, diversity and social responsibility
  "We are a socially responsible organisation and we are exemplars in our community for sustainable practices. Our environmental performance is better than sector average benchmark indicators for waste to landfill, water use and energy consumption. We will continue to monitor closely our environmental performance and look for further improvements.
  During the term of this Strategic Plan we will advance our vision for reconciliation, promote and progress equality of opportunity and pursue ways to further reduce the environmental impact of our campuses and our activities" (Edith Cowan University, 2017, p. 9).

- **Strategic Goal 4:** Ensuring organisational sustainability
  Objective 15.4 - reduce carbon footprint through actions that include decreasing waste to landfill, water usage and energy consumption (Edith Cowan University, 2017, p. 19).

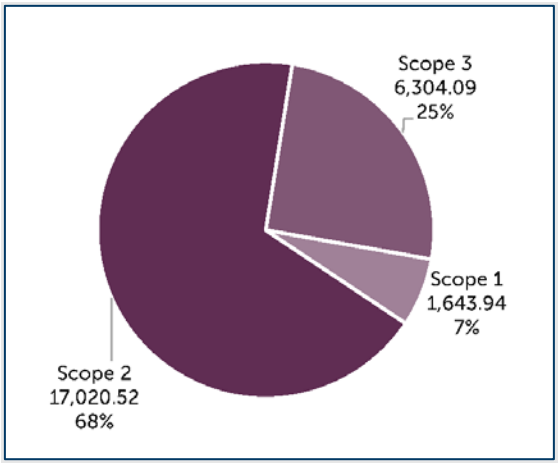
e) **2019:** ECU published its *Sustainability at ECU* report providing an overview of the strategic approach to sustainability and demonstrating initiatives that improve the University's environmental footprint (Edith Cowan University, 2019).

2.2 ECU's Carbon Footprint

Since 2008, ECU has conducted annual carbon surveys to measure its Carbon Footprint. The surveys reveal the University has reduced its carbon emissions by nearly one third, from 34,371 tonnes CO2-e in 2008 to 24,969 tonnes CO2-e in 2019.

ECU's most recent carbon survey for the period January – December 2019 includes Scope 1, Scope 2 and Scope 3 emissions (Figure 3).

Figure 3: ECU's total Greenhouse Gas (GHG) emissions in 2019 by Scope (Carbon Neutral, 2020)

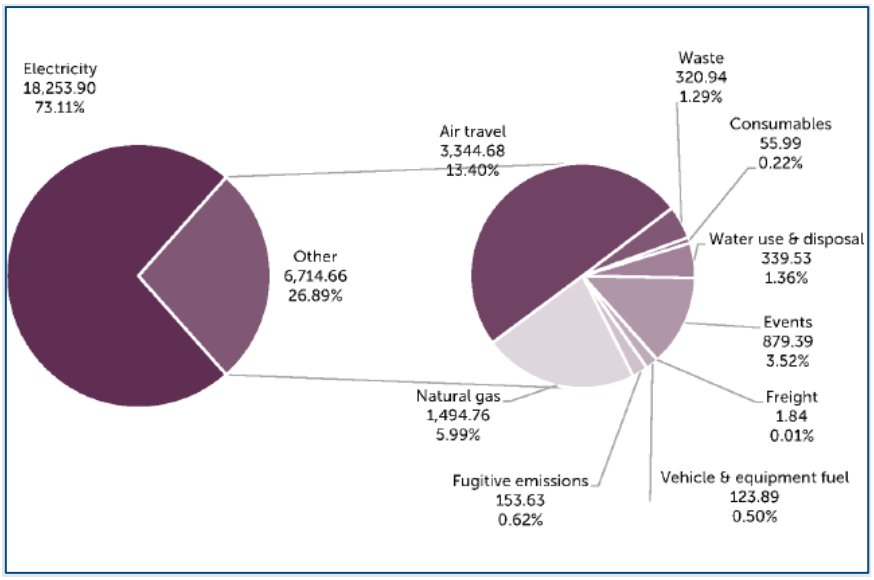


The Carbon Neutral report (2020, p.10) provides a summary of each scope as found below:

- ***"Scope 1:** Direct emissions relating to the burning of fossil fuels, used for building heating, gas boilers for hot water, to run generators or fuel for fleet vehicles. It also includes fugitive emissions such as refrigerant leakages from air conditioning plant and equipment.*
- ***Scope 2:** Emissions associated with imported electricity generation from power stations to run electrical equipment, heating and lighting systems.*
- ***Scope 3:** Emissions from activities such as waste generation, staff commuting, paper use, events, consumables etc."*

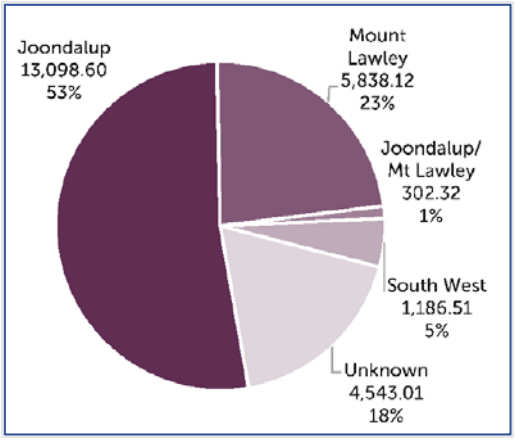
A further breakdown of ECU's gross Greenhouse Gas (GHG) emissions by activity (Figure 4), provides a helpful overview from where ECU's emissions are being generated.

Figure 4: ECU's gross Greenhouse Gas (GHG) emissions by activity (Carbon Neutral, 2020)



Finally, a breakdown of ECU's 2019 emissions per campus (Figure 5) reveals that the ECU Joondalup campus comprises 53% of ECU's overall emissions, leaving 23% for the Mount Lawley campus and only 5% for the South West Campus.

Figure 5: ECU's total Greenhouse Gas (GHG) emissions by facility (Carbon Neutral, 2020)



2.3 Sustainability at ECU

ECU has a consistent track record of including sustainability in diverse aspects of its business. As noted in ECU's *Sustainability at ECU* report (Edith Cowan University, 2019, p.3):

> *"There is a high degree of focus throughout the campus community on developing and implementing strategies which improve the University's overall environmental footprint."*

The following examples, compiled from ECU's *Sustainability at ECU* report and 360 Environmental's Sustainability Audit, are worthy of mention.

2.3.1 ECU Digital and Campus Services

Carbon Footprint Reduction	ECU has been measuring its Carbon Footprint since 2008 and conducts an annual carbon survey. The University's carbon emissions have reduced from 34,371 tonnes CO2-e in 2008 to 24,969 tonnes CO2-e in 2019 (Edith Cowan University, 2019).
Carbon Offsetting	"ECU offset 91 tonnes of carbon emissions in 2018 through the surrender of Biodiverse Reforestation Carbon Offsets in the Yarra Yarra Biodiversity Corridor" (Edith Cowan University, 2019, p.6).
Energy Consumption	Through management of the Energy Improvement Program, "ECU is amongst the most efficient consumers of energy in the Australian University Sector. Only four other institutions reported better performance levels in the 2018 TEFMA Benchmarking report. ECU's combination of efficient buildings coupled with advanced BMS technology helps to drive this level of sustained performance" (Edith Cowan University, 2019, p.4).
Waste Output	"Over the last ten years ECU has been at the forefront of a mission within the wider community to improve its levels of divergence of waste to landfill. ECU has implemented several key strategies in that time including: (a) installation of uniform recycling bins within buildings and across the campuses; (b) increased waste recovery streams including Organic, Hazardous, oils, Batteries Green and Electronic Waste; (c) creating of a waste recycling station; and (d) partnering with a progressive commercial organisation who have invested heavily in technologies such as Cleanaway" (Edith Cowan University, 2019, p.5).
Targeted Reductions in Plastics	"In 2018, ECU's Vice-Chancellor announced that ECU was restricting the use of single use bottled water from its campuses." This includes: a) café's and vending operators removing plastic water bottles from sale across three campuses; b) installation and upgrade of filtered water refilling stations across all campuses; and

	c) the provision of free reusable water bottles at ECU events and the sale of subsidised reusable PBA free bottles at most cafes. In addition, "all café outlets have made significant progress in moving towards biodegradable packaging", plates and cutlery (Edith Cowan University, 2019, p.6).
Pollution	In January 2012, ECU became the first smoke-free university in Western Australia receiving and Australian Medical Association (AMA) Award for this achievement.
Transport	"ECU provides pool vehicles available to students and staff with transport options for University or course-related business. ECU also makes available and strongly encourages the use of SmartRider cards as an alternative inter-campus travel option. ECU makes a financial contribution towards the TransPerth free CAT service from ECU Joondalup campus to the Joondalup Railway station" (Edith Cowan University, 2020, September 10).
Urbi Bikes	"ECU and Edith Cowan University staff and students are eligible to use Urbi Bikes at reduced costs. Bike sharing has positive benefits for the environment, reduces traffic congestion, noise and air pollution" (Urbi Bikes, n.d.).
Student Car Share	"Car Share is a convenient and simple car hire system targeted at students. It operates from central pick-up, drop-off locations. The vehicles are available to use within a 300km radius when not booked, students just select the required time block and lock it in. It is a great asset to utilise in a situation where students need a vehicle short-term, saving them the hassle of per-day rental, worrying about their own transport and even parking on a regular basis where that is difficult" (Edith Cowan University, 2019, p.8).
Sustainable Building Design	"The *ECU Planning and Design Guidelines* provides guidance to designers in respect to Ecological Sustainable Design ("ESD"). ESD means to design buildings with longevity and minimal impact on the existing biodiversity and there are three key ways to achieve this: a) Compliance with the six environmental performance indicators; b) Incorporating Green Star building design features to a minimum standard of 4 stars with the target of reaching 5 stars. Please note ECU does not apply for Green Star accreditation certificates but does aim to incorporate green star design features into its building design; and c) Meeting the requirements for design documentation and review according to the process. This document provides a step-by-step guide which will allow the design to be reviewed prior to proceeding to the next stage of design development" (Edith Cowan University, 2019, p.8-9).
Benchmarking	"ECU participates in the annual Tertiary Education Facilities Management Association (TEFMA) benchmarking exercise where the University compares its services, processes, and outcomes to other Australian universities. ECU is a sector leader in terms of carbon emissions, energy cost/consumption and waste output" (Edith Cowan University, 2019, p.9).
Printing and Copying	"ECU has embedded enhanced printing and copying technologies across all campuses. A reduction in the printer/copier fleet by 35% (120 devices), the model count streamlined from 96 models to 5, inbuilt capabilities such as B&W default settings, follow me print, and automatic print cancelling after 12 hours, have all helped reduce the environmental impact of excess print practices" (Edith Cowan University, 2019, p.9).
Food Recovery Networks	"Several of ECU's café operators are actively engaged in contributing to food recovery / redistribution programs. The operators of Café 6, Cafe23 and Café 10 have been collaborating with Ozharvest for several years, by donating excess food. Another exciting tri-party trial is currently underway on the Joondalup campus. An additional food recovery

	trial that included ECU researchers, Bermuda café and the ECU Student Guild has also taken place" (Edith Cowan University, 2019, p.10).
Environmental Management Certification ISO14001	"The *Facilities and Services Centre* at ECU is certified to operate a Waste Environmental Improvement Program, Water Environmental Improvement Program, and an Energy Environmental Improvement Program" (Edith Cowan University, 2019, p.3).
Environmental Data Monitoring System	"ECU uses an online tool, *Greensense View*, to monitor water, energy usage and water consumption allowing ECU to produce efficient environmental reports to support our Environmental Management System, educate and inform staff and students of environmental impacts and save money" (Edith Cowan University, 2019, p.8).

2.3.2 ECU Strategic Procurement

Procurement and Contracting documents	"Legal integrity for tenders - reviews contracts and templates for ECU contracts - contains sustainability questions for tenderers" (360 Environmental, 2020, p.65).
Sustainable Procurement Guidelines	ECU adheres to revised sustainable procurement guidelines which were updated in November 2019 (360 Environmental, 2020).

2.3.3 ECU Student Guild

Cloud Storage of Documents	"Reduce carbon footprint by decreasing printed copies of documents and mainly moving to the cloud where documents are being easily accessible by all staff and senate" (Taskforce Targets, 2020, p.3).
Student Gardens	"Student Gardens accessible to all staff and student outside of building 9 which is a public green space in ECU Joondalup campus" (Taskforce Targets, 2020, p.5).
Sustainability Events	"Events conducted and organized to meet the targets of: sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development etc. i.e. Succulent shenanigans where Guild Student Assist Officer provide Succulents to students during stressless week; Garden Gurus in partnership with ECU Counselling and ECU Guild where important topics are discussed like how to better manage stress during exams/ assessments while gardening together; World Peace day where Student Clubs are supported by the ECU Guild to have a peaceful march around ECU Joondalup and also the release of doves" (Taskforce Targets, 2020, p.7).
Cup Free Days	"Supporting students to use reusable keep cups where possible. Providing free Keep Cups for orientation day during each semester. Supporting club activities by providing them with reusable metal straws and cutleries as gifts for prizes. Actively encouraging students to use reusable water bottles on campus instead of single use plastic bottles. Host the 'Coffee cup free day' each semester with BERMUDA at ECU JO, GRINDHOUSE at ECU ML, and at KULBARDI cafe ECU BU, for free coffees to students who bring their own keep cups on that day" (Taskforce Targets, 2020, p.14).

2.3.4 School of Arts and Humanities

Boodja Justice Research Group	"On 2-3 December 2019, a workshop was held on ECU South West Campus on Wardandi Boodja, bringing together Noongar elders, community leaders, and ECU academics across multiple disciplines to share their ideas and opportunities for an aspirational and transformational agenda for research and action in the face of the climate crisis. Transformational actions came out of the workshop" (360 Environmental, 2020, p.71).

Teaching Programs	The Social Work program integrates climate change across the course as a key context for social injustice and action. Individual researchers provide social work field placement programs with a focus on climate justice action research (Taskforce Targets, 2020).

2.3.5 School of Business and Law

Enactus ECU	Enactus ECU aligns student projects and initiatives with the United Nations Sustainable Development Goals (360 Environmental, 2020).
Principles for Responsible Management Education (PRME)	As an advanced signatory to the Principles for Responsible Management Education (PRME), SBL has appointed a Director of PRME and Sustainability to actively embed sustainability in business units (Edith Cowan University, 2019).
Research activities	School of Business and Law research "informs policy makers, green supply chain, CSR, global resource efficiency and addressing environmental degradation through stakeholder and industrial collaboration" (360 Environmental, 2020, p.63). 'Gig' economy and its implications for workers, organisations, public policy and society. Modern slavery research into the supply chain - Researching 47 factors to define how the supply chain should operate noting that Australia has the Act for Modern Slavery (2018) (360 Environmental, 2020). "Research on green human resource management and demonstrating its impact on improved environmental performance and sustainable supply chain management, as well as studies on lean manufacturing practices and responsible consumption behaviours" (Taskforce Targets, 2020, p.8). "Responsible business management and SDG-related research areas such as workplace wellbeing (related to SDG 8), ethical and inclusive leadership (related to SDG 8, 9 and 10), workplace bullying (related to SDG 8 and 10), sustainable cities and communities (SDG 11), responsible consumerism (related to SDG 12), Life Cycle Asset Management (related to SDG 12), and residents waste source behaviour (related to SDG 12), green human resource management (related to SDG 13)" (Taskforce Targets, 2020, p.17).
New Columbo Plan and Bhutan Sustainability Tour	"While many nations are struggling to reduce their carbon emissions, the Kingdom of Bhutan is already carbon negative: it takes more greenhouse gasses from the atmosphere than it emits. As a result, according to its own figures, this nation of around 750,000 people removes nearly three times as much CO2 as it produces. Students complete 2 weeks community work for community academic credit" (360 Environmental, 2020, p.63).
Staff and Student Initiatives	"In collaboration with the City of Wanneroo - food items are provided. Donating second hand clothing items, collecting bottle tops and knitting beanie's/supplying for the homeless. Sustainability committee has a range of initiatives - well-being newsletter. GIVE initiative which has encouraged SBL staff to give unwanted clothing and items a second life" (360 Environmental, 2020, p.63).

2.3.6 School of Engineering

Teaching Programs	The Engineering curriculum has three programs with a high degree of focus on sustainability: Bachelor of Engineering (Civil and Environmental) Honours, Bachelor of Engineering (Electrical & Renewable Energy) Honours, Master of Engineering (Electrical & Renewable Energy) (Edith Cowan University, 2019).
Research activities	"There are a significant number of research activities underway within the school with major emphasis on sustainability. Examples include: Renewable energy and smart energy systems; Environmental monitoring technologies; Water and wastewater management; Recycling waste as building materials and for the enhancement of

	foundations; Environmental catalysis for clean production of hydrogen and hydrocarbons; Materials and processes for energy efficient reverse osmosis" (Edith Cowan University, 2019, p.11).
Water Surveillance Technology	ECU researchers assist Water Corporation to detect unauthorised access to water catchment facilities in WA. Maintaining secure and contaminant free water supply is a significant contribution by ECU to the broader environment and WA communities (Edith Cowan University, 2019).
ECU Developed Technologies	ECU students and staff develop technologies which have the potential to generate significant environmental gains (Edith Cowan University, 2019).

2.3.7 School of Medical and Health Sciences

Teaching Programs	"Collaborative effort to drive connection horticulture, agriculture, and health. Nutrition, public health, and community development units. Seeking sustainable and regenerative farming supporting natural capital and encouraging good food choices. Students are reminded of the alignment - food vision and public health aligns to the SDG goals. Virtual water in food waste" (360 Environmental, 2020, p.66).
Climate Health WA Enquiry	ECU School of Medical and Health Science had direct involvement into government policy development that involves SDGs with submissions to the 2019 Climate Change WA Inquiry (360 Environmental, 2020). This work is in addition to a whole-of-university submission to the Climate Health WA Inquiry that included input from academics across the University.

2.3.8 School of Science

Teaching Programs	"Bachelor of Science and Conservation Biology, Ecology, Restoration, Water Management and Fire Ecology, Ecosystem Resilience, and Conservation Ecology" (360 Environmental, 2020, p. 62).
Student practical experiences using natural assets within the precinct	"ECU students (pre COVID19) travel to Bhutan for education opportunities. Partnerships with Greening Australia and Yarra Yarra catchment (400km north of Perth). This is Australia's largest revegetation project based on carbon capture and biodiversity" (360 Environmental, 2020, p.62).

2.3.9 Western Australian Academy of Performing Arts (WAAPA)

Recycle resources	"Up to 80 percent of costumes are recycled." WAAPA has quadrupled the recyclability of its sets (360 Environmental, 2020, p.69).

3. Identified Gaps

Summary of Identified Gaps	
3.1	ECU Emissions Aspiration Gap
3.2	Joondalup Precinct Leadership Gap
3.3	Findings from the audit by 360
3.4	Accountability for Sustainability

3.1 ECU Emissions Reduction Aspiration Gap

In the context of the Paris Agreement and the International Panel on Climate Change (IPCC) 1.5 degrees report (International Panel on Climate Change, n.d.), governments and institutions across Australia and internationally are setting emissions reduction targets.

A number of Australian universities have already set emissions reductions targets such as Monash University's net zero target by 2030 (Monash University, n.d.), La Trobe University's net zero target by 2029 (La Trobe University, 2019), and UWA's net emissions from energy target by 2025 (University of Western Australia, n.d.).

"ECU has achieved significant reductions in greenhouse gas emissions since 2008 with a reduction from 34,371 tonnes CO2-e to 24,969 tonnes CO2-e in 2019" (360 Environmental, 2020, p.13).

This appears to correspond with ECU's publicly stated plans to reduce its carbon footprint as mentioned in its Strategic Plan 2017-2021:

> "**Objective 15.4:** *reduce carbon footprint through actions that include decreasing waste to landfill, water usage and energy consumption"* (Edith Cowan University, 2017, p19.).

However, despite this achievement, the University does not appear to have specific greenhouse gas emission reduction goals and targets as there are no formal reduction targets included in the ECU Strategic Plan or ECU's Sustainability Report (360 Environmental, 2020).

The 360 Environmental Sustainability Audit also notes that the absence of a firm commitment appears at odds with ECU policies and aspirations such as:

a) **Sustainability Policy** (Commitment): *"Conducting its business in ways that address sustainability and which raise awareness both within itself and the broader community of the needs and requirements for a sustainable future"* (Edith Cowan University, 2019, p.2).
b) **Sustainability Policy** (Principles): *"Incorporate sustainability considerations in all levels of organisation and decision making"* (Edith Cowan University, 2019, p.2).
c) **ECU Environmental Declaration:** *"Raising public, government, industry, foundation and institutional awareness by publicly addressing the need to move towards an environmentally sustainable future"* (Edith Cowan University, 2019, p.1).

3.2 Joondalup Precinct Leadership Gap

Australia became a signatory and ratified the Paris Agreement (UNFCCC Conference of the Parties 21) in 2015, "committing to the goal of keeping global warming below 2.0C with an aspiration to limit warming to 1.5C" (360 Environmental, 2020, p.11).

Under the Paris Agreement, cities are entitled to independently make more ambitious targets. The City of Joondalup was an early member of the Covenant of Mayors for Climate and Energy and made ambitious commitments to a 40% Greenhouse gas emissions reduction target by 2030 (360 Environmental, 2020).

As stated in the City of Joondalup's Local Planning Strategy, closer integration with ECU, specifically around referencing sustainability and energy, is anticipated:

> *"Encourage the integration of the Joondalup Learning Precinct based in and around intensification of the Edith Cowan University (ECU) campus. Such a development should include the provision of commercial and residential floorspace and high levels of sustainable/energy efficient built form"* (City of Joondalup, n.d., p.8).

Noting ECU's potential contribution to the City of Joondalup's ambitious target, the Sustainability Audit revealed:

> *"To contribute to achieving the City of Joondalup target, the ECU Joondalup campus would need to achieve a 40% net emissions reduction in the near term, with reductions over 40% being considered as contributing to the community target. Given that ECU would be expected to be a lead institution in this effort, lagged by other stakeholders with less institutional capacity, the scenario in this report will assume an ambitious 40% campus reduction by 2023, followed by carbon neutrality by 2025, and significant carbon positive goal of an additional 40% by 2030"* (360 Environmental, 2020, p.22).

ECU and City of Joondalup are both approaching the development of new strategic plans in 2021. The timing may be right for coordination of strategic visions with a focus on sustainability and emissions reductions (360 Environmental, 2020).

In addition, the Department of Water and Environmental Regulation, with its head office now based in Joondalup, is overhauling Climate and Energy and a new State Climate Policy is imminent. The Sustainability Audit noted that engagement with the Department may assist in achieving City of Joondalup precinct targets (360 Environmental, 2020).

Yet another precinct stakeholder, Ramsay Health Care, owner of Joondalup Health campus, recently launched a $1 million Environmental Sustainability Fund to support hospitals to undertake "projects that reduce greenhouse gas emissions" (360 Environmental, 2020, p.46).

ECU has potential to become a precinct leader, in collaboration with key local partners, if it chooses, to develop and implement its own carbon emissions reductions strategy, while coordinating with local stakeholders to develop and implement a collaborative emissions reduction strategy that benefits the precinct.

3.3 Findings from the audit by 360

Table 3: Findings adapted from Sustainability Audit (360 Environmental, 2020)

Audit Area	Finding	Compliance
Governance: Sustainability framework for ECU	**Policy:** "The ECU Sustainability Policy places an emphasis on efficiency, for ECU to conduct all its operations in an *environmentally sensitive manner, minimising waste and maximising efficiency.* However, this approach ignores the value of resilience encapsulated in institutional capacity and memory. The sustainability policy centres on ECU campus activities and lacks aspiration" (360 Environmental, 2020, p.23).	Opportunity for improvement
	Reporting: "The Sustainability Policy states: Annual operational plans are to include sustainability reporting. *"All Schools and Service Centres at ECU will include sustainability goals within annual operational plans and report to the University Executive on their outcomes and achievements through Executive Deans of Schools and Centre Directors."* From a review of the 2020 operational plans it is apparent that only Digital and Campus Services, School of Arts and Humanities, and School of Business and Law provided sustainability goals in the plans. ECU's School of Engineering, School of Science, School of Business and Law, School of Arts and Humanities, and Digital and Campus Services are institutional leaders in their engagement, research and participation in sustainability initiatives. There is an opportunity to report on these initiatives more widely and strengthen the focus into	Non-compliance

	areas with the opportunity to significantly reduce emissions into other Schools e.g. Health and Education" (360 Environmental, 2020, p.23).	
	Targets: Emissions reduction targets are not available for ECU. (360 Environmental, 2020).	Not applicable at time of audit
Governance: Sustainability Culture	"There is a strong culture of sustainability within pockets of the university and under leadership this focus could permeate all disciplines of the university, placing ECU at the forefront of sustainability for WA" (360 Environmental, 2020, p.23).	Opportunity for improvement
Governance: Environmental Declaration	"The Environmental Declaration requires: *Setting an example of environmental responsibility by establishing and maintaining processes of resource conservation, recycling and waste reduction within the University.* Over decades, there has been ongoing loss of bushland at campuses impacting protected species (Carnaby's cockatoo at Joondalup, phascogale and threatened orchids at Bunbury). This is of concern to staff and students requiring a: • Commitment to cease all clearing of native vegetation as part of all ECU contracts (procurement); • Program of restoration to protect bushland and habitat for threatened species; and • Extend conservation practices beyond the campus to the precincts" (360 Environmental, 2020, p.24).	Non-compliance
Aboriginal and Torres Strait Islander Peoples engagement – ECU's Reconciliation Action Plan (RAP) - May 2018 to April 2021	"The seven inter-connected themes in the RAP publicly articulate ECU's approach to reconciliation between Aboriginal and/or Torres Strait Islander peoples and non- Indigenous Australians. The ECU RAP commits to continued annual reporting to University Executive and Council on progress against the Strategic Plan's KPI for Aboriginal and/or Torres Strait Islander peoples' employment and Strategic Goal for sustainability. Environmental work has socioeconomic, cultural, health and political impacts. Indigenous collaborators often have a holistic world view and there are opportunities to further share and develop knowledge systems. It is an imperative that indigenous knowledge and ways of being in relation to the land and waters be included in all work on the sustainable use and management of landscapes. Emerging leaders and their elders expect this going forward" (360 Environmental, 2020, p.24).	Opportunity for improvement
TEFMA (TEFAL reports) – provide a summary of energy/water consumption.	"TEFMA reports 2016-2018 were reviewed. Energy and water use targets should be shared and considered more broadly as part of precinct targets" (360 Environmental, 2020, p.25).	Opportunity for improvement

3.4 Accountability for sustainability

The Sustainability Audit captured suggestions from ECU staff relating to the appointment of a Chief Sustainability Officer (CSO), potentially operating at the level of a Chief Financial Officer or Chief Information Officer, to form a part of the Executive team (360 Environmental, 2020).

However, this suggestion does not appear compatible with the existing leadership structure at ECU. Accountability for achieving ECU's sustainability objectives can still take place should this portfolio be assigned to a current Executive Team member or an equivalent level within the University leadership team (see section 4.1.5 (a)).

4. Future options for ECU consideration

The Sustainability Audit identified a variety of options that ECU may wish to consider should the University wish to expand its commitment to sustainability and continue its reduction of carbon emissions, conceivably to net zero.

In this section of the report, these options are categorised by the seven key areas identified by the Taskforce, but also includes *Strategic Oversight and Reporting*.

Key areas include:

- Strategic oversight and reporting;
- Biodiversity;
- Energy and Technology;
- Social and Education;
- Transport;
- Waste;
- Sustainable Resource Management; and
- Water.

4.1 Strategic oversight and reporting

Any expansion of ECU commitments to sustainability will require action where existing University policies and procedures exist, but may require new policies, benchmarking targets against United Nations Sustainability Goals, committing to sector specific external institutional accreditation programs or memberships, and expanding submissions to university rankings schemes.

4.1.1 Embed commitments in ECU Strategic Plan 2022-2027

ECU has already publicly stated its plans to reduce its carbon footprint (ECU Strategic Plan 2017-2021):

> "**Objective 15.4:** *reduce carbon footprint through actions that include decreasing waste to landfill, water usage and energy consumption"* (Edith Cowan University, 2017, p19.).

However, a new Strategic Plan for the period 2022-2027 presents an opportunity to further embed this commitment, setting clear measurable carbon emissions reductions targets.

4.1.2 University Rankings

There are several university rankings that measure institutions against their sustainability practices. ECU already participates in the *Times Higher Education (THE) Impact Rankings*. However, ECU could also consider participation in the *UI GreenMetric World University Rankings.*

4.1.2 (a) Times Higher Education (THE) Impact Rankings

The Times Higher Education (THE) Impact Rankings is the only global performance scheme that assesses universities against the United Nations' Sustainable Development Goals (Times Higher Education, n.d.).

Using "carefully calibrated indicators to provide comprehensive and balanced comparisons across three broad areas: research, outreach, and stewardship"; the *THE* Impact Rankings requires participating universities to provide evidence for SDG17 (Partnership for the Goals), followed by evidence for a minimum of 3 SDGs of choice (Times Higher Education, n.d.).

In 2019 and 2020, ECU provided evidence to support 4 and 5 SDG submissions respectively (see table 4), demonstrating the University's commitment to sustainability. **In 2020, ECU was ranked 83 out of 767 universities** overall, compared to 42 of 462 in the inaugural year for the ranking scheme. The increased number of participating universities in this second year caused the ranks of many inaugural participants to fall, a trend that is likely to continue until the number of participants stabilises. Changes to *THE*'s methodology, such as more precise criteria to identify research associated with individual SDGs, also impacted some scores.

Table 4: ECU Results - THE Impact Rankings

Description	2019	2020	2020 Positioning
Total Participants	450	768	
Overall ranking (ECU)	42	83	Top 11%
SDG 3 Good Health and Wellbeing (Rank)	28	46	Top 7%
SDG 4 Quality Education (Rank)	11	9	Top 1%
SDG 5 Gender Equality (Rank)	6	21	Top 4%
SDG 11 Sustainable Cities and Communities (Rank)	-	26	Top 6%
SDG 17 Partnership for the Goals (Rank)	101-200	101-200	

Should ECU formalise a carbon emissions target and embark on greater sustainability initiatives, the following SDGs may be relevant in future ranking submissions:

- SDG 6 Clean Water;
- SDG 7 Clean Energy;
- SDG 9 Industry Innovations and Infrastructure;
- SDG 12 Responsible Consumption and Production;
- SDG 13 Climate Action;
- SDG 14 Life below water; and
- SDG 15 Life on land.

4.1.2 (b) UI GreenMetric World University Rankings

UI GreenMetric World University Rankings is another university ranking system that may align with ECU's sustainability commitments. UI GreenMetric aims to assess university policies and actions related to Green Campus and Sustainability practices.

Using 6 categories – Setting and Infrastructure, Energy and Climate Change, Waste, Water, Transportation, and Education (see table 5) – the tenth edition (2019) saw 766 universities from 83 countries participate (www.http://greenmetric.ui.ac.id/).

Table 5: UI GreenMetric World University Rankings (Categories)

UI GreenMetric World University Rankings (Categories)	
Setting and Infrastructure	This indicator highlights whether the campus deserves to be called a Green Campus. The aim is to trigger the participating university to provide more space for greenery and safeguarding the environment, as well as the development of sustainable energy.
Energy and Climate Change	A universities attention to the use of energy and climate change issues is the indicator with the highest weighting in this ranking. Additional measures could include energy efficient appliances usage, renewable energy usage policy, total electricity use, energy conservation program, green building, climate change adaptation and mitigation program, greenhouse gas emission reductions policy.
Waste	Waste treatment and recycling activities are major factors in creating a sustainable environment. Universities should consider programs and waste treatments, i.e. recycling program, toxic waste recycling, organised waste treatment.
Water	The aim is for universities to decrease water usage, increase conservation programs and protect habitat.
Transportation	Transportation policies to limit the number of motor vehicles on campus, the use of campus buses and bicycles. Pedestrian policy and a commitment to decrease carbon footprints.
Education	Education is 18% of the total score. Educating a new generation with a concern for sustainability and the environment.

4.1.3 Further Commitments to the United Nations Sustainable Development Goals

Beyond ECU's commitment to participate in the Times Higher Education Impact Rankings, the University could formalise a commitment to the United Nations Sustainable Development Goals (SDGs).

A commitment to SDGs may include:

- Becoming a signatory to the Universities Commitment to the SDGs;
- Joining the Sustainable Development Solutions Network (SDSN) Australia, New Zealand & Pacific network (see section 4.1.4 (c)); and
- Launching a dedicated sustainability or SDG website that assists in reporting on ECU's progress towards its stated SDG goals (if applicable), research relevant to SDGs, and staff or student initiatives (see section 4.7.2).

Becoming a signatory to the *Universities Commitment to the SDGs* is open to any university in the Australia, New Zealand and Pacific Region. As of 20 September 2019, 15 Australian Universities have signed onto this commitment, including Western Australia's Murdoch University (Sustainable Development Solutions Network, n.d.).

Table 6: Universities Commitment to the SDGs

Universities Commitment to the SDGs	
Overview	The *University Commitment to the SDGs* is a short statement, for signing by the head of the university, that affirms the university's intention to support and promote the SDGs through their research, education and operations, as well as report on activities in support of the goals (Sustainable Development Solutions Network, n.d.).
About	The Commitment was initiated by SDSN Australia, NZ & Pacific (AusNZPac) as a tool to engage senior university leadership on the SDGs, start conversations within the university on how it can support them, and demonstrate to external stakeholders why universities are critical for addressing the SDGs (Sustainable Development Solutions Network, n.d.).
Become a signatory	Becoming a signatory does not involve any mandatory or legal obligations, and it is up to each university how it interprets the Commitment (Sustainable Development Solutions Network, n.d.).

4.1.4 Accreditations, certifications, and memberships

A range of options exist for ECU should it wish to participate in certifications or sector-specific accreditation schemes or memberships. These options align with an area of focus for the Taskforce (Social and Education), specifically Taskforce Target 9 (Appendix A):

Social and Education	
Target 9	Participate in global partnerships for sustainable development, complemented by multi-stakeholder partnerships that mobilise and share knowledge, expertise, technology, and financial resources, to support the achievement of ECU sustainability goals, while promoting research leadership in these areas.

The following certifications and memberships may be of interest to ECU:

- Climate Active Certification;
- International Sustainability Campus Network (ISCN) membership;
- Sustainable Development Solutions Network (SDSN) membership; and
- Australasian Campuses Towards Sustainability (ACTS) membership.

4.1.4 (a) Climate Active Certification

Climate Active, previously known as the National Carbon Offset Standard, is the Australian government's carbon neutral program.

Table 7: Climate Active Certification (Climate Active, n.d.)

Climate Active Certification	
How it works	Climate Active certification is awarded to businesses and organisations that have credibly reached a state of achieving net zero emissions, otherwise known as carbon neutrality. This means that the activities associated with running a business or producing a particular product have no net negative impact on the climate.
Benefits	• Provides an enhanced corporate social responsibility; • Positive social and environmental outcomes, improved employee engagement and community connection; • Energy and cost savings; and • Networking opportunities with other environmentally concerned entities.

To achieve carbon neutral certification, ECU will need to "measure its carbon emissions, reduce these where possible, offset remaining emissions and publicly report on its carbon neutrality. Certification for organisations and events can be sought and allows for the use of the Climate Active carbon neutral certification trademark, which can be used to showcase carbon neutral status and climate leadership" (360 Environmental, 2020, p.41).

4.1.4 (b) International Sustainability Campus Network (ISCN)

ISCN provides an international forum that supports higher education institutions in the exchange of information, ideas, and best practices for achieving sustainable campus operations and integrating sustainability in research and teaching (International Sustainability Campus Network, n.d.).

ECU could become an ISCN member by endorsing the ISCN Sustainable Campus Charter. The Charter requires signatories to support five calls to action (International Sustainability Campus Network, n.d.):

1. Embed sustainability in all aspects of the university (governance, operations, learning, research, community);
2. Create an environment that cultivates resilient, empowered, caring and engaged students, staff, and faculty who will contribute to the health of people and places;
3. Engage with external partners, industry, government and civil society to disseminate knowledge, research and best practices to benefit the communities in which we serve;
4. Deepen and broaden the collaboration that happens between members of the network to accelerate collective action; and
5. Ensure that the network is significantly inspiring international dialogue and debate to contribute to the Sustainable Development Goals.

The University of Melbourne and UNSW Sydney are the only Australian universities with ISCN membership.

Table 8: International Sustainability Campus Network Membership (International Sustainability Campus Network, n.d.)

ISCN Membership Overview	
Membership Requirements	The Charter must be signed by the president, vice-chancellor, rector (International Sustainability Campus Network, n.d.).
Membership Dues	Pay an annual Charter membership fee of 2,000 € (with discounts for smaller universities and those in developing countries available) that contributes to the operational costs of the ISCN-Secretariat (International Sustainability Campus Network, n.d.).

4.1.4 (c) Sustainable Development Solutions Network (SDSN)

ECU may wish to join the Sustainable Development Solutions Network (SDSN) Australia, New Zealand & Pacific, a regional chapter of the United Nations global initiative Sustainable Development Solutions Network (SDSN).

Membership is open to universities, research institutions, foundations, civil society, and other organisations in the region that have deep expertise in one or more areas related to sustainable development, and who commit a substantial amount of their own technical and research work towards finding and/or implementing solutions for sustainable development (Sustainable Development Solutions Network, n.d.).

There are currently 20 Australian Universities listed as regional members of SDSN Australia, New Zealand & Pacific, including Curtin University Sustainability Policy, Centre for Responsible Citizenship and Sustainability at Murdoch University, and the University of Western Australia.

Table 9: Sustainable Development Solutions Network (SDSN, 2020)

Sustainable Development Solutions Network (SDSN)	
Who can join?	Membership in the Sustainable Development Solutions Network is free and open to not-for-profit institutions (not individuals). Institutions must be knowledge-generating, i.e. they must conduct research, analyses, and/or data collection, and can be universities, research institutions, foundations, or civil society groups. Member institutions should have deep expertise in one or more areas related to sustainable development and commit a substantial amount of their own work towards finding and/or implementing solutions for the SDGs (Sustainable Development Solutions Network, n.d.).
Why join?	By becoming a member of the SDSN, ECU will join a unique network of problem solvers and contribute to practical solutions for sustainable development, working together to support: • Global Discussions on Sustainable Development; • Local, National, and Regional Problem Solving for Sustainable Development; • Educational Initiatives for Sustainable Development; and • Applied Research and Communication for Sustainable Development (Sustainable Development Solutions Network, n.d.).
Cost	There are no costs associated with membership in the SDSN. Any institution interested in joining the SDSN is invited to complete an online application form to the SDSN Secretariat through a web portal. The form contains questions about the applying institution, its sustainable development activities, and its proposed involvement with SDSN (Sustainable Development Solutions Network, n.d.).

4.1.4 (d) Australasian Campuses Towards Sustainability (ACTS)

Australasian Campuses Towards Sustainability (ACTS) “aims to inspire, promote and support change towards best practice sustainability across all types of campuses” (Australasian Campuses Towards Sustainability, n.d.).

29 Australian Universities, including University of Western Australia, are members of ACTS. However, ECU is not a current member.

Should ECU choose to become an ACTS member, it would benefit from a wide range of resources and tools such as Green Impact (see section 4.4.6 (a)), STARS, and LiFE. There will also be opportunities for ECU to apply for the annual ACTS Award of Excellence which is only available for current ACTS members (Australasian Campuses Towards Sustainability, n.d.).

Table 10: Australasian Campuses Towards Sustainability Membership (Australasian Campuses Towards Sustainability, n.d.)

ACTS Membership Summary	
Institutional Membership	"Institutional membership connects Universities, TAFEs and Polytechnics in Australia and New Zealand who are working to create a sustainable future. ACTS provides the opportunity for individuals, teams and whole institutions to share both problems and solutions among a wide network of peers within the sector. ACTS utilise case studies, interactive forums and networking opportunities to facilitate the collaborative sharing of sustainability knowledge and opportunities" (Australasian Campuses Towards Sustainability, n.d.).
Annual Fees	$1100 excl. GST (0-19,999 EFTSL) / $1275 excl. GST (> 20,000 EFTSL)
Benefits	• "Access to the members-only web content, including comprehensive resources; • Access to the EAUC (a UK based association) and AASHE (a USA based association) member resources – as part of an exclusive international collaboration; • Access to the LiFE Index guidelines, a comprehensive performance management and improvement system; • Publicity of your institution's sustainability achievements, including the member Spotlight; • Member discounts for institutional Green Impact packages; • Member only eligibility to the ACTS Awards of Excellence as part of the Green Gown Awards Australasia; • In partnership with AASHE, member discounts and exclusive support for the Sustainability Tracking, Assessment & Rating System (STARS); and • Receive a Member report card for you to promote throughout your institution" (Australasian Campuses Towards Sustainability, n.d.).

4.1.5 University-wide culture of sustainability

ECU may wish to strengthen its culture of sustainability to encourage both an institutional responsibility and action and personal commitment from staff and students towards its targets.

This could be achieved by:

- Establishing a Sustainability Champions Group that may include an Executive Champion;
- Embedding sustainability in all areas of the University's work, including creating a Sustainability/ Sustainable Development Goals landing page on the ECU website;
- Integrating sustainability in the Reconciliation Action Plan due for renewal in April 2021; and
- Considering accounting and campus service enhancements.

4.1.5 (a) Sustainability Champions Group

Encouraging an ECU-wide culture of sustainability that aligns with any future ECU commitments to carbon emissions reductions or sustainability will require champions. ECU may wish to designate an Executive Champion to facilitate this transition.

A model worth consideration is ECU's commitment to Equality and Diversity and its growth as an institutional leader in gender quality.

4.1.5 (b) Embedding sustainability in all areas of the University's work

Encouraging an ECU-wide culture of sustainability will need a transition from the Sustainability Champions Group to mainstreaming any adopted approaches in all areas of the University's work. The Sustainability Audit (360 Environmental, 2020, p.50) noted that ECU already has "established pathways to embed a paradigm shift into the teachings of ECU where activities pivot around the central theme of sustainability." A dedicated relevant landing page would profile ECU's work and collaborations in the area for both internal and external audiences, and would enhance ECU's positioning for rankings/ institutional accreditation schemes, such as the Times Higher Education (THE) Impact Rankings (see section 4.7.2).

However, this paradigm shift may also take place through staff and student initiatives or programs that foster behaviour change on and off campus (see section 4.4).

4.1.5 (c) Reconciliation Action Plan

ECU's Reconciliation Action Plan is due for renewal in April 2021. Any commitments to sustainability and emissions reductions, as well as associated programs or initiatives, will benefit from Aboriginal and Torres Strait Islander traditional ecological knowledge perspectives. This provides ECU with the opportunity to further showcase its commitment to reconciliation and sustainability (360 Environmental, 2020).

Considerations may include contemporary caring for country initiatives such as replacing ECU distributed gifts (bottles of wine) with ECU donations to integrated biodiversity initiatives or sustainable programs such as wildlife sanctuaries (see section 4.1.7).

4.1.5 (d) Accounting and Campus Service considerations

The Sustainability Audit (360 Environmental, 2020, p.41) recommended an evaluation of ECU internal control and reporting activities. In addition, should ECU wish to engage in tree planting and native regrowth projects, suggestions were provided:

> *"Conduct a Qualitative Comparative Analysis with COSO/WBCSD Nonfinancial Internal Control Framework Guidelines (Nelson and Rauland, 2019) to evaluate ECU internal control and reporting activities against the requirements of Climate Active, the National Carbon Offset Standard, and TEFMA and against international standards such as the WRI/WBSCD Greenhouse Gas Protocol, Australian National Greenhouse and Energy Reporting System (NGERS), ISO14033/64, and US EPA ANSI E4.*
>
> *For tree planting and native regrowth projects use FullCAM, a world best practice Australian CSIRO developed fully integrated Carbon Accounting Model (CAM). The Climate Active standards also explicitly refer to Life Cycle Assessment (LCA) techniques and international LCA Standards (such as ISO14040:2006, ISO14044:2006) as the basis for any analysis of new developments. Other greenhouse gas reporting standards, such as PAS2050:2011 and the Greenhouse Gas Protocol Product Life Cycle Standard are also based on LCA and are used as the basis for carbon footprint calculation."*

4.1.6 Adopt a precinct approach to target setting

A longer-term consideration for ECU may be the facilitation and/or implementation of Joondalup Precinct carbon reductions or sustainability targets to leverage improved sustainability outcomes. This could be done in collaboration with the City of Joondalup; Joondalup Health Campus; the WA Police Academy; the Department of Water and Environment Regulation; and the North Metropolitan TAFE as part of the broader Joondalup precinct area.

4.1.7 Offsetting Carbon Emissions

ECU could consider a pathway to carbon neutrality by offsetting its emissions with the purchase of Australian Carbon Credit Units (ACCU). Emissions are offset at a cost of $14.17 per unit. While this may be the fastest way to reduce carbon emissions, it is more costly over time as "payments must be repeated indefinitely to cover ongoing emissions" (360 Environmental, 2020, p.35).

The Sustainability Audit noted that "offsetting Joondalup Campus emissions of 12,957.69 tonnes e-CO2 would cost approximately $185,000 per year to maintain" (360 Environmental, 2020, p.35).

However, offsetting can occur with tree planting (see section 4.2) or ecological repair campaigns. An example of successful offsetting of this nature occurred when "ECU offset 91 tonnes of carbon emissions in 2018 Biodiverse Reforestation Carbon Offsets in the Yarra Yarra Biodiversity Corridor" (Edith Cowan University, 2019, p.6).

4.2 Biodiversity

In its effort to support local biodiversity initiatives, ECU could combine staff and student behavioural change projects while supporting local not-for-profit organisations such as Trillion Trees (www.trilliontrees.org.au).

In addition to any on-campus biodiversity initiatives ECU may choose to implement, ECU could sponsor or register teams that contribute to revegetation efforts in Western Australia, and through partnerships with local organisations like Trillion Trees, the University could participate in offsetting (see section 4.1.7) that contribute to the rehabilitation of Western Australia's biodiversity. The ECU Student Guild representatives on the Taskforce have been keen to see more initiatives of this nature and believe ECU could do more to support student-led projects that benefit revegetation and biodiversity in WA.

The Taskforce's Sustainability Audit (360 Environmental, 2020, p37) identified an additional means of contributing to revegetation and rehabilitation programs:

> *"The location of Edith Cowan University adjacent to Lake Joondalup provides an opportunity for action and support to improve the biodiversity of the Lake. The City of Joondalup is a signatory to the ICLEI – Local Governments for Sustainability's Local Action for Biodiversity (LAB) plan in 2008. The City prepared a Biodiversity Action Plan 2009-2019 and a Yellagonga Integrated Management Plan 2014 2019 (YIMP) with City of Wanneroo and Department of Parks and Wildlife. The YIMP covers the catchment of Yellagonga Regional Park, which includes Lake Joondalup. The YIMP includes groundwater and surface water monitoring and environmental advice from ECU including midge management and acid sulfate soils. With the plan due for renewal there is an opportunity that the role could be expanded with students assisting with revegetation and rehabilitation programs within the Lake and designing biofilter systems to remove nutrients before they enter the lake."*

The abovementioned considerations for *Biodiversity* align with Taskforce Targets 1-3 (Appendix A):

Biodiversity	
Target 1	Ensure that ECU lands are used for their best and most productive purpose with a strong emphasis on maintaining and encouraging biodiversity.
Target 2	Strengthen ECU's education, resilience and capacity to mitigate, adapt and respond to climate-related hazards and integrate climate change measures into policies, strategies and planning.
Target 3	Aim to contribute research and education that informs sustainable land and water management, that assists in the reduction of degradation of natural habitats, halts the loss of biodiversity, and protects and prevents the extinction of threatened species.

4.3 Energy and Technology

In its efforts to mitigate carbon emissions, ECU could investigate its capability to generate clean on-site energy (and potentially contributing to the grid), in addition to the installation of technologies that support green energy sources. This may lead to the establishment of an integrated plan which includes installation opportunities, timelines, risks and conversion requirements, and additional logistical requirements (360 Environmental, 2020). In addition, this may include closing ECU's emissions reduction aspiration gap (see section 3.1) by setting clear emissions targets.

Energy reduction options highlighted by 360 Environmental's Sustainability Audit (2020) include:

- Solar power installation;
- Solar Shade Parking / Energy storage;
- Corporate Power Purchase Agreements;
- Virtual Power Plant (VPP) and Plico Energy;
- Peer-to-Peer (P2P) trading and Power Ledger; and
- Energy Efficiency and Conservation.

The following considerations for *Energy and Technology* align with Taskforce Targets 4 and 5 (Appendix A):

Energy and Technology	
Target 4	Explore opportunities for ECU to understand and take advantage of sustainable energy sources.
Target 5	Led by ECU Researchers, enhance research that encourages innovation and support leading to upgrades of sustainable technological capabilities across appropriate industry sectors.

4.3.1 Solar Power Installation

Solar power may be a future consideration should ECU formalise emissions reduction targets. One option available is the installation of solar panels utilising ECU Joondalup Campus roof space. Of all the WA universities, ECU is in the prime position of having ample flat, north-facing roof space across its campuses and could capitalise on this position to significantly reduce its carbon emissions, if not become entirely energy self-sufficient.

The Sustainability Audit (360 Environmental, 2020, p.26-27) highlighted the potential for solar power installation:

> *"The Perth Metropolitan area and surrounds have an ideal geography for the generation of solar power. A ballpark estimate of solar capacity is ~1700kWh of annual electrical power output per 1kW of north facing rooftop solar installed (LG Calculator, 2020), monthly ranging from 75kWh (July) to 221 kWh (Dec). To completely replace 15,000 MWh of electricity usage by the ECU Joondalup (Carbon Neutral, 2019) could conceivably require up to 8.8 MW of solar power production."*

Calculating the potential return on investment for ECU, should it utilise its North, West and East facing roof space, the Sustainability Audit (360 Environmental, 2020, p.27) noted:

> *"North facing rooftop generation capacity on the ECU Joondalup Campus, according to our interviews with the School of Engineering is 4MW. Although the cost of solar panels has dropped to as low as $0.40 per Watt, the industry rule of thumb for budgeting for installed solar on major projects is $1 per Watt to include administration, consultants fees, infrastructure, installation, inverters, electrical works, connection, insurance and commissioning. Minimal annual asset management and maintenance budgets are required in addition. Consequently, the capital expenditure for a 4MW system could be $4 million AUD. Assuming a maximum yearly savings of ~$1,750,000 with a levelized retail electricity price of $0.20 per kWh gives a 3 year ROI on the investment, followed by an continued savings thereafter. With a $0.04-$0.10 AUD levelized cost of electrical power over 20 years, not installing solar power represents a significant opportunity cost from the onset (IRENA, 2018). Additional investments in solar can also be made on West and East facing roofs, with these alternatives taking an average power production hit of 15%. However, because East facing panels peak in production earlier (10-11am) and West facing panels peaking later (2pm-3pm), this means that the University can consume more of its generated power while exporting less to the grid, resulting in additional savings due to feed-in tariffs lagging the cost of importing electricity."*

Solar Park Shades could be yet another source of solar power for the University with 14kW units (24,000 kWh) shades covering double row 3 car spacings, and these are available in units that are electric car charger ready (360 Environmental, 2020).

4.3.2 Energy Storage

The deployment of energy storage can be a welcome complement to solar power or renewable energy generation (see section 4.3.1). This will be important for the availability of electricity, for increasing optimal value for grid exported electricity, and for participating in any precinct scale microgrid (360 Environmental, 2020).

The ECU Joondalup campus already has an alternative means of energy storage to store excess midday solar power "in the form of cooled water for the Central chilled water plant located in Plantroom 2 in Building 16 (360 Environmental, 2020, p.28).

ECU School of Engineering experts believe that alternative energy storage options could be experimented with such as "hydrogen production, water treatment of intercepted rainwater, or geothermal" (360 Environmental, 2020, p.28).

Energy storage could also be achieved with the addition of electrical car charge points at ECU parking bays, which may work well if ECU pursued Solar Park Shades (see section 4.3.1) that are available in units that are electric car ready. These charge points could be low cost and a form of excess solar storage with the potential for reducing community emissions.

> *"Private vehicle travel to ECU Joondalup currently results in ~7,500 t e-CO2 (Edith Cowan University 2017 Travel Surveys). 72% of Staff at ECU campuses currently commute along to work by car, with a further 5% carpooling, and these figures are consistent of the past 20 years with a slight upward trend. Transition of 100% of staff and student vehicles to EVs, and fully charging them from excess daytime solar electricity would at maximum abate that quantity of emissions. Taken in the context of the Joondalup campus GHG emissions of ~13,000 tCO2-e this is significant. EV initially reduces the drivers cost of transport from $0.15/km to $0.05/km. Possible electricity subsidies or salary sacrifice options employed by the University could further reduce this significant annual cost of on average $2,000 per capita for staff and students. This approach could cushion employees and students who are experiencing economic upheavals such as during the COVID-19 pandemic. Capturing solar energy in the form of parking sails would also cool EVs during the day, improving battery life"* (360 Environmental, 2020, p.29).

4.3.3 Corporate Power Purchase Agreements (PPA)

The ECU Joondalup campus, as a large-scale consumer, can participate directly in the wholesale electricity market to secure long-term power offtake contracts with large scale renewable energy projects.

> *"This trend has been emerging since 2016, and currently most major universities in Australia engage in the Corporate PPA market to some degree (BRC-A, 2019). Such contracts can be cost competitive with existing electricity contracts, especially given the rapidly declining costs of large-scale renewable generation in recent years. The levelized cost of Large-scale PV solar electricity with storage is now comparable with the lowest cost of fossil fuel based new generation (Closed cycle natural gas) with strong downward trends not found in competing technologies (CSIRO, 2018).*
>
> *Meanwhile, in Western Australia the retail price faces upward price pressure due to growing system variability on the network (AEMO, 2019) relating to increased climate variability and shifting demand due, in part, to increases in behind-the-meter rooftop solar. This approach would require additional administration by ECU than purchasing electricity through a retailer, and these and other transactions costs would also need to be taken into consideration.*
>
> *A pipeline of twelve major renewable energy projects are currently planned or under construction in Western Australia with 740MW of combined capacity (Climate Council, 2020).*
>
> *However, Retailer and PPA subscription to these projects is high and access to remaining capacity may be competitive. The Victorian Local Government Association has demonstrated that combining small and mid-level consumers can increase bargaining power in the negotiation of PPAs while sharing administration and transaction costs (BRC-A, 2019). Under this model it is possible that multiple users within the City of Joondalup could combine to bid under a consortium PPA with large scale renewable projects. ECU is well positioned to take a lead in facilitating such a consortium PPA.*
>
> *One disadvantage of contracting a Corporate PPA is that prices and offtake volumes are typically locked in for a long period, generally for 10 years or more. However, a consortium agreement could leave flexibility for ECU to pursue alternate strategies over time by negotiating shifts in offtake to other parties with fewer conservation or renewable energy options"* (360 Environmental, 2020, p.26).

4.3.4 Virtual Power Plant (VPP) and Plico Energy

ECU could develop a Virtual Power Plant (VPP). A VPP is a network of small to medium scale, decentralised generating units with behind-themeter battery storage that are dispatched from a central control room while remaining independent in their operation and ownership. VPPs relieve network load by dynamically distributing power from individual units during peak load, and optimally trading power between participants. that could relieve network load by power distribution (360 Environmental, 2020).

The Sustainability Audit (360 Environmental, 2020, p. 31) identifies the benefits ECU could achieve should it develop a VPP using the Plico Energy model:

> *"Plico Energy is a local organisation which develops VPPs around a not-for-profit Association structure, with non-allocated joint revenue being reinvested in the VPP on behalf of the association. The VPP delivers a quicker ROI on renewable investments through coordinated installation and maintenance services, efficiencies and load optimisation, responsive real time dispatch services, and sophisticated information systems. Participants pay a lower "retail" price for electricity until the asset has been purchased from the VPP, which assumes the capital cost upfront through funding with equity capital (Susi Partners).*
>
> *In developing a VPP using the Plico Energy model that included the Joondalup campus and nearby parties, ECU could achieve the following benefits:*
>
> - *Reducing costs through taking advantage of Small-scale Technology Certificates (STCs) across multiple facilities and dwellings*
> - *Giving each ECU business unit and School visibility and control over its own usage and footprint*
> - *Creating an educational laboratory with data visualisation tools for students to engage with including:*
>   - *Engineers*
>   - *Data scientists*
>   - *Commerce (trading)*
>   - *Behavioural scientists*
> - *Utilise a structure that allows minimal capital expenditure"*

4.3.5 Peer-to-Peer (P2P) trading and Power Ledge

The Sustainability Audit (360 Environmental, 2020, p.32) noted the following about P2P trading:

> *"P2P electricity trading is a disruptive technology which facilitates an incremental real-time trading of surplus renewable energy to external customers in a way that is responsive to small scale changes in energy usage. By creating a more efficient market this reduces costs and maximises revenue for participants and helps to balance loads on the grid and ultimately reduce network charges.*
>
> *There appears to be an opportunity for ECU, should it combine peer-to-peer trading, rooftop solar power and storage to enable the University to trade with its (non-solar) neighbours in the Joondalup Precinct."*

4.3.6 Energy Efficiency and Conservation

ECU's School of Engineering has identified opportunities for energy efficiency on ECU campuses. Improvements to chillers, ventilation, voltage optimisations, and isolation of potential upgrades or retrofits to ECU facilities could result in larger reductions in emissions than ECU's current initiatives, for example, focusing on lighting upgrades alone (360 Environmental, 2020).

ECU's Digital and Campus Services has already begun LED lighting upgrades as these are approximately 50% more efficient than incandescent lights and have a longer lifespan.

The Sustainability Audit (360 Environmental, 2020, p.32) notes:

> *"Example in one case study, the University of Queensland analysed the efficiency of air-conditioning chillers which accounted for 45% of energy use on campus, and installed an optimisation package reducing energy consumption by 20% saving more than $100,000 per year with a 2 year ROI (Dept of Industry, 2010). Edith Cowan has well developed systems (QFM, Greensense) for investigating and scheduling upgrades for energy efficiency at the University. A comprehensive Energy Efficiency Opportunities Audit, using the best practice methodologies developed by the Australian government for the Energy Efficiency Opportunities scheme, should be considered."*

4.4 Social and Education

Further enhancing ECU's initiatives that create a university-wide culture of sustainability (see section 4.1.5), the University may wish to strengthen its staff and student commitments to sustainability.

There is evidence that students are choosing their universities based on an institutions environmental or sustainable commitment. Recent surveys from the Princeton Review, QS Quacquarelli Symonds, Ipsos Mori are good examples.

Princeton Review's *2020 College Hopes and Worries* Survey (Princeton Review, n.d.) found that:

- 66% of 12,845 respondents said having information about a college's commitment to environmental issues would contribute "Somewhat," "Very Much," or "Strongly" to their application and enrolment decisions
- 25% of respondents indicated it would contribute "Strongly" or "Very much".

QS Report - *Sustainability in Higher Education: What More Can Universities Do?,* (QS Quacquarelli Symonds. 2019, September 13) found that:

- 94% of students agree that universities could do more to be environmentally sustainable.
- Respondents believe that universities should take responsibility for a variety of areas, including protecting the environment (66%), developing sustainable technologies (65%), and developing green energy technologies (61%).
- 55% would like to learn about sustainability through extracurricular activities within departments, linking coursework or dissertations to the issues (54%), and placements or work experience (54%).

Ipsos MORI, on behalf of Amnesty International (2019), questioned more than 10,000 people aged 18-25-year olds—also known as Generation Z—in 22 countries for the "Future of humanity" survey. Respondents were asked to pick up to five issues from a list of 23 major issues facing the world. In total:

- 41% of respondents said climate change was one of the most important issues facing the world, making it the most cited globally, followed by 36% who chose pollution and 31% who selected terrorism.
- Global warming was also most cited as one of the most important environmental issues facing the world (57%), out of 10 environmental issues such as ocean pollution, air pollution and deforestation.

This evidence appears to suggest that current and future students are likely to be responsive to university initiatives that address sustainability and carbon emissions reductions.

The following considerations for *Social and Education* align with Taskforce Targets 6-9 (Appendix A):

Social and Education	
Target 6	Provide access to safe, inclusive, and accessible green and public spaces on ECU campuses, with emphasis for women and children, older persons and persons with disabilities.
Target 7	The attainment of knowledge and skills needed to promote sustainable practices through the promotion and delivery of educational content integrated into existing coursework, units, workplace integrated learning opportunities, and research projects.
Target 8	Utilise appropriate socially and environmentally responsive procurement policies and procedures to improve ECU resource efficiency and minimise ECU's environmental footprint in consumption and delivery of university business.
Target 9	Participate in global partnerships for sustainable development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of ECU sustainability goals, while promoting research leadership in these areas.

4.4.1 SDG Student Program

The SDG Students Program is an initiative of Sustainable Development Solutions Network (SDSN) Youth that aims to engage students in higher education in the global effort to achieve the 2030 Agenda and the SDGs, as well as empower them with the knowledge, skills, and pathways to action to be effective agents of change today (SDG Students Program, n.d.).

This initiative aims to develop a global network of Student Hubs. There are only 3 hubs active in Australia, however, there are none in Western Australia.

ECU's potential commitment to SDGs (see section 4.1.3) could extend to include establishing a SDG Student Hub, where students are encouraged to complete the SDG Students Program Certificate. Jointly developed by SDSN Youth, the Ban Ki-Moon Centre for Global Citizens and the SDG Academy, students are encouraged to complete the non-credit certificate.

4.4.2 SDG Integration in ECU Courses

ECU's Centre for Teaching and Learning could facilitate the embedding of sustainability knowledge and capabilities, potentially linking to SDGs, in its curriculum framework.

Another option available to ECU is a collaborative effort with the SDG Academy's Community of Practice. The Community of Practice invites global higher education institutions, NGOs, for-profit businesses, and relevant government entities to join a diverse community dedicated to advancing education for sustainable development through peer learning and the sharing of best practices, customized resource development, and opportunities for research and thought leadership (Sustainable Development Solutions Network, n.d.).

The combination of the SDG Student Program (see section 4.4.1) and SDG and sustainability integration in courses may have a lasting impact on social and education outcomes.

4.4.3 #ACT4SDGs

ECU's potential commitment to educating its staff and students about the benefits of sustainability and carbon emissions reductions could take the form of an annual staff or student challenge or event during the Global Week to #ACT4SDGs.

The Global Week to Act4SDGs website ((www.act4sdgd.org) provides the following summary of the initiative:

> *"Each year millions of people across the world mobilize to take individual and collective action for people and the planet while world leaders meet at the UN General Assembly. The goal is to mark the anniversary of the adoption of the Sustainable Development Goals, the universal plan to create a better world by 2030, by ending poverty, fighting inequality and addressing the urgency of climate change.*
>
> *The Global Week to #ACT4SDGs aims to mobilize and consolidate a global movement of people who stand behind the Goals, to take action and to demand world leaders accelerate progress and hold to their commitments to the 2030 Agenda. Every action counts: from public demonstrations, to online campaigns, to beach cleanups, museum exhibits and school art projects on sustainability topics. People, organizations and communities everywhere join in actions to support the Sustainable Development Goals."*

ECU could facilitate behavioural change with this level of student and staff engagement, while celebrating the university's sustainability achievements and SDG commitments. ECU's School of Business and Law has been part of the #ACT4SDGs since 2019.

4.4.4 Green Initiative Fund

A Green Initiative Fund (TGIF) would promote sustainable development by providing necessary funding to the university community. The fund could be available to students of all backgrounds by empowering them to develop, propose, and enact sustainable projects on campus, possibly in collaboration with ECU's Digital and Campus Services (see section 4.6.3).

A fund of this nature could conceivably be funded by student fees, with student recipients receiving financial support for projects that positively impact students through increasing educational opportunities, promoting environmental awareness, engaging in sustainability research, advocating for climate and environmental justice, reducing greenhouse gas emissions, increasing energy and water efficiency, limiting the amount of waste created on campus, and encouraging healthier, more planet-friendly lifestyles (University of California, (2020).

Taken in conjunction with the implementation of a SDG Student Hub (see section 4.4.1) and student participation in #ACT4SDGs (see section 4.4.3), initiatives of this nature could embed a sustainability culture among ECU students.

4.4.5 Fair Trade accreditation

ECU could encourage or mandate on-campus vendors and cafes to pursue Fair Trade accreditation.

In order to receive endorsement as a Fair Trader of Australia, businesses are required to demonstrate their commitment to the 10 Principles of Fair Trade including creating opportunities for disadvantaged producers, payment of a fair price, gender equality and fair working conditions (Fair Trade Association, n.d.).

4.4.6 Staff Behavioural Change

4.4.6 (a) Green Impact Toolkit

ECU could educate and equip staff to change workplace behaviours that contribute to any potential SDG commitments or assist with carbon emissions reductions.

Green Impact (see section 4.1.4 (d)) is a change and engagement program facilitated by Australasian Campuses Towards Sustainability (ACTS). The program is implemented by organisations who want to provide a supporting framework for their staff to deliver sustainability actions in the workplace and aligns with UN Sustainable Development Goals (Australasian Campuses Towards Sustainability, n.d.).

ECU is not a current member. However, 13 Australian Universities, including UWA, are current members. 3 of 4 Australian universities ranked in the Top 10 *THE* Impact Rankings 2020 are also members.

4.4.6 (b) Live Campus Environmental Updates

ECU currently uses *Greensense View* to monitor its waste, water and energy consumption. The system enables ECU to review live data for the University, individual campuses and buildings.

One of the benefits of accessing live data is that it "helps to educate and inform staff and students of environmental impacts" (Edith Cowan University, 2020).

To more effectively communicate campus water usage, and to drive change in energy and water consumption, ECU may consider displaying ECU Environmental Dashboard in real-time across campuses that utilise digital screens in buildings or outside Future Student offices, similar to the new installations in building 1 of the ECU Joondalup Campus.

4.4.6 (c) Work from Home Days

Continuing the theme of staff behaviour and reducing carbon emissions, ECU could consider formalising one *"Work From Home"* day per week or fortnight, calculating the reduced travel of staff from home to campuses in the university's carbon reduction.

This change is consistent with the current shifts in behavioural changes toward telepresence instead of attending meetings, such as Teams or Zoom meetings as a result of COVID-19. ECU already has the technical infrastructure in place to encourage this shift which may contribute to its emissions reduction target (360 Environmental, 2020).

4.4.7 Strategic Procurement Refinements

Advancing an ECU-wide culture of sustainability may include how ECU engages in its Strategic Procurement.

Refinements to ECU Strategic Procurement processes may include choosing suppliers who can provide products which are Earth Friendly; have Green Star rating; GECA (Good Environmental Choice Australia) certification; or are accredited with ISO 14001: Environment Management Systems (or environmental management practices) (360 Environmental, 2020).

The Sustainability Audit revealed an opportunity to strengthen the Risk and Opportunity Assessment and Procurement Strategy for procured service and goods Contract and Supplier Management**.** In addition, ECU may wish to implement an Aboriginal and Torres Strait Islander supplier engagement strategy as part of its Strategic Procurement procedures (360 Environmental, 2020).

Strategic Procurement Refinements also aligns with Sustainable Resource Management (see section 4.7), specifically Taskforce Target 13 (Appendix A):

Sustainable Resource Management	
Taskforce Target 13	Encourage procurement processes that adopt sustainable practices and integrate sustainability information into reporting cycles.

4.5 Transport

To better understand student and staff travel behaviour, ECU could conduct a staff commuting survey to inform drafting a **Sustainable Transport Strategy** that integrates with any potential commitment to carbon emissions reductions and SDGs.

Reducing single person travel by students and staff to and from its campuses, ECU could contribute to its carbon reductions goals.

The Sustainable Transport Strategy may include a plan to accelerate Electric Vehicle use, not only within its own fleet, but also for staff and students by increasing the number of charging stations on its campuses. This strategy may also contribute to solar power generation if combined with Solar Park Shades (see section 4.3.1).

The abovementioned considerations for *Transport* align with the Taskforce Target 10 (Appendix A):

Transport	
Target 10	Identify sustainable transport strategies that enhance the staff and student experience as it relates to sustainability within our campuses and broader community.

4.6 Waste

The following considerations for *Waste* align with Taskforce Target 11 (Appendix A):

Waste	
Target 11	Develop a framework for ongoing waste management.

4.6.1 SCR Group – GIVE Initiative

Each year, SCR Group saves over 18 million kilograms of clothing from landfill and instead find new homes for them. The organisation offers solutions for local government, national and local shopping centres, schools, private organisations, charities and retailers (SCR Group, n.d.).

ECU's School of Business and Law has an existing partnership with SCR Group's GIVE initiative (Edith Cowan University, 2019). This partnership could be scaled to support student and staff engagement programs that reduce waste at a personal and professional level.

4.6.2 Warp It

ECU could consider initiatives that focus on office furniture reuse or repurposing initiatives to reduce purchasing and disposal costs. In the United Kingdom, universities are effectively implementing an initiative called *Warp It* (https://www.warp-it.co.uk).

> *"Only 10% of the raw materials used to make a product are found in the final product. So, the chair you are sitting on actually generated a further 90% of waste during manufacture. More alarmingly, the amount of waste generated for a single laptop computer is close to 4000 times the weight. For this reason alone it is important to reuse where possible. But there are also lots of other benefits to reuse.*
>
> *The Warp It vision is to be a network where buying new is the last resort and nothing is wasted. A network where reusable items are redistributed for their 2nd and 3rd useful lives. When the items fail they are diverted into repair and reintroduced later.*
>
> *We want to reduce waste and carbon emissions. We want to make it easy for staff to reduce unnecessary purchasing. We want to make it easy for organisations to divert surplus resources to charity and SMEs so they can further their aims." (*https://getwarpit.com/about)

An initiative like *Warp It* could require public sector, business and charity to collaborate to reduce resource use, encourage efficiency and sustainability.

4.6.3 ECU Research Integration with campus operations

ECU's School of Science and School of Engineering students and early career researchers could actively participate in ECU campus operations by embedding water and waste audits into undergraduate course units and postgraduate research units.

4.7 Sustainable Resource Management

In addition to Strategic Procurement Refinements (see section 4.4.7), the University may also review its consumption of resources, specifically for events.

The following considerations for *Sustainable Resource Management* align Taskforce Targets 12, 13 and 14 (Appendix A):

Waste	
Target 12	Develop a framework for ongoing sustainable consumption of resources and efficient production of outputs.
Target 13	Encourage procurement processes that adopt sustainable practices and integrate sustainability information into reporting cycles.
Target 14	Ensure that ECU staff and students have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.

4.7.1 Sustainable Events Guide

The development of a Sustainable Events Guide could provide ECU Corporate Events and Schools or Service Centres the ability to continue their events delivery while aiming to generate zero landfill food waste. The guide could provide staff and students with a checklist of considerations and, where appropriate, mandate specific actions that align with any potential University emissions reductions strategies.

4.7.2 Sustainability webpage

ECU could develop a webpage dedicated to its sustainability goals and carbon emissions reductions. The webpage could also provide a snapshot of ECU's resource management and demonstrate its sustainability leadership in energy and water consumption improvements through cost-effective ways, food waste reduction, and research related to the United Nations Sustainable Development Goals (see section 4.1.5 (b) and 4.1.3).

4.7.3 Sustainable building design and construction

ECU strives for excellence in building design and aims to minimise the draw on fossil fuels while maximising solar and other passive energy in its design features.

ECU currently incorporates Green Star building design features to a minimum standard of 4 stars with the target of reaching 5 stars. While ECU does not apply for Green Star accreditation certificates, it does aim to incorporate these green star design features into all its building designs, and this will include the new ECU City Campus.

ECU also developed Environmental Performance Indicators that apply to all building projects, namely:

1. Thermal Comfort – to ensure the thermal comfort of building occupants in normal operating conditions;
2. Indoor Air Quality – to ensure indoor air is free from contaminants and contains ample amounts of fresh air;
3. Materials Intensity – to minimise the energy embodied in construction materials;
4. Operational Energy Consumption – to minimise the total energy consumed within the building;
5. Greenhouse Gas Emissions – to minimise the emissions of greenhouse gases from energy sources; and
6. Scheme Water Consumption – to minimise the consumption of water from scheme sources.

(Planning and Design Guidelines (2020)

ECU could continue its commitment to sustainable building design by pursuing Green Star accreditation for new buildings to a minimum standard of 5 stars for all new buildings. The University could also benefit from ongoing review of its Planning and Design Guidelines (2020) to include accounting for climate impacts through new design and construction projects.

5. External Funding Options[3]

The following external funding options, identified in the Sustainability Audit (360 Environmental, 2020) may be relevant to the recommendations contained in this report (see section 6).

Summary of External Funding Options	
5.1	Emissions Reduction Fund (ERF)
5.2	Green Bonds
5.3	Australian Renewable Energy Agency (ARENA)
5.4	Clean Energy Finance Corporation (CEFC)
5.5	Western Australian Government Changes
5.6	WasteSorted Grants
5.7	Linkage Grants

5.1 Emissions Reduction Fund (ERF)

The ERF is the primary legislation the Commonwealth of Australia for funding GHG emissions abatements. The ERF is a fund for purchasing, by reverse auction, GHG emissions reductions from abatement projects established in accordance with approved methodologies. The Coalition Government has ear marked an annual $200 million dollars expenditure via the ERF for the next 10 years. The most recent auction benchmark price per tonne e-CO2 of GHG abatement was $14.17 AUD. Abatements purchased under the ERF cannot be applied to the ECU emissions reduction target until after the end of the 7 years crediting period. However, given that the Covenant of Mayors target is for 2030, reductions achieved from ERF projects would apply to the target if made within the next 3 years.

Methodologies covered under the ERF include upgrades to refrigeration and ventilation fans, commercial or public lighting, air conditioning units, close control air conditioners, refrigerated display cabinets, and chillers. An Aggregated Small Energy Users Methodology would also allow ECU to act as an Aggregator for energy efficiency users, such as SMEs, in the City of Joondalup or elsewhere that would not have the resources to individually submit a project to the ERF, and where individual transaction costs might render the project infeasible.

5.2 Green Bonds

Since 2016, Monash University has successfully issued $300 million USD in Green Bonds for low carbon building and solar development under a Green Bonds program. These bond programs were undertaken in accordance with the Climate Bonds Standard and Certification Scheme (CBSCS) which insures that rigorous scientific criteria apply to bond issuers to demonstrate that they are acting in accordance with the goals of the Paris Climate Agreement. “Investors with $45tn of assets under management have made public commitments to climate and responsible investment - green bonds can help them achieve their pledges in fixed income.” (CBSCS, 2020)

5.3 Australian Renewable Energy Agency (ARENA)

ARENA is the lead Commonwealth agency to improve the competitiveness of renewable energy technologies and increase the supply of renewable energy through innovation. Under the Advancing Renewables programme ARENA provides matching funds between $100,000 to $50 million AUD for innovative renewable energy solutions which would be subeconomic without the funding. The first priority for ARENA has been solutions which better integrate renewables into the electricity system, and over $430 million AUD has been invested in these projects. Many of the innovative Energy Storage and Precinct Scale approaches included in this report would likely qualify under this priority. ARENA also provides Research and Development Funding for which the Edith Cowan University research on Solar Windows, in particular, might qualify.

5.4 Clean Energy Finance Corporation (CEFC)

With the backing of the Australian Government, the CEFC makes investments for clean energy or energy efficiency projects smaller than $5 million AUD via wholesale debt facilities provided to co-financiers who use this capital to provide low cost finance. CEFC investments include solar, energy storage, small scale wind, bioenergy, hydrogen, commercial building retrofits, housing, asset purchase, and green vehicles.

[3] This section is sourced directly from 360 Environmental’s Sustainability Audit (360 Environmental, 2020, p.33-35).

5.5 Western Australian Government Changes

On 6 March 2019, the McGowan Government launched the Energy Transformation Strategy, including a whole of system plan for the south-west, and a Distributed Energy Resource Roadmap to guide the integration of distributed energy sources into the SWIS electricity grid. A commitment to enable and maximise the value of Distributed Energy Resources (DER) has been made by the Western Australian government, which is currently in the process of policy formation. Given the high priority given to this issue by the State, a clearer picture on specific programs and funding is expected to emerge later in 2020.

Clean State is an independent initiative advocating for action on climate change and jobs in Western Australia. Clean State promote solutions that create jobs supporting businesses, families and communities and make our state a fairer, safer place to live and work. Clean State has provided a map of opportunities for the first essential steps in Western Australia's journey to a zero-carbon economy (Clean State 2020).

5.6 WasteSorted Grants

WasteSorted Grants are administered by the WA Government Waste Authority to increase resource recovery from waste and encourage community education to change behaviour around waste and improve education around waste avoidance and resource recovery. Up to $250,000 is available for recycling infrastructure and $50,000 for community education. The recycling infrastructure grant could include:

- Expanding recycling facilities on campus for existing programs
- Expanding the types of material reused to include composting facilities to produce mulch to use on site
- Measures to better monitor volumes of waste and recycling produced.

The community education grant could include:

- Additional education to students and staff around behaviour change
- Programs to encourage waste avoidance in areas such as cafés and the library.

WasteSorted Grant applications for 2020/2021 are due each year in the third quarter.

5.7 ARC Linkage Grants

The Linkage Program promotes national and international research partnerships between researchers and business, industry, community organisations and other publicly funded research agencies. By supporting the development of partnerships, the Australian Research Council (ARC) encourages the transfer of skills, knowledge, and ideas as a basis for securing commercial and other benefits of research.

The Linkage Projects scheme objectives are to:

- support the development of long-term strategic research alliances between higher education organisations and industry and other research end-users, to apply advanced knowledge to problems
- provide opportunities for internationally competitive research projects to be conducted in collaboration with organisations outside the higher education sector, and
- enhance the scale and focus of research in Australian Government priority areas.

6. Taskforce Recommendations

Summary of Taskforce Recommendations	
6.1	Overview
6.2	Summary of Key Projects
6.3	Timeline for Carbon Reduction
6.4	Estimated Capital Investment
6.5	Recommendations Schedule

6.1 Overview

The Taskforce's mandate is to provide recommendations aimed at reducing ECU's carbon footprint. While this report has highlighted future considerations for ECU (see sections 4.1 - 4.7), this section establishes a potential pathway to greater reductions that could lead to carbon neutrality.

The underlying intent is to establish a timeline on how ECU might arrive there and contemplates 4 key features:

5. A proposed reduction in carbon footprint from the known starting point (2019);
6. 6 sub-projects targeting the large carbon output sources;
7. An estimated Capital Investment profile; and
8. Estimated financial savings over a 10-year period.

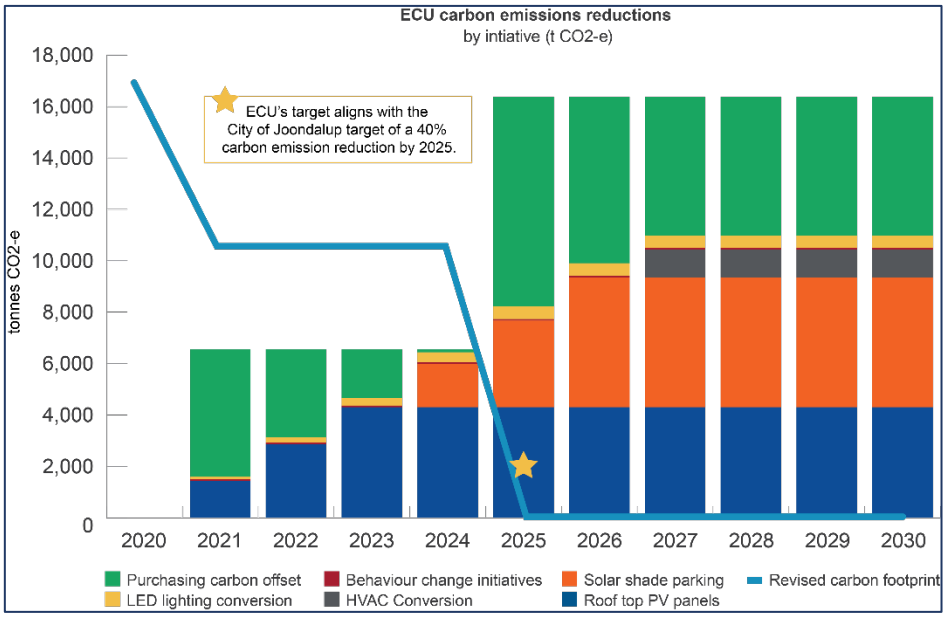
For establishing a potential pathway to carbon emissions reductions, the Taskforce notes the proposed future of the Mount Lawley campus, namely a potential campus closure and relocation of functions to Joondalup and the new ECU city campus.

The projects that require technological upgrades or installations will require capital investments to the Joondalup campus first, as it comprises 53% of ECU's carbon footprint (Carbon Neutral, 2020). Investments to address carbon reductions on the Joondalup campus will likely generate the greatest returns for the University as it is currently housed. Those projects that involve student and staff are not limited to the Joondalup campus.

These recommendations, therefore, propose the implementation of 6 key projects, namely:

- Installation of rooftop solar (PV) panels;
- Solar Shade Parking;
- Heating, Ventilation and Air Conditioning (HVAC) Conversion and Upgrades (Optimisation Package);
- LED Lighting Conversion;
- Behavioural Change; and
- Carbon Offset Initiatives.

Figure 6: Overview of proposed ECU Carbon emissions reductions



6.2 Summary of Key Projects

6.2.1 Installation of rooftop solar (PV) panels

ECU should consider the installation of solar panels on north facing roof space where appropriate (see section 4.3.1).

This project assumes the Solar Array has a capacity of 4.4MW, is north facing, and has no obstructions. Installation of the array could be phased over 3 years (2021-2023) at an estimated annual investment of $1.3 million or an estimated total investment of $4 million over the period (Appendix C).

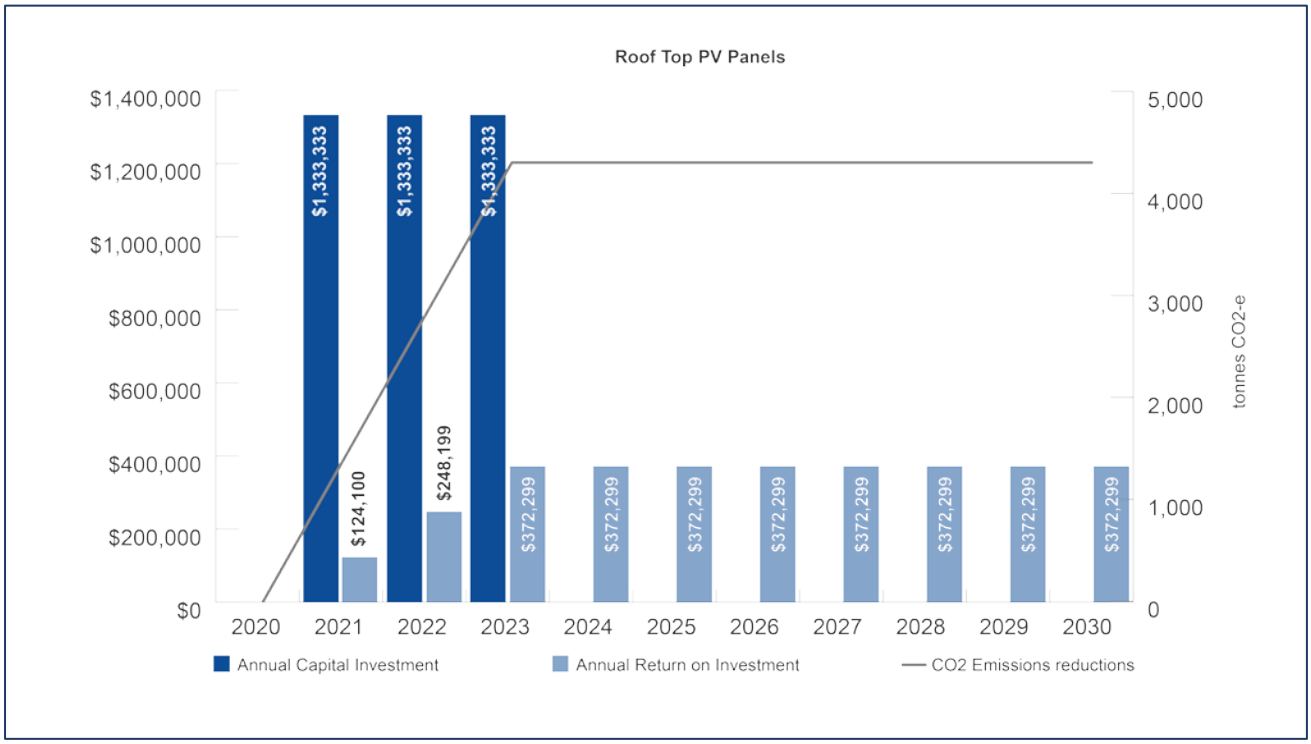
Total savings generated between 2021 and 2030 could be as much as $3.3 million with an annual reduction in CO2 emissions of 4,300 tonnes.

Cost reduction is based on savings in consumption and excludes supply charges (including Network Share and Capacity Charge). The following table summarises the carbon reductions by tonnes and displays the total spend and savings for each period.

Table 11: Financial Estimates – Rooftop Solar

Financial Estimate (Rooftop Solar): 2021-2030					
2025			**2030**		
CO2 Reductions *(tonnes in 2025)*	Combined Spend by 2025	Combined Savings by 2025	CO2 Reductions *(tonnes in 2030)*	Combined Spend by 2030	Combined Savings by 2030
4,302	($4,000,000)	$1,489,195	4,302	($4,000,000)	$3,350,689

Figure 7: Annual Capital Investment Vs Annual Return on Investment - Rooftop Solar



6.2.2 Solar Shade Parking

The installation of solar panelled covered parking shelters across 2,138 (80%) of parking bays on the Joondalup campus is consistent with findings in the Sustainability Audit (360 Environmental, 2020) and is a consideration for ECU (see section 4.3.1).

This project assumes 6 bays per 14KW solar array (double row 3 car bays), and that the solar arrays are north facing. The installation is phased over 3 years (2024-2026) at an estimated annual cost of $1.6 million or an estimated total cost of $4.9 million over the period (Appendix C).

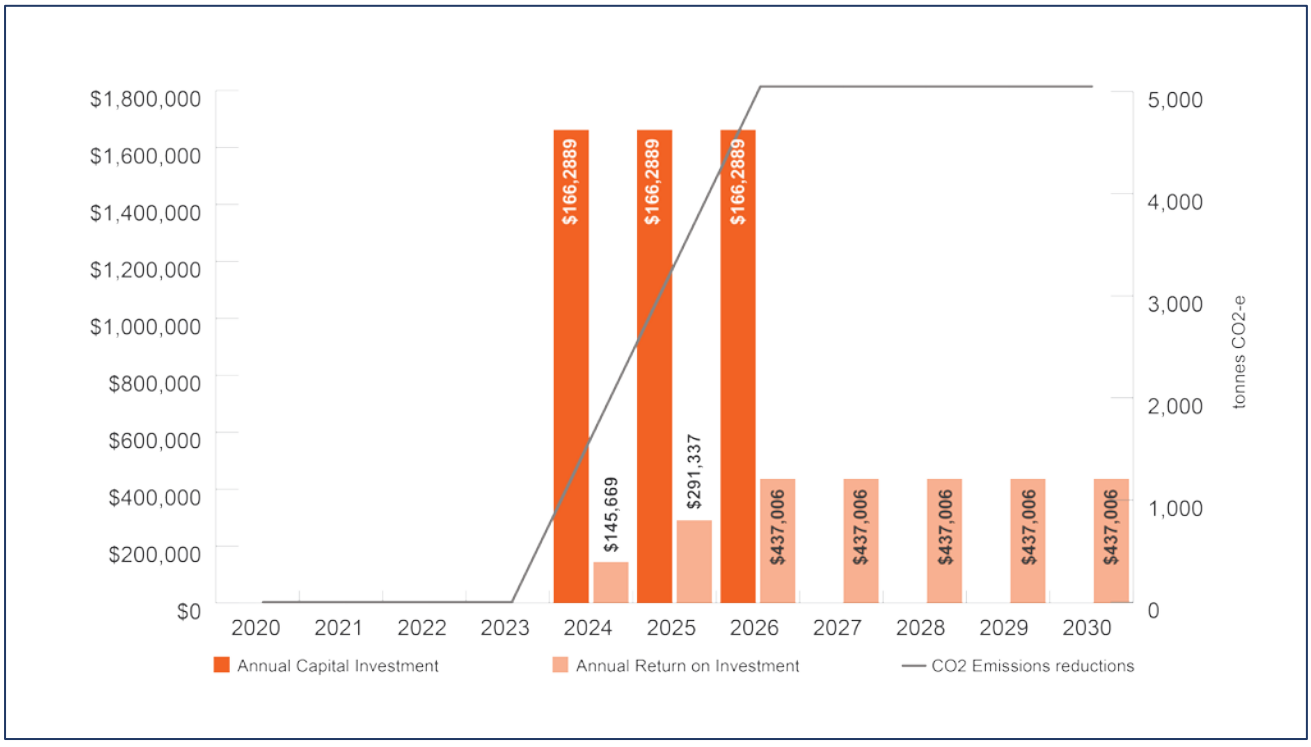
Total savings generated between 2021 and 2030 could be as much as $2.6 million with an annual reduction in CO2 emissions of 5,050 tonnes.

Cost reduction is based on savings in consumption and excludes supply charges (including Network Share and Capacity Charge) CO2 reductions is based on a rate per KWH derived from Carbon Neutral report (2019).

Table 12: Financial Estimates – Solar Shade Parking

Financial Estimate (Solar Shade Parking): 2021-2030					
2025			**2030**		
CO2 Reductions *(tonnes in 2025)*	Combined Spend by 2025	Combined Savings by 2025	CO2 Reductions *(tonnes in 2030)*	Combined Spend by 2030	Combined Savings by 2030
3,367 tonnes	($3,325,778)	$437,006	5,050 tonnes	($4,988,667)	$2,622,035

Figure 8: Annual Capital Investment Vs Annual Return on Investment - Solar Shade Parking



6.2.3 Heating, Ventilation and Air Conditioning (HVAC) Conversion and Upgrades (Optimisation Package)

ECU could purchase a Heating, Ventilation and Air Conditioning (HVAC) optimisation package to upgrade the Joondalup campus air conditioning plant, making it more efficient (see section 4.3.6).

This project assumes HVAC consumes an estimated total of 45% of Electricity Consumption and the upgrade will likely generate a 20% reduction on consumption (360 Environmental, 2020). In addition, this model assumes the project will be deployed in 2027 with a total estimated investment of $200,000.

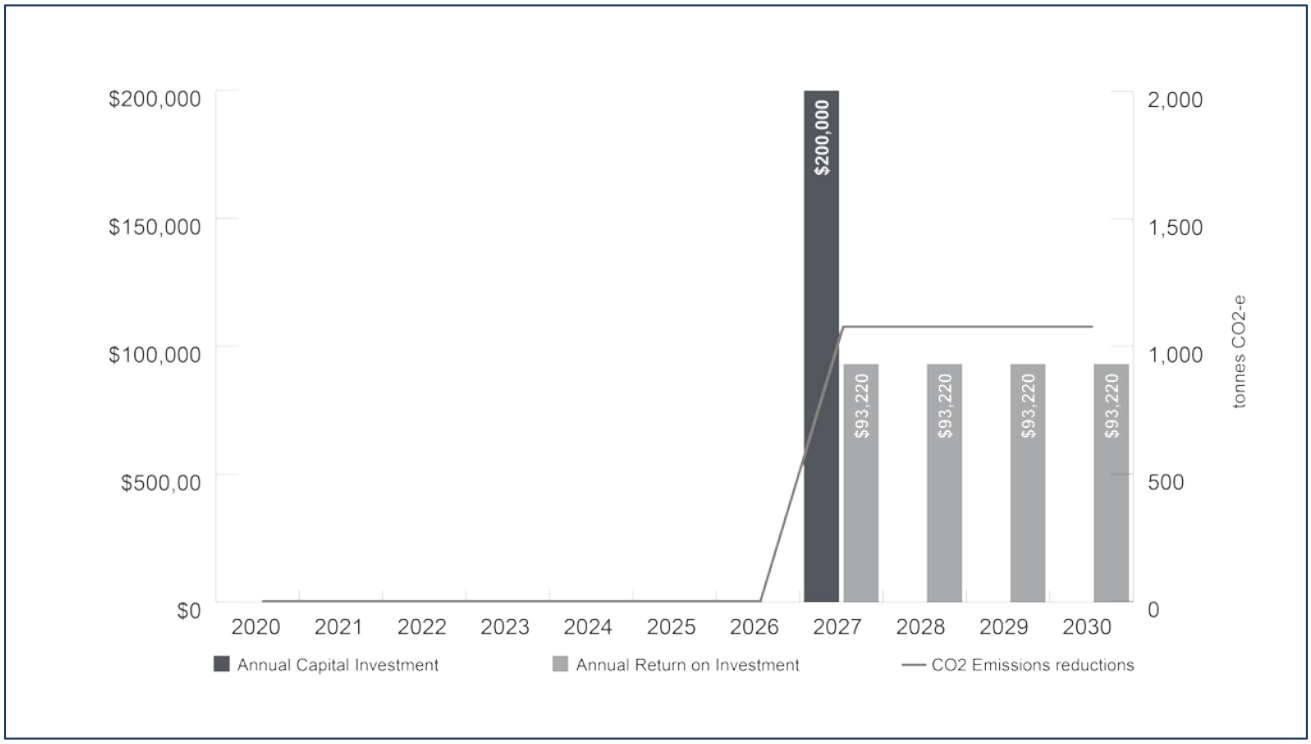
Total savings generated between 2021 and 2030 could be as much as $400,000 with an annual reduction in CO2 emissions of 1,077 tonnes.

Cost reduction is based on savings in consumption and excludes supply charges (including Network Share and Capacity Charge). CO2 reductions is based on a rate per KWH derived from Carbon Neutral report (2019).

Table 13: Financial Estimate – HVAC Conversion

Financial Estimate: 2021-2030					
2025			**2030**		
CO2 Reductions *(tonnes in 2025)*	Combined Spend by 2025	Combined Savings by 2025	CO2 Reductions *(tonnes in 2030)*	Combined Spend by 2030	Combined Savings by 2030
-	$0	$0	1,077	($200,000)	$372,881

Figure 9: Annual Capital Investment Vs Annual Return on Investment – HVAC Conversion



6.2.4 LED Lighting Conversion

New buildings on the Joondalup campus (Building 27 and Building 15) are fitted with LED lights, and there are already areas of the campus fitted with LED lights. However, ECU should replace remaining incandescent globes (approximately 10,000) with more efficient LED across the campus (see section 4.3.6).

The installation is phased over 5 years (2021-2025) at an estimated annual investment of $200,000 or an estimated total investment of $1 million over the period (Appendix C).

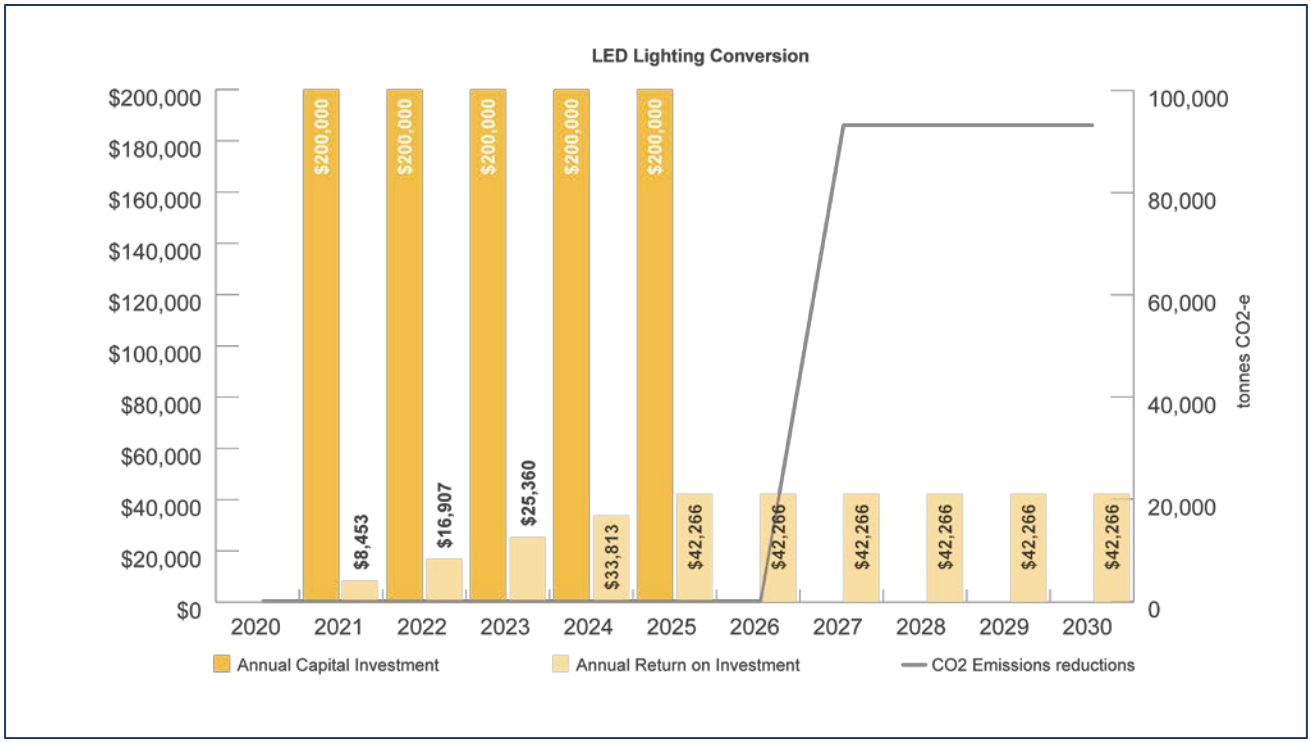
Total savings generated between 2021 and 2030 could be as much as $338,131 with an annual reduction in CO2 emissions of 488 tonnes.

Cost reduction is based on savings in consumption and excludes supply charges (including Network Share and Capacity Charge). CO2 reductions is based on a rate per KWH derived from Carbon Neutral report (2019).

Table 14: Financial Estimate – LED Lighting Conversion

Financial Estimate: 2021-2030					
2025			**2030**		
CO2 Reductions *(tonnes in 2025)*	Combined Spend by 2025	Combined Savings by 2025	CO2 Reductions *(tonnes in 2030)*	Combined Spend by 2030	Combined Savings by 2030
488	($1,000,000)	$126,799	488	($1,000,000)	$338,131

Figure 10: Annual Capital Investment Vs Annual Return on Investment – LED Lighting Conversion



6.2.5 Behavioural Change

ECU may wish to invest in on-campus marketing campaigns and a web present to encourage modified behaviour in the University community to reduce its environmental impact, and to communicate its carbon reduction and sustainability successes.

This project assumes behavioural change can only be implemented during peak hours (working hours), and that electricity consumption can be reduced by 10%. The installation is phased over 10 years (2021-2030) at an estimated annual investment of $10,000 or an estimated total investment of $100,000 over the period (Appendix C).

Total savings generated between 2021 and 2030 could be as much as $5,400 with an annual reduction in CO2 emissions of 62 tonnes.

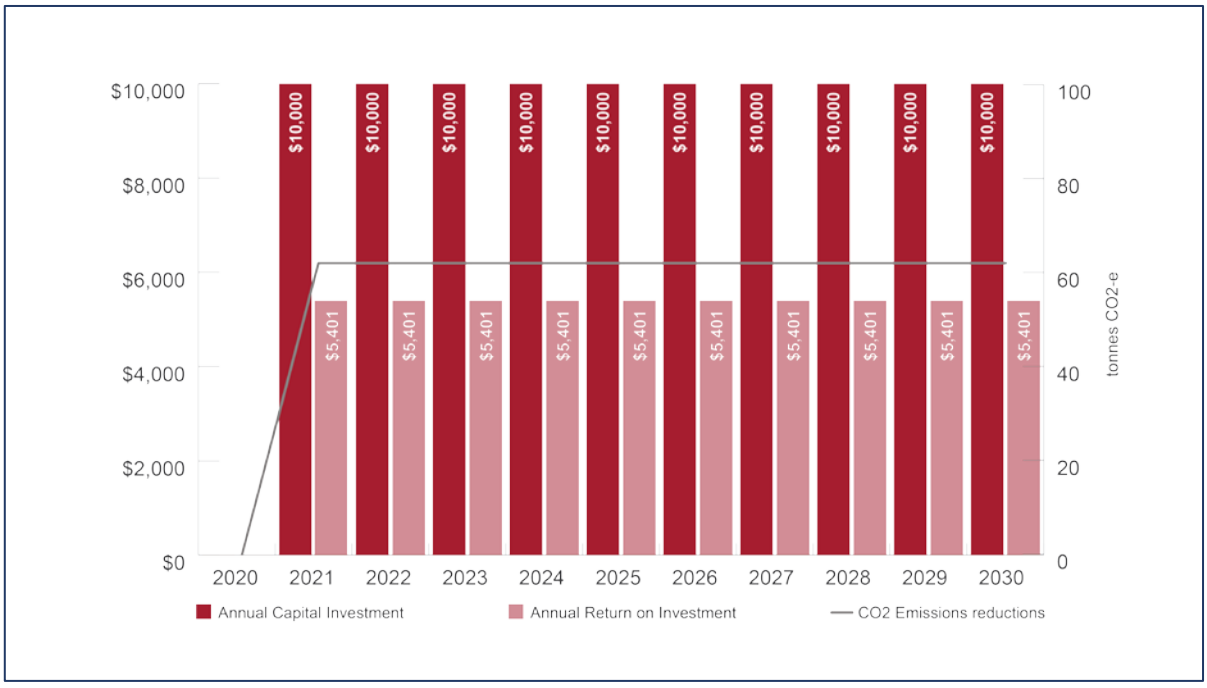
Relevant initiatives that may apply are:

- **Sustainability Champions Group** (see section 4.1.5 (a)) - Establish a group or committee that may include an Executive Champion to facilitate the promotion of ECU's carbon reductions initiative and sustainability goals;
- **Reconciliation Action Plan** (see section 4.1.5 (c)) – should ECU choose to integrate sustainability and contemporary caring for country initiatives in the revised RAP, these initiatives may be promoted;
- **SDG Student Program** (see section 4.4.1) – promote the SDG program and student successes;
- **Green Impact** (see section 4.4.6 (a)) – marketing of the engagement program to educate and equip staff to change workplace behaviours;
- **Live Campus Environmental Updates** (see section 4.4.6 (b)) - Implementation of live updates may further enforce behaviour change; and
- **Work from Home Days** (see section 4.4.6 (c)) - Promote University-mandated days with the explicit intention of driving down ECU's carbon emissions.

Table 15: Financial Estimate – Behavioural Change

Financial Estimate: 2021-2030					
2025			**2030**		
CO2 Reductions *(tonnes in 2025)*	Combined Spend by 2025	Combined Savings by 2025	CO2 Reductions *(tonnes in 2030)*	Combined Spend by 2030	Combined Savings by 2030
62	($50,000)	$27,003	62	($100,000)	$54,006

Figure 11: Annual Capital Investment Vs Annual Return on Investment – Behavioural Change



6.2.6 Carbon Offset Initiatives

The abovementioned projects (see sections 6.2.1-6.2.5), when combined, will not deliver a carbon neutral result for the Joondalup campus, although they will significantly reduce carbon emission. A reduction of the remaining carbon to a point of neutrality can be achieved by purchasing off-site carbon reduction initiatives.

Carbon offsetting is based on a target of a 40% reduction between 2021 and 2024, and a 100% reduction from 2025 to 2030. Offsetting initiatives can comment in 2021 with an estimated total investment of $660,000 producing a varied carbon emissions reduction year to year.

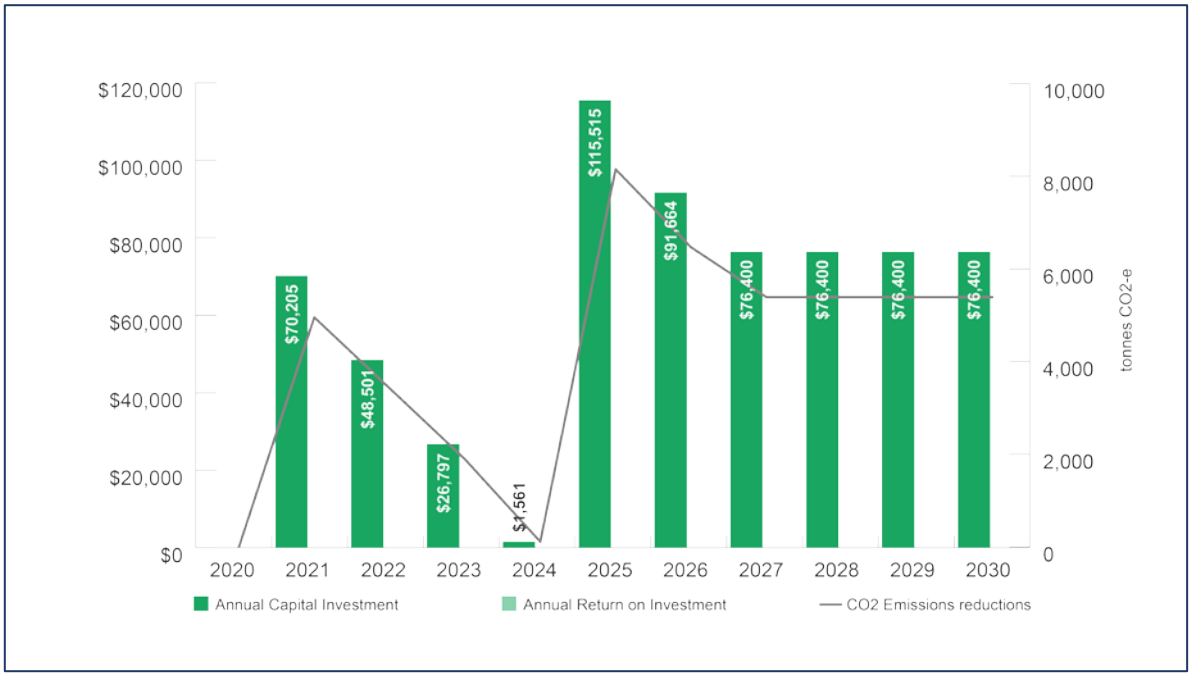
Any offsetting schemes could be combined with on or off-campus initiatives that foster behaviour change among staff and students. Relevant initiatives that may apply are:

- **Trillion Trees** (see section 4.2) - ECU could sponsor or register teams that contribute to revegetation efforts in Western Australia, and through carbon sequestration partnerships with local organisations like Trillion Trees;
- **#Act4SDGs** (see section 4.4.3) – ECU investments in reforestation and plantations schemes could align with the Global Week to #ACT4SDGs that encourage staff and student engagement in sustainability of carbon reduction initiatives;
- **Green Initiative Fund** (see section 4.4.4) - A fund of this nature could encourage students to contribute to on-campus emissions reductions;
- **Sustainable Events Guide** (see section 4.7.1) – ECU may integrate offsetting initiatives with the development of a Sustainable Events Guide where event budgets include carbon offsetting contributions in addition to an aim to generate zero landfill food waste; and
- **Reconciliation Action Plan** (see section 4.1.5 (c)) – contemporary caring for country initiatives may include offsetting such as replacing ECU distributed gifts (bottles of wine) with ECU donations to integrated biodiversity initiatives or sustainable programs such as wildlife sanctuaries or reforestation schemes.

Table 16: Financial Estimate – Carbon Offset Initiatives

Financial Estimate: 2021-2030					
2025			**2030**		
CO2 Reductions *(tonnes in 2025)*	Total Spend by 2025	Total Savings by 2025	CO2 Reductions *(tonnes in 2030)*	Total Spend by 2030	Total Savings by 2030
8,152	($262,578)	$0	5,392	($659,841)	$0

Figure 12: Annual Capital Investment Vs Annual Return on Investment – Carbon Offset Initiatives

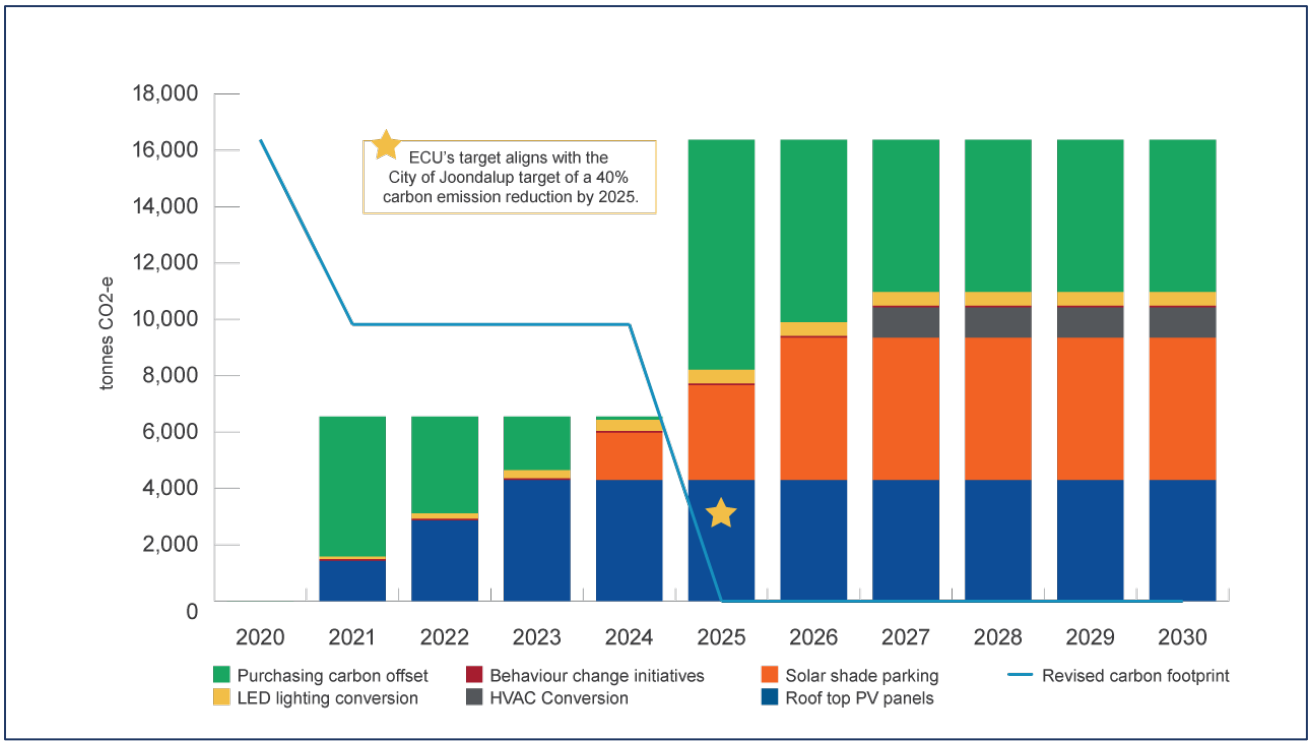


6.3 Timeline for Carbon Reduction

The Taskforce believes a pathway to carbon emissions reductions is possible between 2021-2030 with a combination of renewable energy investments, behavioural change initiatives, and carbon offsetting.

Carbon emissions can be reduced from the estimated annual carbon output for the Joondalup campus (2019 baseline of 16,371 tonnes) by 40% per year for the first 4 years (2021-2024), to an estimated 9,823 tonnes. Thereafter, the campus could reach carbon neutrality by 2025 and maintain it through to 2030. However, a net zero result could take longer to achieve should ECU wish to limit or stagger its initial capital investments.

Figure 13: Estimated Carbon Footprint per year (by tonnes Co2-e)



6.4 Estimated Capital Investment

The estimation of likely carbon saving from each of the 6 projects uses metrics contained, in part, in the 360 Environmental Sustainability Audit (2020). Each of the projects contains an investment parameter over defined periods and estimated operational savings (principally in utilities) over subsequent years.

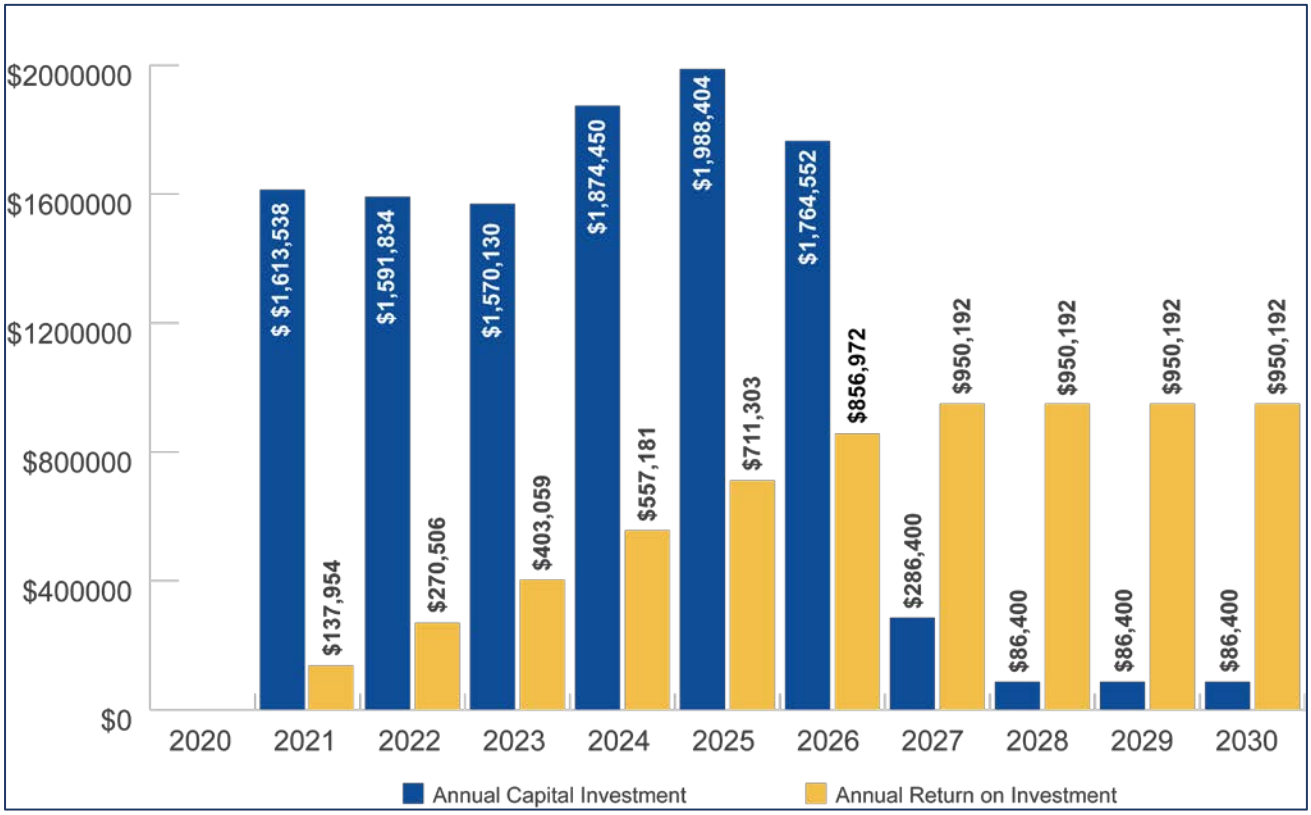
The timeframe for achieving carbon neutrality can be shortened or extended and is dependent on ECU's appetite for investment. An accelerated capital contribution is likely to produce a more rapid transition to a carbon neutral position.

A detailed summary outlining the Taskforce's modelling over a 10-year period (2021-2030) and reviewed by ECU's School of Engineering, is found in Appendix C. The summary provides a year-by-year breakdown of potential investments made, expected expenditure savings, and net savings over this period. Based on this model, ECU can expect to see net savings from its investments in 2027 (Appendix C).

Table 17: Investment Summary

Investment Summary	2025 (Year 5)	2030 (year 10)
Investment (Combined Spend)	($8,638,356)	($10,948,508)
Expected Expenditure Savings (Combined Savings)	$2,080,003	$6,737,741
Net Saving (Net Result)	($6,558,353)	($4,210,766)

Figure 14: Annual Capital Investment Vs Return on Investment



6.5 Recommendations Schedule

Strategic Oversight and reporting

Recommendations	Report Reference	Timeline
1. Embed commitments to emissions reductions and sustainability in ECU Strategic Plan 2022-2027	4.1.1	Q4 2021
2. Become a signatory to University Commitment to the Sustainable Development Goals led by Sustainable Development Solutions Network	4.1.3	Q4 2021
3. Adopt a carbon emissions target	3.1	Q4 2021
4. Commit to Sustainability across all areas of ECU's work and benchmark the University against United Nations Sustainable Development Goals	4.1.4	Q1 2022
5. Expand submissions to Times Higher Education (THE) Impact Rankings and UI GreenMetric World University Rankings	4.1.2	Q3 2022
6. Align with City of Joondalup and Joondalup Precinct targets/strategic plans	3.2	Q3 2025
7. Commit to sector-specific memberships, accreditation, and certification programs relevant to sustainability	4.1.4	Q1 2023
8. Establish a Sustainability Champions Group, including an Executive Champion	4.1.5	Q1 2023
9. Commit to a minimum 5 Star Green Star for all new buildings on established campuses and investigate 6 Star Green Star for the City Campus.	4.7.3	Q4 2023
10. Commit to targeting minimum performance level for non-building capital works against the Infrastructure Sustainability Rating Scheme.	4.7.3	Q4 2023

Biodiversity

Recommendations	Report Reference	Timeline
11. Encourage students and staff involvement in revegetation and protecting biodiversity through tree planting days in partnership with Trillion Trees	4.2	Q2 2023
12. Review procurement procedures to ensure native flora and fauna is protected for all forward works on all campuses. All remaining trees and native vegetation to be retained and shift to a restoration focus within the campuses and precincts.	4.4.7	Q2 2023
13.Commence restoration and enhance the remaining habitat on ECU campuses, with a focus on those species at the highest risk (particularly Joondalup and Bunbury campuses). Move towards restoration for functioning ecosystems.	4.2	Q4 2023
14. Collaborate with The City of Joondalup to align ecological priorities and collaborate on the avoidance of threatening processes in line with the City of Joondalup's Biodiversity Action Plan.	3.2	Q1 2024
15. Connecting to existing trails and path networks, include signage with Noongar language identifying the natural and heritage features of the area, such as local Noongar values, and the more recent history of the area (i.e. interpretative signage).	4.1.5	Q2 2024

Energy and Technology

Recommendations	Report Reference	Timeline
16. Investigate ECU's capability to mitigate ECU's carbon footprint through the generation of clean on-site energy (and potentially offsetting peak electricity demand through the use of onsite renewable energy sources)	4.3	Q1 2021
17. Develop a carbon management plan to support reducing ECU's carbon footprint through identifying processes to investigate, evaluate and implement energy efficiency and renewable energy opportunities	4.3	Q3 2021

Social and Education

Recommendations	Report Reference	Timeline
18. Embed environmental sustainability policies and practices in learning and teaching, including the use of simulation technology in relevant courses[4]	4.4	Q1 2024
19. Review ECU's Reconciliation Action Plan to strengthen and align reconciliation with sustainability, specifically incorporating Indigenous knowledge and ways of being in the sustainable use and management of landscapes.	4.1.5	Q1 2021
20. Initiate University-wide staff and student education programs such as #ACT4SDGs during Sustainability Week	4.4.3	Q1 2022
21. Encourage Fair Trade accreditation for on campus vendors and cafes	4.4.5	Q1 2023
22. Establish an SDG Student Hub at ECU enabling students to obtain SDG Students Program Certificate	4.4.1	Q3 2021
23. Initiate a campus program that offers students the opportunity to develop and launch innovative sustainability projects and establish partnerships to promote increased recycling through the container deposit scheme and other WA Waste Strategy initiatives. Example: The Green Initiative Fund, University of California, Davis	4.4.4	Q1 2024
24. Initiate a staff sustainability engagement program with an awards element designed for School and Service Centre adoption. Example: Sustainability Impact Toolkit.	4.4.6	Q3 2022
25. Display ECU Environmental Dashboard in real-time across campus to raise more awareness and drive behaviour change	4.4.6	Q1 2022

[4] For example: School of Science may deliver a Masters in Sustainability which aligns with national accreditation for Infrastructure Sustainability and Green Star as well as the Global Reporting Initiative.

Transport

Recommendations	Report Reference	Timeline
26. Conduct a staff and student commuting survey to inform drafting a Sustainable Transport Strategy. Example: University of Melbourne	4.5	Q2 2023
27. Establish an integrated transport plan which accelerates Electric Vehicle use from charging stations, to funding and incentivising students	4.5	Q1 2024
28. Develop an active transport strategy to encourage staff and students to use alternative transport replacing single-person vehicle trips	4.5	Q1 2024
29. Incentivise the participation of staff in international conferences via online fora	4.5	Q3 2023

Waste

Recommendations	Report Reference	Timeline
30. Collaborate with the WA Waste Authority, based in Joondalup, to decrease waste with the creation or implementation of a circular economy.	4.6.1	Q4 2023
31. Promote new and increase the scale of existing engagement to promote circular economy outcomes such as School of Business and Law partnership with the SCR Group GIVE Initiative.	4.6.1	Q4 2023
32. Initiate office furniture reuse or repurposing initiatives to reduce purchasing and disposal costs. Example: WARPit, University of Oxford	4.6.2	Q4 2023

Sustainable Resource Management

Recommendations	Report Reference	Timeline
33. Seek to deliver on targets set for, energy and water consumption improvements through cost-effective ways, food waste reduction, sustainable management of natural resources	4.7.1	Q1 2024
34. Develop a Sustainable Events Guide allowing ECU to aim to generate zero landfill food waste and mitigating emissions by contributing to a local restoration and revegetation project.	4.7.1	Q1 2024
35. Promote ECU's sustainability leadership and resource management with the implementation of a Sustainability webpage aligned to the United Nations Sustainable Development Goals	4.7.2	Q3 2022

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AREA	TASKFORCE TARGETS	SDG ALIGNMENT	ECU EXPERT/S	ECU ACTIONS TO DATE	IDENTIFIED GAPS
BIODIVERSITY	**1.** Ensure that ECU lands are used for their best and most productive purpose with a strong emphasis on maintaining and encouraging biodiversity.	**15.A** *(Life on Land)* Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems.	**School of Science:** • Dr Eddie Van Etten • Dr Rob Davis • Dr David Blake • Dr Anna Hopkins • Dr Sora Marin Estrella • Prof Pierre Horwitz • Prof Ray Froend	ECU Environmental management plans for all campuses.	
	2. Strengthen ECU's education, resilience and capacity to mitigate, adapt and respond to climate-related hazards and integrate climate change measures into policies, strategies and planning.	**13.1** *(Climate Action)* Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.	**School of Arts and Humanities:** • Dr Naomi Godden • Dr Sue Bailey • Dr Marilyn Palmer **School of Science:** • Dr Aaron Jenkins • Prof Pierre Horwitz • Prof Ray Froend	**School of Arts and Humanities:** Dr Naomi Godden is leading a project with the WA community sector to mainstream climate justice mitigation, adaptation, and disaster response, across all areas of the organisation (including policies, strategies and planning). This project may provide useful input for ECU.	
		13.3 *(Climate Action)* Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.	**School of Arts and Humanities:** • Dr Naomi Godden • Dr Sue Bailey • Dr Marilyn Palmer • Dr Danielle Brady **School of Science:** • Dr Eddie Van Etten • Dr Aaron Jenkins • Prof Pierre Horwitz		

AREA	TASKFORCE TARGETS	SDG ALIGNMENT	ECU EXPERT/S	ECU ACTIONS TO DATE	IDENTIFIED GAPS
			• Prof Ray Froend • Prof Angus Morrison-Saunders • Dr Kat O'Mara • **School of Science Courses:** Bachelor of Sustainability degree; Masters of Environmental Management (c/work)		
	3. Aim to contribute research and education that informs sustainable land and water management, that assists in the reduction of degradation of natural habitats, halts the loss of biodiversity, and protects and prevents the extinction of threatened species.	**15.3** *(Life on Land)* By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.	**School of Arts and Humanities:** • Dr Naomi Godden • Dr Sue Bailey • Dr Marilyn Palmer • Dr Danielle Brady **School of Science:** • Dr Eddie Van Etten • Dr Rob Davis • Dr David Blake • Dr Anna Hopkins • Prof Pierre Horwitz • Prof Ray Froend		
		15.5 *(Life on Land)* Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species.	**School of Science:** Most academics in the natural sciences.	**School of Science:** Many projects are underway, or have been completed	
		15.B *(Life on Land)*	**School of Science:** • Dr Eddie Van Etten		

AREA	TASKFORCE TARGETS	SDG ALIGNMENT	ECU EXPERT/S	ECU ACTIONS TO DATE	IDENTIFIED GAPS
		Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation.	• Dr David Blake • Dr Anna Hopkins		
ENERGY AND TECHNOLOGY	**4.** Explore opportunities for ECU to understand and take advantage of sustainable energy sources.	**7.2** *(Affordable and Clean Energy*) By 2030, increase substantially the share of renewable energy in the global energy mix.	**<u>School of Engineering:</u>** • A/Prof Iftekhar Ahmad • Dr Octavian Bass • Prof Daryoush Habibi • A/Prof Ganesh Kothapalli • Prof Stefan Lachowicz **<u>Digital and Campus Services:</u>** Kevin Hall – Manager Buildings and Maintenance	**<u>ECU Student Guild:</u>** Reduce carbon footprint by decreasing printed copies of documents and mainly moving to the cloud where documents are being easily accessible by all staff and senate. **<u>Digital and Campus Services:</u>** Manage the Energy Environmental Improvement Program which: • Identifies opportunities to reduce energy consumption. • Stay below the mean average for energy consumption per EFTSL for Australian Universities.	• There are significant untapped opportunities to mitigate ECU's carbon footprint through the generation of clean energy on site. • Establish an integrated plan which entails exploration of various green energy sources, installation opportunities, timelines, risks and conversion requirements and logistical requirements.
		7.B *(Affordable and Clean Energy)*			

AREA	TASKFORCE TARGETS	SDG ALIGNMENT	ECU EXPERT/S	ECU ACTIONS TO DATE	IDENTIFIED GAPS
		By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support.			
		9.4 *(Industry, Innovation and Infrastructure)* By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities.	**School of Engineering:** Most academics in engineering	**School of Engineering:** Significant research is being undertaken at ECU to increase the efficiency in the use of materials and energy in different industries, with particular focus on reducing the environmental impact.	
	5. Led by ECU Researchers, enhance research that encourages innovation and support leading to upgrades of sustainable technological capabilities across applicable industry sectors.	**9.5** *(Industry, Innovation and Infrastructure)* Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of			

AREA	TASKFORCE TARGETS	SDG ALIGNMENT	ECU EXPERT/S	ECU ACTIONS TO DATE	IDENTIFIED GAPS
		research and development workers per 1 million people and public and private research and development spending.			
		9.C *(industry, Innovation and Infrastructure)* Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020.			
		13.2 *(Climate Action)* Integrate climate change measures into national policies, strategies and planning.	**School of Science:** • Prof Ray Froend • Prof Paul Lavery • Prof Pierre Horwitz	Integrate climate change measures into ECU policies, strategies and planning.	
SOCIAL AND EDUCATION	**6.** Provide access to safe, inclusive, and accessible green and public spaces on ECU campuses, with emphasis for women and children, older persons and persons with disabilities.	**11.7** *(Sustainable Cities and Communities)* By 2030, provide universal access to safe, inclusive, and accessible green and public spaces, in particular for women and children, older persons and persons with disabilities.	**School of Business and Law:** SBL Researchers in areas of Diversity and Workplace Inclusion, inclusive leadership, and bullying from the School of Business and Law including: • Dr Uma Jogulu • Dr Azadeh Shafaei • Prof Maryam Omari • Dr Mehran Nejati	**ECU Student Guild:** Student Gardens accessible to all staff and student outside of building 9 which is a public green space in ECU Joondalup campus. **South West Campus:** The Community Garden is an accessible public space that students and staff co-manage and enjoy.	

AREA	TASKFORCE TARGETS	SDG ALIGNMENT	ECU EXPERT/S	ECU ACTIONS TO DATE	IDENTIFIED GAPS
	7. The attainment of knowledge and skills needed to promote sustainable practices through the promotion and delivery of educational content integrated into existing coursework, units, workplace integrated learning opportunities, and research projects.	**4.7** *(Quality Education)* By 2030, ensure that all learners acquire the knowledge and skills needed promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development.	**<u>School of Science</u>:** Sustainability Degree **<u>School of Arts and Humanities:</u>** • Dr Naomi Godden • Dr Sue Bailey • Dr Marilyn Palmer • Dr Danielle Brady **<u>School of Business and Law:</u>** SBL PRME and Sustainability Steering Committee led by Dr Mehran Nejati	**<u>School of Science</u>:** Sustainability Degree **<u>School of Arts and Humanities:</u>** The Social Work program integrates climate change across the course as a key context for social injustice and action. Naomi Godden provides a social work field placement program that focusses on climate justice action research. **<u>School of Business and Law:</u>** The School of Business and Law formally became an advanced signatory to the UN Principles for Responsible Management Education (PRME) in 2019. This warranted a more focused commitment to responsible management education and incorporating sustainability, SDGs, responsible management and ethics in our curriculum. At the school, we have continued to develop and compile new SDG-related content to enhance the	

AREA	TASKFORCE TARGETS	SDG ALIGNMENT	ECU EXPERT/S	ECU ACTIONS TO DATE	IDENTIFIED GAPS
				knowledge and skills needed to promote sustainable development. Just as an example, in Semester 2 of 2020, students in the *Managing for Sustainability* Class led by Dr Mehran Nejati will participate in the World Climate Role-Play Simulation which enables them to discuss the implications of climate change for business and society and evaluate the importance of global cooperation in addressing the climate urgency through critical thinking and deductive reasoning through an experiential learning experience. **ECU Student Guild:** Events as conducted and organized to meet the targets of: sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development etc. i.e. Succulent shenanigans where Guild Student Assist Officer provide Succulents to	

AREA	TASKFORCE TARGETS	SDG ALIGNMENT	ECU EXPERT/S	ECU ACTIONS TO DATE	IDENTIFIED GAPS
				students during stressless week; Garden Gurus in partnership with ECU Counselling and ECU Guild where important topics are discussed like how to better manage stress during exams/ assessments while gardening together; World Peace day where Student Clubs are supported by the ECU Guild to have a peaceful march around ECU Joondalup and also the release of doves.	
	8. Utilise appropriate socially and environmentally responsible procurement policies and procedures to improve ECU resource efficiency and minimise ECU's environmental footprint in consumption and delivery of university business.	**8.4** *(Decent Work and Economic Growth)* Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on sustainable consumption and production, with developed countries taking the lead.	**School of Business and Law:** • Dr Mohammad Iranmanesh • A/Prof Ferry Jie • Dr Flavio Romero Macau • Dr Mehran Nejati • Dr Reza Kiani Mavi • Dr Azadeh Shafaeu	**School of Business and Law:** Research on green human resource management and demonstrating its impact on improved environmental performance and sustainable supply chain management, as well as studies on lean manufacturing practices and responsible consumption behaviours (See for example: Iranmanesh et al., 2019; Nejati et al., 2017; Shafaei et al., 2020; Zailani et al., 2019)	
	9. Participate in global partnerships for sustainable development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and	**17.16** *(Life on Land)* Enhance the global partnership for sustainable development, complemented by multi-stakeholder partnerships	**School of Science:** • Prof Angus Morrison-Saunders • Prof Pierre Horwitz	**School of Science:** Sustainability Degree	

AREA	TASKFORCE TARGETS	SDG ALIGNMENT	ECU EXPERT/S	ECU ACTIONS TO DATE	IDENTIFIED GAPS
	financial resources, to support the achievement of ECU sustainability goals, while promoting research leadership in these areas.	that mobilize and share knowledge, expertise, technology, and financial resources, to support the achievement of the sustainable development goals in all countries, in particular developing countries.	**School of Business and Law:** • Dr Mehran Nejati • A/Prof Simone Scagnelli SBL PRME and Sustainability Steering Committee **School of Arts and Humanities:** Boodja Justice Research Group (led by Naomi Godden) is a new collective of 25 academics and Noongar elders focussing on climate justice-related research and action. ECU members include: • Dr Naomi Godden • Dr Sue Bailey • Dr Marilyn Palmer • Prof Kathy Boxall • Prof Pierre Horwitz • Dr Danielle Brady • Dr Sora Marin Estrella • Prof Mindy Blaise • Dr Zoe Leviston • Dr Jane Merewether • Elisabeth Taylor • Dr Jonathan Marshall • A/Prof Trudi Cooper • Dr Stephanie Godrich • Dr Donna Mazza	**School of Business and Law:** Becoming an advanced signatory to the United Nations Principles for Responsible Management Education (PRME) by ECU School of Business and Law, reporting to them on our progress every two years, and being an active member of the PRME Australia and New Zealand Chapter, organising joint and collaborative sustainability-related initiatives with other public universities in WA such as ANZAM SDG Pitch Challenge, and the upcoming Sustainability Week Challenge, as well as other initiatives such as the GIVE initiative which has encouraged SBL staff to give your unwanted clothing and items a second life.	

AREA	TASKFORCE TARGETS	SDG ALIGNMENT	ECU EXPERT/S	ECU ACTIONS TO DATE	IDENTIFIED GAPS
			• Renee Newman • Dr Deirdre Drake • A/Prof Justine Dandy		
TRANSPORT	**10.** Identify sustainable transport strategies that enhance the staff and student experience as it relates to sustainability within our campuses and broader community.	**11.2** (Sustainable Cities and Communities) By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.	**School of Engineering:** • A/Prof Iftekhar Ahmad • Dr Octavian Bass • Dr Nando Guzzomi • Prof Daryoush Habibi • Dr Kevin Hayward • Prof Ganesh Kothapalli • Prof Stefan Lachowicz **Digital and Campus Services:** Kerry Devine – Manager Campus Operations and Support Services	**School of Engineering:** Significant research is being undertaken at ECU to solve the technological challenges for the use of renewable energy in different industries, with particular focus on the transport industry and the uptake of electric vehicles. **ECU Student Guild:** In good partnership and support of active promotion with URBI which is an environmentally friendly bike share service for staffs and students to ride bikes around ECU Joondalup campus, Joondalup Station, Joondalup Health Campus and also various areas around Joondalup. **Digital and Campus Services:** • Developing a parking strategy which will impact active transport. • Developing a proposal for a secure bicycle	

AREA	TASKFORCE TARGETS	SDG ALIGNMENT	ECU EXPERT/S	ECU ACTIONS TO DATE	IDENTIFIED GAPS
				compound at the Mt Lawley Campus. • Managing University pool vehicles choosing hybrid and smaller fuel-efficient vehicles including a fully electric Nissan Leaf. • Promoting use of smart rider cards as an alternative to using fleet vehicles where appropriate. • ECU provides a financial contribution to the free CAT bus service between ECU Joondalup Campus and Joondalup railway station. • Coordination of the Urbi bike sharing services located at Joondalup Campus. • Coordinating Car Share service – a convenient and simple car hire system targeted at students.	
WASTE	**11.** Develop a framework for on-going waste management.	**11.6** *(Sustainable Cities and Communities)* By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.	**School of Science:** • Dr Eddie Van Etten **School of Business and Law:** • Dr Edmund Goh	Reducing ECU's adverse per capita environmental impact **School of Business and Law:**	

AREA	TASKFORCE TARGETS	SDG ALIGNMENT	ECU EXPERT/S	ECU ACTIONS TO DATE	IDENTIFIED GAPS
			• Dr Mohammad Iranmanesh • A/Prof Ferry Jie • Dr Mehran Nejati • Dr Flavio Romero Macau • Dr Reza Kiani Mavi • Dr Azadeh Shafaei	Dr Edmund Goh from ECU School of Business and Law has been collaborating with City of Joondalup for a research study which explores residents' adoption of the three-bin waste system, their attitudes towards waste and recycling, and how well they sort their household waste into the three bins.	
SUSTAINABLE RESOURCE MANAGEMENT	**12.** Develop a framework for on-going sustainable consumption of resources and efficient production of outputs.	**12.1** *(Responsible Consumption and Production)* Implement the 10-year framework of programmes on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries.	**School of Business and Law:** • Dr Edmund Goh • Dr Mehran Nejati	**School of Business and Law:** At SBL, the PRME and Sustainability Steering Committee has trialled the GIVE initiative which has encouraged SBL staff to give your unwanted clothing and items a second life. This appeared to be a successful initiative and has been continuing to date. In terms of impact, in 2019, this project led to giving a second life to more than 44kg of used clothing, shoes, handbags and accessories and saving them from ending up in landfills. This translates into saving more than 8800 Littre of water.	
		12.2 *(Responsible Consumption and Production)*	**School of Engineering:** • A/Prof Yasir Al-Abdeli • A/Prof Mehdi Khiadani	Achieving the sustainable management and efficient use of ECU's natural resources	Energy and water consumption at ECU premises can be improved

AREA	TASKFORCE TARGETS	SDG ALIGNMENT	ECU EXPERT/S	ECU ACTIONS TO DATE	IDENTIFIED GAPS
		By 2030, achieve the sustainable management and efficient use of natural resources.	• Dr Tushar Sen • Dr Masoumeh Zargar		through cost-effective measures
		12.3 *(Responsible Consumption and Production)* By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.		Progressively reduce food waste from ECU campus retailers and consumers	
		12.4 *(Responsible Consumption and Production)* By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.	**School of Science:** • Dr Kat O'Mara • Dr Aaron Jenkins	Achieve the environmentally sound management of chemicals and all wastes and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the local environment.	
		12.5 *(Responsible Consumption and Production)* By 2030, substantially reduce waste generation through prevention,		Substantially reduce ECU's waste generation through prevention, reduction, recycling and reuse.	

AREA	TASKFORCE TARGETS	SDG ALIGNMENT	ECU EXPERT/S	ECU ACTIONS TO DATE	IDENTIFIED GAPS
		reduction, recycling and reuse.		**ECU Student Guild:** Supporting students to use reusable keep cups where possible. Providing free Keep Cups for orientation day during each semester. Supporting club activities by providing them with reusable metal straws and cutleries as gifts for prizes. Actively encouraging students to use reusable water bottles on campus instead of single use plastic bottles. Host the 'Coffee cup free day' each semester with BERMUDA at ECU JO, GRINDHOUSE at ECU ML, and at KULBARDI cafe ECU BU, for free coffees to students who bring their own keep cups on that day. Organized a Clean Up Australia day in partnership with Clean Up Australia at the beginning of the year to promote awareness regarding reducing, reusing and recycling.	
			Digital and Campus Services: Kerry Devine – Manager Campus Operations and Support Services	**Digital and Campus Services:** Manage the Waste Environmental Improvement Program which: • Works with ECU waste provider to implement and communicate a	

AREA	TASKFORCE TARGETS	SDG ALIGNMENT	ECU EXPERT/S	ECU ACTIONS TO DATE	IDENTIFIED GAPS
				Waste Education Program to all Centres/Schools. • Improves the management of existing and new waste streams (i.e. consolidating biohazardous waste into the ECU Waste Management Contract). • Identifying and expanding the number of recycling streams to result in an increase in visibility and accountability of what is being recycled. • Continuing to support the planning for the waste transfer stations project for South West Campuses. • Construct a Mount Lawley Waste Compound (dependant on funding).	
		12.7 *(Responsible Consumption and Production)* Promote public procurement practices that are sustainable, in accordance with national policies and priorities.		Promote public procurement practices that are sustainable, in accordance with national policies and priorities.	

AREA	TASKFORCE TARGETS	SDG ALIGNMENT	ECU EXPERT/S	ECU ACTIONS TO DATE	IDENTIFIED GAPS
	13. Encourage procurement processes that adopt sustainable practices and integrate sustainability information into reporting cycles.	**12.6** *(Responsible Consumption and Production)* Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.	**School of Business and Law:** • A/Prof Simone Scagnelli • Dr Mehran Nejati	**School of Business and Law:** Through research in sustainability reporting, corporate social responsibility, and ethics, School of Business and Law has been informing companies and organisations about the business case for sustainability and responsible business practices, leading to improved firm image, reputation, performance, and stakeholder relations, among others. Also, some of our units cover sustainability reporting in their teaching and learning modules.	
	14. Ensure that ECU staff and students have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.	**12.8** *(Responsible Consumption and Production)* By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.	**School of Arts and Humanities:** Social Work academics: • Dr Naomi Godden • Dr Sue Bailey • Dr Marilyn Palmer • Dr Danielle Brady **School of Business and Law:** SBL PRME and Sustainability Steering Committee	ECU conducts research and delivers courses that contribute to an awareness of sustainable development and lifestyles in harmony with nature. **School of Business and Law:** We have researchers at the School of Business and law who work on responsible business management and SDG-related research areas such as workplace wellbeing	

AREA	TASKFORCE TARGETS	SDG ALIGNMENT	ECU EXPERT/S	ECU ACTIONS TO DATE	IDENTIFIED GAPS
				(related to SDG 8), ethical and inclusive leadership (related to SDG 8, 9 and 10), workplace bullying (related to SDG 8 and 10), sustainable cities and communities (SDG 11), responsible consumerism (related to SDG 12), Life Cycle Asset Management (related to SDG 12), and residents waste source behaviour (related to SDG 12), green human resource management (related to SDG 13), to name a few. Also, in terms of Teaching and Learning, the School of Business and Law formally became an advanced signatory to the UN Principles for Responsible Management Education (PRME) in 2019. This warranted a more focused commitment that led to the establishment of the School of Business and Law's PRME and Sustainability Steering Committee. In addition to the explicit commitment to sustainability by SBL leadership, the School has used a bottom-up process for integrating sustainability and ethics in its teaching and learning, research and operations through forming a PRME	

AREA	TASKFORCE TARGETS	SDG ALIGNMENT	ECU EXPERT/S	ECU ACTIONS TO DATE	IDENTIFIED GAPS
				and Sustainability Steering Committee. The team has been led by Dr. Mehran Nejati (appointed as the Director of PRME and Sustainability at SBL) and has representatives from various stakeholders and disciplines including students and professional staff. School of Business and Law drafted its school-specific Sustainability Strategy in 2020 and has progressively incorporated values and principles of sustainability and global responsibility in its teaching, research and operations. **<u>ECU Student Guild:</u>** Able to share information on awareness for sustainable development and lifestyles in harmony with nature on our socials such as Monthly Newsletters to all students, Facebook and Instagram. Also able to reach students through surveys and suggestions of what their awareness level is at in regards to sustainable development and lifestyles in harmony with nature.	

AREA	TASKFORCE TARGETS	SDG ALIGNMENT	ECU EXPERT/S	ECU ACTIONS TO DATE	IDENTIFIED GAPS
WATER	**15.** Develop a framework for ongoing water resource management.	**6.5** *(Clean Water and Sanitation)* By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate.	**School of Engineering:** • A/Prof Mehdi Khiadani • Dr Tushar Sen • Dr Masoumeh Zargar **School of Science:** • Prof Pierre Horwitz • Prof Ray Froend • A/Prof Mark Lund **Digital and Campus Services:** Kevin Hall – Manager Buildings and Maintenance	**Schools of Engineering and Science:** There are many active research projects at ECU dealing with the management of water resources and the treatment of wastewater. **School of Science:** Large number of undergraduate and postgraduate projects undertaken over the last 20 years **Digital and Campus Services:** Manage the Water Environmental Improvement Program which: • Improves and innovates in the area of water conservation and efficiency. • Identifies and recommends opportunities to reduce both scheme and ground water consumption. • Minimise negative impacts to water quality.	

360 environmental

ECU Joondalup, Mount Lawley and Bunbury

Sustainability Audit

Prepared for

Edith Cowan University - Climate Initiative Taskforce

September 2020

AUSTRALIA ECU EDITH COWAN UNIVERSITY

people planet professional

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Disclaimer

Executive Summary

In July 2020, Edith Cowan University commissioned a Sustainability Audit to support the universities sustainability commitments. Universities have a critical role to play in addressing the realities and consequences of climate change. Whilst Edith Cowan University's (ECU) achievements have been notable, there is more for ECU to do to advance sustainability at its campuses, into the broader precincts and the communities within which the University operates. This work provides a chance to:

- refocus and reinvigorate strategies as ECU partners with communities
- move closer to aligning all activities to the Sustainability Development Goals of the United Nations, and
- to responding appropriately to the overwhelming scientific advice that reducing greenhouse gas emissions is urgently needed to limit global warming.

Universities have a vital role to play in supporting scientific opinion and there is support for ECU to be a leader. Actions that have the biggest impact on reducing climate emissions (on campus, for the precinct and broader community) should be prioritized, targets set, publicly declared and a program of work initiated.

There are many ECU experts who can and will need to contribute to the required solutions.

> *Edith Cowan University has always been a leader in ways that count…. ECU has pioneered initiatives which are now mainstream* (ECU letter to Professor Chapman 26/3/2020).

An education relevant to the real-world experience of local, regional and international communities is a strategic priority for ECU. There are established pathways to embed a paradigm shift into the pedagogy of ECU where all activities can pivot around the central theme of sustainability.

It is an imperative that indigenous knowledge and ways of being in relation to the land and waters are included in all work on the sustainable use and management of landscapes. Emerging indigenous leaders and Elders expect this going forward. This topic should no longer be an afterthought, but a key leading approach. Indigenous and local knowledge is key to a sustainable society.

In 2020, as there is an increasing amount of social problems to solve, contributing to building and developing a sustainable society is considered a considered a corporate social responsibility (CSR). In raising the profile of Environmental Sustainability at ECU there is an opportunity to integrate understandings of both Environmental and Organisational Sustainability to avoid contradiction between strategic goals.

Several lessons relevant to ECU can be drawn from research into these dynamic regeneration cycles in complex systems. The optimal balance of efficiency and resilience and accumulating or deploying capital depends on timing within the regenerative cycle. During a release phase it is

important to skillfully deploy capital to allow systemic transformation and avoid systemic collapse. Passive and risk adverse investment appropriate to the preceding conservation phase is no longer appropriate. Protecting vulnerable populations during a release phase is particularly important to avoid long periods of painful societal disintegration.

A positive example of this is the current deployment of government spending to avoid economic collapse during the Pandemic. However, if this deployment does not align with systemic pressures it will not seed regeneration. Attempting to shore up the status quo in this instance tends to prolong collapse. Another useful concept from the Environmental Sustainability field of practice is that of adaptive change management.

The scope of the audit involved:

- providing a gap analysis between current state and future state with respect to the ECU Climate Initiative Taskforce Targets and their alignment with the UN Sustainable Development Goals
- Reviewing existing ECU measurement, reporting, and recordkeeping practices for GHG and Sustainability reporting by ECU, and perform a Gap analysis against various standards and best practice
- Exploring opportunities to implement Integrated Reporting, to highlight the importance of Sustainability outcomes in ECU Annual Reports
- Identifying opportunities and best practices to improve ECU's sustainability and influence on sustainability in the broader community
- Advising ECU on available programs, schemes or grants (including relevant criteria) that may support ECU's current actions
- Highlighting costs and savings associated with any recommendations.

The audit found 3 non-compliances, 1 partial-compliance and 5 opportunities for improvement (refer Table 3 of the report) as described:

Three (3) non-compliances

- Emission reduction targets are not available for ECU.
- Only two of the schools are reporting on sustainability through their respective operational plans as is required.
- ECU's Environmental Declaration requires: Setting an example of environmental responsibility by establishing and maintaining processes of resource conservation, recycling and waste reduction within the University. Over decades, there has been ongoing loss of bushland at campuses for building and fire protection impacting habitat for protected fauna species (Carnaby's cockatoo at Joondalup and the phascogale at Bunbury) and flora species (threatened orchids at Bunbury). The frequency of burning and fire control measures has impacted biodiversity where trees have died without replacement, fauna has been exposed and predated and the understory replaced with introduced weed species.

One (1) partial-compliance

- There are 17 UN Sustainability Development Goals (SDG) as described in Appendix B of which ECU has mapped targets to 10 of the SDG. The 7 SDG not covered require a statement of rationale for materiality of priority to explain why these have not been covered.

Five (5) opportunities for improvement

- The ECU Sustainability Policy centers on campus activities (refer Appendix C) and lacks aspiration.
- There is an opportunity to share sustainability initiatives more widely and strengthen the focus into areas with the opportunity to have the biggest impact on carbon reduction (beyond the campus) e.g. Health and Education.
- There is a strong culture of sustainability within pockets of the university (refer Appendix B) and under leadership this focus could permeate all disciplines of the university, placing ECU at the forefront of sustainability for WA.
- ECU's Reconciliation Action Plan commits to continued annual reporting to University Executive and Council on progress against the Strategic Plan's KPI for Aboriginal and/or Torres Strait Islander employment and the Strategic Goal for sustainability. The Strategic Goal for sustainability is not clearly defined.
- Tertiary Education Facilities Management Association reports were reviewed. Energy and water use targets could be shared and considered more broadly as part of precinct targets.

Universities have a critical role to play in addressing the realities and consequences of climate change. ECU's commitment and dedication to students, graduates that are global citizens contributing to cultural life, society, and economy whilst connecting with the community and world is significant. As humans extract more from the earth than ever before, the benefits and opportunities from a paradigm shift in how we think and operate in a reconciled Australia are incentive enough for us all to pursue a sustainable future.

The opportunities for strategic partnerships and collaborations, promoting equality, diversity, and social responsibility are there for ECU, through demonstrated thought leadership on behalf of West Australian's, for Western Australia and beyond The pandemic has accelerated powerful trends that raise the profile for sustainability. The world is stepping forward to 'New Normal' amid COVID-19, and ECU is well-placed to position as the sustainability leader for Western Australia and set the example for all Universities to follow.

Acronyms

Acronym	Definition
AACSB	The Association to Advance Collegiate Schools of Business
ACARA	Australian Curriculum, Assessment and Reporting Authority
ACCU	Australian Carbon Credit Units
AITSL	Australian Institute for Teaching and School Leadership
ARC	Australian Research Council
AuSSI	Australian Sustainable Schools Initiative
CAM	Carbon Accounting Model
CSR	Corporate Social Responsibility
CDP	Carbon Disclosure Project
CEFC	Clean Energy Finance Corporation
DER	Distributed Energy Resources
ECU	Edith Cowan University
EfS	Education for Sustainability
ERF	Emissions Reduction Fund
FullCAM	CSIRO developed fully integrated Carbon Accounting Model (CAM)
GCMCE	Global Covenant of Mayors for Climate and Energy
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IR	Integrated Reporting
ISCA	Infrastructure Sustainability Council of Australia
LCA	Life Cycle Assessment
NCOS	National Carbon Offset Standard
NDC	Nationally Determined Contributions
NCP	Nature's Contributions To People
NGERS	Australian National Greenhouse and Energy Reporting System
NDC	Nationally Determined Contributions
NGO	Non-government Organisation
PPA	Power Purchase Agreements
PRME	Principles for Responsible Management Education
RAD	Reaching Across the Divide
RAP	Reconciliation Action Plan
ROI	Return on Investment
SDG	Sustainable Development Goals

Acronym	Definition
SIP	Sharing Information on Progress (SIP) Reporting
STAWA	Science Teachers Association of WA
TEFMA	Tertiary Education Facilities Management Association
TEQSA	Tertiary Education Quality and Standards Agency
UN	United Nations
UNEP	United Nations Environmental Programme
VPP	Virtual Power Plant
YIMP	Yellagonga Integrated Management Plan

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1 Introduction

1.1 Greenhouse Gas Emissions Reductions and Climate Change – A Whole of Society Responsibility

In 2015, Australia became a signatory and ratified the Paris Agreement (UNFCCC Conference of the Parties 21) with the goal of keeping global warming below 2.0C with an aspiration to limit warming to 1.5C. The Paris Agreement consists of commitment by national governments to achieve Nationally Determined Contributions (NDC) through country specific legislation and regulation and includes supplementary targets by non-State Actors such as cities, companies, and NGOs.

These targets are science-based, underpinned by numerous rigorous and mutually reinforcing climatological studies undertaken over decades and constitute the consensus view of the global scientific community. The impacts of failing to limit global warming to 1.5C, as summarised in IPCC Special Report 15 (2016), are significant and include:

- An ice-free Arctic Ocean during summer with attendant positive global warming feedbacks and climactic shifts
- Triggering of instabilities for Greenland and Antarctica ice sheets resulting in multi-metre additional sea level rises in coming centuries
- Exacerbation of ocean acidification to levels unprecedented in the past 65 million years, devastating marine ecosystems and aquaculture
- An acceleration of global biodiversity loss by multiples of at least 2
- Uncontrollable melting of permafrost locking in steeper warming trajectories
- A minimum doubling of the global population exposed to water stress
- Reductions in projected food availability, particularly in sub-Saharan Africa.

The special report concluded that warming greater than 1.5°C is not unavoidable but depends on an international commitment to net zero emissions by 2050. The least cost pathway to a 1.5C scenario will be determined by emission limits achieved by 2030, as up to 75% of the remaining emissions budget may already have been expended based on the most likely scenarios (UNFCCC 2015).With reference to this benchmark, the Australian Nationally Determined Contribution of a short-term target of a 28% reduction from 2005 emissions levels by 2030 has been widely criticized as inadequate (Climate Council, 2019). While the Western Australian State government has not yet set an independent 2030 emissions reduction target, all other State and Territory governments have set more ambitious interim targets or are in the process of setting them (ACT 75%, NSW 35%, NT 50%, QLD 30%, SA 50%, TAS >95%1, VIC >40%2) (Matich, 2020), Victoria Government (2019). However, in committing to net zero emissions by 2050 the Western Australian government has a de facto commitment to an ambitious 2030 target.

Under the Paris Agreement, non-State actors such as Cities could independently make more ambitious targets. The City of Joondalup, within which the main ECU campus is located, joined in this effort as an early member of the Covenant of Mayors for Climate and Energy (GCMCE, 2015). As part of this initiative, the City of Joondalup has committed to a 2030 target of a 40% reduction in Greenhouse gas emissions from within the territorial boundary of the city and the facilitation of a demand responsive energy system. Such initiatives by Cities are increasing seen as critical to limiting warming to 1.5C. The UNEP emissions gap reports have shown that without ambitious action by non-State Actors, limiting global warming to 2.0C is impossible, and modelling has shown that the 1.5C scenario can only be achieved by whole-of-society commitment to the target.

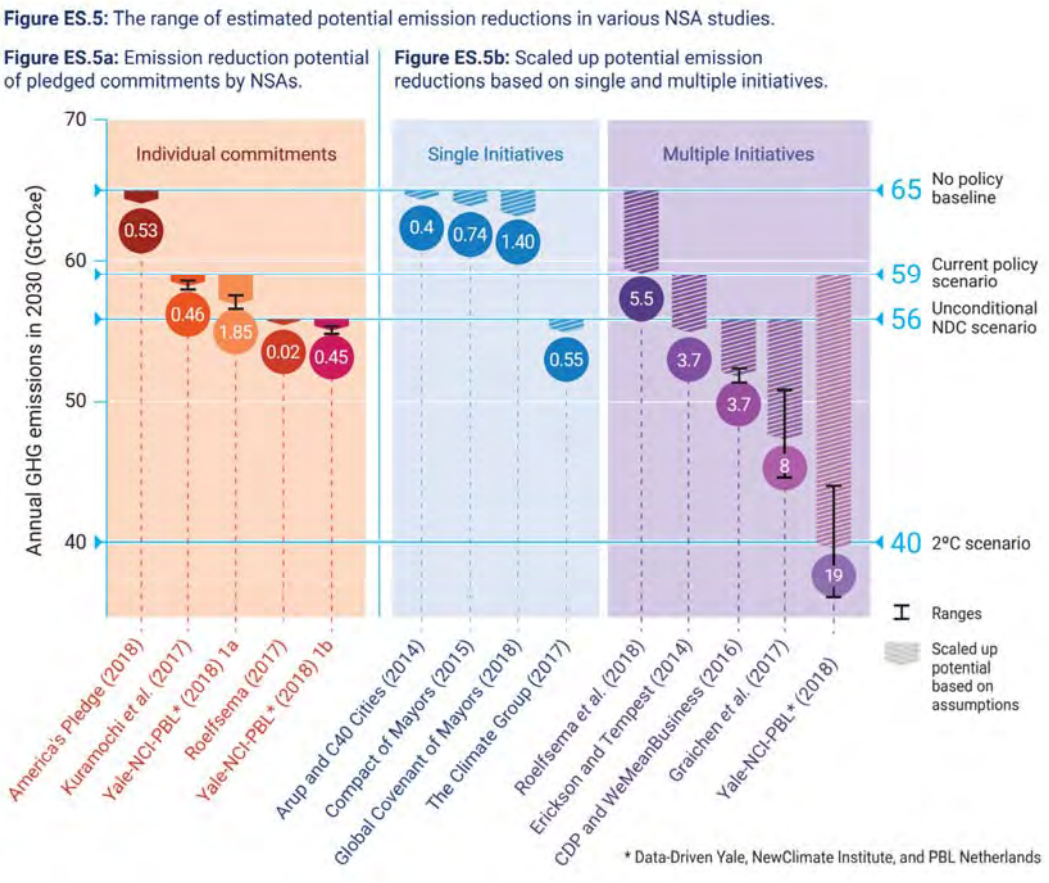

Figure 1: UNEP Emissions Gap Report to Limit Warming

Since 2019, over 7000 Academies and Universities globally have declared a Climate Emergency to underscore the need for their institutions to respond to Climate Change with the urgency required to avert widespread suffering.

1.2 Edith Cowan University Climate Initiative Taskforce

The Edith Cowan University Climate Initiative Taskforce (the Taskforce) was formed in early 2020 to audit the University's current carbon footprint and recommend to the Vice-Chancellor, and University Executive, achievable ways by which it can be reduced.

The Taskforce's activities are informed by ECU's:

- Environmental Declaration (https://www.ecu.edu.au/__data/assets/pdf_file/0015/210813/Environmental-Declaration.pdf)
- Sustainability Policy (https://www.ecu.edu.au/centres/facilities-and-services/our-services/environmental-management), and
- Environmental Management System (https://www.ecu.edu.au/centres/facilities-and-services/our-services/environmental-management)
- ECU commissioned a Sustainability Audit of the Edith Cowan University (ECU) campuses at Joondalup, Mount Lawley and Bunbury in August 2020. 360 Environmental was engaged to deliver this scope of services. ECU has a strong commitment to sustainability including the establishment of the Climate Initiative Taskforce, undertaking Carbon Footprint auditing and mapping to the United Nations Sustainability Goals.

ECU academic and professional staff members from seven schools, all campuses and all service centers (122 signatories of which fifteen are members of the professoriate) called on ECU to declare a climate emergency and set a 2030 net zero emission target (quoted from the letter to Professor Chapman dated 26/3/2020).

ECU has achieved significant reductions in greenhouse gas emissions since 2008 with a reduction from 34,371 tonnes CO2-e to 24,969 tonnes CO2-e in 2019. ECU ultimately wishes to achieve a net zero carbon footprint. ECU seeks to define sustainability benefits in other areas such as banning plastic bottles on campus and increasing sustainability education for students.

ECU has an estimated $1 billion asset base in terms of buildings and is preparing a transition plan to achieve a more sustainable university that engages broadly with the community to achieve the 1.5C scenario required by the UN to avoid a climate emergency. This sustainability audit is a tool for EDU to use to improve sustainability performance, identifying gaps and opportunities to achieve this, and to **position ECU as a leader in creating a sustainable future.**

1.3 Objectives

The objectives of the Sustainability Audit are to support ECU's sustainability commitments by:

- Providing a gap analysis between current state and future state with respect to the ECU Climate Initiative Taskforce Targets and their alignment with the UN Sustainable Development Goals

- Reviewing existing ECU measurement, reporting, and recordkeeping practices for GHG and Sustainability reporting by ECU, and perform a Gap analysis against various standards and best practice
- Exploring opportunities to implement Integrated Reporting, to highlight the importance of Sustainability outcomes in ECU Annual Reports
- Identifying opportunities and best practices to improve ECU's sustainability and influence on sustainability in the broader community
- Advising ECU on available programs, schemes or grants (including relevant criteria) that may support ECU's current actions
- Highlighting costs and savings associated with any recommendations.

1.4 Scope of Work

The scope of work includes:

- Review ECU's existing sustainability practices on the Joondalup, Mount Lawley and Bunbury campuses against the Taskforce's Mapping Template, and:
  - Provide a gap analysis between current state and future state as it relates to the identified Targets within the mapping template for the 15 listed targets
  - Review existing measurement and reporting practices and provide recommendations identifying improvements, if any
  - Recommend any additional actions and/or best practices that ECU may consider in addition to existing practices that would contribute to positive carbon footprint/sustainability outcomes
- Project different time scales to achieve carbon neutrality, recognizing the limits on capital
- Consider what is required to offset current emissions and the benefit of tree planting either on or off site
- Advise ECU on available programs, schemes or grants (including relevant criteria) that may support, and leverage ECU's current actions or recommendations provided
- Highlight expected costs associated with recommendations should ECU choose to adopt them.

A certified written audit report (word and pdf formats, with all native files) will be issued following receipt of comments on the draft report.

1.5 Report Presentation

This report is presented as follows:

- Chapter 1 - Introduction
- Chapter 2 - Methodology

2 Methodology

2.1 Methodology

The following was undertaken:

- 1-2 day on-site audit of each Joondalup, Mount Lawley and Bunbury campuses
- Interview key staff and undertake a review of ECU's existing sustainability practices on the Joondalup, Mount Lawley and Bunbury campuses against the Taskforce's Mapping Template
- Prepare draft and final audit reports identifying:
  - Gaps between **current state and future state** as it relates to the identified Targets within the mapping template for the 15 listed targets.
  - Measurement and reporting practices and provide **recommendations identifying improvements**, if any.
  - Any additional actions and/or **best practices** that ECU may consider in addition to existing practices that would contribute to **positive carbon footprint/sustainability outcomes**.
  - Project **different time scales to achieve carbon neutrality**, recognizing the limits on capital
  - Consider what is required to **offset current emissions** and the benefit of tree planting either on or off site
  - Advise ECU on **available programs, schemes or grants** (including relevant criteria) that may support and leverage ECU's current actions or recommendations provided
  - **Highlight expected costs associated with recommendations** should ECU choose to adopt them.

2.2 Audit Team

Michelle Rhodes and Sam Nelson formed the project team. Michelle Rhodes is a Lead Environmental Auditor (Certificate 119340) and Sam Nelson has over thirty years of experience in sustainability, environmental accounting, scientific programming and environmental data systems.

The third-party audit was conducted with reference to key auditing protocols, as prescribed under ISO 19011:2014 Guidelines for Management Systems and in accordance with ISO 14001:2015. The following documents were reviewed as part of the audit:

- Taskforce's Mapping Template 15 listed targets
- Edith Cowan University's Sustainability Policy
- Reporting processes.

A pre-audit review of all relevant documentation was undertaken and an audit presentation was prepared and a protocol was developed based on the Scope of the Audit (refer Appendix A for audit table and results).

The audit was undertaken with various interviews with key staff between 10-20 August 2020. Documents and processes were reviewed and key personnel interviewed (refer Table 1 for more details and Appendix A for Interview feedback summaries).

The audit table was completed to demonstrate compliance (or otherwise) and identify gaps and opportunities with the Taskforce's Mapping Template 15 listed targets (Appendix B). Some key documents that were noted are provided in Appendix C.

2.2.1 Audit Specifications

Audit details are summarised in **Table 1.**

Table 1: Audit Details

Audit Specifications	Audit Details
Site Audit	10-20 August 2020
Location	Edith Cowan University (ECU) campuses at Joondalup, Mount Lawley and Bunbury
Audit Purpose	Review ECU's existing sustainability practices against the Climate Initiative Taskforce's Mapping Template
Auditor and Audit Team	Michelle Rhodes (Lead Auditor) 360 Environmental and Sam Nelson (Sustainability Consultant)
Executive Sponsor	Professor Cobie Rudd Deputy Vice-Chancellor (Strategic Partnerships) & Vice-President
Contract Contact	Lorna Viljoen Manager, Management Systems, Digital and Campus Services
Principle Auditees People Attending Audit, Interviewed and Who Assisted with the Provision of Information	**Joondalup Campus (270 Joondalup Drive, Joondalup, WA)** **School of Engineering** Professor Daryoush Habibi – Executive Dean Dr Fernando Guzzomi – Senior Lecturer Dr Stefan Lachowicz – Senior Lecturer Associate Professor Iftekhar Ahmad – Academic Associate Professor Mehdi Khiadani – Assoc Dean Research Associate Professor Ganesh Kathapalli **School of Science** Dr Dave Blake – Lecturer, Environmental Science Dr Eddie Van Etten – Senior Lecturer Dr Rob Davis – Senior Lecturer Vertebrate Biology Professor Pierre Horwitz – Professor **School of Business and Law** Dr Mehran Nejati Ajibisheh – Senior Lecturer

Audit Specifications	Audit Details
	Dr Mohammad Iranmanesh – VC Research Fellow Associate Prof Ferry Jie Dr Reza Kiani Mavi – Senior Lecturer Associate Prof Simone Domenico Scagnelli – Director Accounting and Finance Dr Azadeh Shafaei Darastani – Research Fellow Dr Judy Lundy – Lecturer **Strategic Procurement** Duane Redden – Manager, Strategic Sourcing and Contracts **Digital and Campus Services (Water and Energy)** Kevin Hall – Manager Buildings and Maintenance School of Medical and Health Sciences Professor Amanda Devine – Assoc Dean - Public Health and OSH **Digital and Campus Services (Waste)** Kerry Devine – Manager Campus Operations and Support Services **Office of Deputy Vice-Chancellor (Strategic Partnerships)** Professor Cobie Rudd - Deputy Vice-Chancellor (Strategic Partnerships)
	Mt Lawley Campus (2 Bradford Street, Mount Lawley, WA) **School of Education** Professor Mindy Blaise – Professor of Education Julie Boston – Academic Coordinator (Teams Meeting) **WAAPA** Mr Cameron Malacari – Production Manager **School of Nursing and Midwifery** Dr Fiona Foxall – School of Nursing and Midwifery (Teams Meeting) **Kurongkurl Katitjin - Centre for Indigenous Australian Education and Research** Jason Barrow Cultural Awareness Officer
	Bunbury Campus (585 Robertson Drive, East Bunbury WA) **School of Arts and Humanities** Dr Naomi Godden – VC Research Fellow Social Work Dr Danielle Brady – Senior Lecturer Dr Marilyn Palmer - Lecturer **SW School of Science** Dr Sora Marin-Estrella - Academic

2.2.2 Definitions of Audit Compliance

Definitions of compliance are summarised in **Table 2.**

Table 2: Definitions and Colour Codes for Compliance

Compliance	Definition
Compliance	Complies at the time of the audit, commitments implemented and satisfactory performance is being achieved.
Non-Compliance	At the time of the audit, does not comply.
Partial-Compliance	At the time of the audit, commitments are partially implemented.
Opportunity for improvement	Opportunity for improvement.
Not Applicable at time of audit	At the time of the audit, commitments not yet relevant.
Unable to Audit	Unable to audit

The audit report is provided to identify non-compliances, partial-compliances and/or improvements. The audit table has been colour-coded for ease of interpretation.

3 Results of the Independent Audit

This section of the report summarises the key audit findings.

3.1 The ECU Emissions Reduction Aspiration Gap

Greenhouse gas emission reduction goals and targets for Edith Cowan University are not publicly available. Without a target by which to gauge success, it is difficult to recommend a forward strategy for greenhouse gas emissions reductions or renewable energy uptake.

Targets mentioned in the public domain are:

- Objective 15 of the 2017-2021 Strategic Plan to "reduce carbon footprint through actions that include decreasing waste to landfill, water usage and energy consumption"
- A 2014 Sustainable Communities Action Plan Target for that year, "(ECU) aim(s) to stay below the mean average for energy consumption per EFTSL for Australian Universities."

Under internal Operational Plans for Digital and Campus Services, the Sustainability Policy Owner, the Measure and Target for Objective 15.4 is to "to stay below the mean average for energy consumption per EFTSL for Australian Universities."

Emission reduction targets are not included in the targets section of the ECU Strategic Plan. An emissions reduction target is not included in the ECU Sustainability Report and further GHG reductions are not included in the Future Initiatives section of that report.

Taken in the context of the urgent science-based targets for greenhouse gas emissions reduction at International, Federal, State, and local government levels, the lack of a published emissions reduction target by ECU is a significant oversight. This lack of a firm commitment and published goal is at odds with ECU policies and Aspirations such as:

> *Conducting its business in ways that address sustainability and which raise awareness both within itself and the broader community of the needs and requirements for a sustainable future* (Sustainability Policy: Commitment).
>
> *Incorporating sustainability considerations in all levels of the organisation and decision making* (Sustainability Policy: Principles).
>
> *Raising public, government, industry, foundation and institutional awareness by publicly addressing the need to move towards an environmentally sustainable future.* (ECU Environmental Declaration).
>
> *We also seek to align the University's goals with Government policy targets* (Sustainability at ECU).

The ECU Vice Chancellery has identified this gap and, from February 2020, has instituted the Climate Initiative Taskforce reporting directly to the University Executive with a view to informing the development of a next Strategic Plan. The urgency that ECU has placed on addressing this issue has since been underscored by an Academic and Professional Staff petition calling on the University to declare a Climate Emergency and to prioritise the issue accordingly.

Accordingly, the University is aspiring to monitor their progress against the United Nations' Sustainable Development Goals including Goal 13 on Climate Action to "Take urgent action to combat climate change and its impacts" (UNEP, 2019).

3.2 Governance and Reporting

Responding to an emissions reduction target will require a broad focus across University domains and departments. The owner for the Sustainability Policy, which is the only policy instrument available under which an ECU emissions reduction target might operate, is currently the Digital and Campus Services (DCS). DCS has a facilities management remit, which is too narrow a focus to cover the whole of organisation scope required to implement an ECU emissions reduction target, particularly where capital investment may be required.

Alternatively, the University Executive has implied responsibility for sustainability goals in the ECU Sustainability Policy, which states that:

> *All Schools and Service Centres at ECU will include sustainability goals within their annual operational plans and report to the University Executive on their outcomes and achievements through Executive Deans of Schools and Centre Directors.*

Upon review, the reporting process does not appear to have been substantially implemented as only Digital and Campus Services and the School of Arts and Humanities mention sustainability activities in their operational plans, and these only relate to maintaining an above average relative performance for energy consumption, as well as initiatives for waste minimisation and recycle, and a reduction in plastic consumption.

Recently, the ECU Vice Chancellor has assigned an Executive strategic role for spearheading the Climate Initiative Taskforce to Deputy Vice Chancellor for Strategic Partnerships, Professor Cobie Rudd.

If an ECU emissions reduction target is to be adopted, new governance structures to implement and respond to it will be required. In discussions with staff, several possible governance structures were considered, including:

- Reinstatement of the Sustainability Communities Steering Committee which previously represented the positions of all schools and departments regarding Sustainability
- Development of a corporate Sustainability Manager role with individual responsibility and budget to implement sustainability initiatives such as those related to an emissions target
- Inclusion of a Chief Sustainability Officer (CSO) as a new position at the level of Chief Operations Officer, Chief Financial Officer or Chief Information Officer University (the Executive does not have Directors). A CSO is an emerging role in many organisations globally, including an increasing number of major Universities. As sustainability issues generally bridge multiple functional domains, a CSO can provide a holistic perspective on strategic challenges facing the University which is not constrained to institutional silos and which encourages a coordinated approach. Staff opinion on a CSO role varied,

but some felt that the position, if introduced, should work across existing institutional lines of control, rather than to develop a new parallel institutional structure which could become its own silo. Creation of this, or similar, high level role would indicate ECU taking a strong leadership commitment to Sustainability.

- Development of funded initiatives within each individual School or Centre with leadership and managerial roles assigned to existing staff.

An initial step toward developing new governance structures would be to enforce existing mandatory reporting on sustainability goals, and to explicitly include emissions reductions, in Operational Plans. Doing so could help illuminate roles, resources, and structures currently active at ECU to assist in future strengthening of sustainability governance.

3.3 Emissions Reduction Target Implementation

Assuming the University decides to adopt an emissions reduction target, there are a variety of strategies that can be undertaken with regards to achieving a range of potential opportunities, each with attendant benefits and costs. One of the primary objectives of this Sustainability Audit is to identify opportunities and costs for emissions reduction. We will assume in this report that the ECU Joondalup campus has adopted the City of Joondalup commitments under the Covenant of Mayors for Climate and Energy.

Under this scenario, the ECU Joondalup campus would assume a role as a leading contributor to attaining, by 2030, a reduction of 40% of emissions within the Joondalup City boundaries wherein the campus is located. For consistency, other campuses would similarly strive to engage within their municipal precincts to achieve similar goals. The City of Perth, the site of a potential new ECU campus, is also a signatory to the Covenant of Mayors and shares identical goals, thus creating a significant emissions challenge during the design, construction, initiation and operational stages of the new campus.

To contribute to achieving the City of Joondalup target, the ECU Joondalup campus would need to achieve a **40% net emissions reduction in the near term,** with reductions over 40% being considered as contributing to the community target. Given that ECU would be expected to be a lead institution in this effort, lagged by other stakeholders with less institutional capacity, the scenario in this report will assume an ambitious 40% campus reduction by 2023, followed by carbon neutrality by 2025, and significant carbon positive goal of an additional 40% by 2030.

3.4 Audit Feedback from Schools and Campus Services

Appendix A contains a summary of feedback from the interviews conducted as part of the survey. There is a substantial amount of excellent work ECU has, and is doing, to reduce its carbon footprint and to drive a range of sustainability initiatives across its campuses. ECU is a sector leader in terms of carbon emissions, energy cost/consumption and waste output. The schools are leading in terms of their research, engagement and participation in sustainability initiatives. Table 3 summarises the audit findings.

Table 3: Findings from Sustainability Audit

Audit Area	Finding	Compliance
Governance Sustainability framework for ECU - Policy	ECU's Sustainability Policy sets the strategic scope of Edith Cowan University's commitment to sustainability in the appropriate management of the organisation and its operations, the engagement of students and staff in principles and applications of sustainability and the engagement of and collaboration with the broader community. The sustainability owner is Director and CIO, Digital and Campus Services, who reports to the Vice President (Corporate Services) reporting to the Vice Chancellor. The ECU Sustainability Policy places an emphasis on efficiency, for ECU to *conduct all its operations in an environmentally sensitive manner, minimising waste and maximising efficiency*. However, this approach ignores the value of resilience encapsulated in institutional capacity and memory. The sustainability policy centres on ECU campus activities (refer Appendix C) and lacks aspiration.	Opportunity for improvement
Governance Sustainability framework for ECU - Reporting	The Sustainability Policy states: Annual operational plans are to include sustainability reporting. *All Schools and Service Centres at ECU will include sustainability goals within their annual operational plans and report to the University Executive on their outcomes and achievements through Executive Deans of Schools and Centre Directors.* From a review of the 2020 operational plans it is apparent that only Digital and Campus Services and Arts and Humanities provide sustainability goals in their plans. All Schools are not reporting on sustainability through their respective operational plans as is required.	Non -compliance
Governance Reporting	The Engineering, Science, Law and Business, Arts and Humanities schools, and Digital and Campus Services are leading in terms of their engagement, research and participation in sustainability initiatives. There is an opportunity to share these initiatives more widely and strengthen the focus into areas with the opportunity to significantly reduce emissions into other Schools e.g. Health and Education.	Opportunity for improvement
Governance Sustainability Culture	There is a strong culture of sustainability within pockets of the university (refer Appendix B) and under leadership this focus could permeate all disciplines of the university, placing ECU at the forefront of sustainability for WA.	Opportunity for improvement
Governance Sustainability framework for ECU - Targets	Emissions reduction targets are not available for ECU. The purpose of ECU's Climate Initiative Taskforce is to audit the University's current carbon footprint and recommend to the Vice-Chancellor, and University Executive, achievable ways by which it can be reduced. Contributing to a positive carbon footprint and sustainability outcomes forms part of the brief for this	Non -compliance

Audit Area	Finding	Compliance
	work (ECU's Climate Initiative Taskforce Consultancy Brief 2020).	
Governance Environmental Declaration	The Environmental Declaration requires: *Setting an example of environmental responsibility by establishing and maintaining processes of resource conservation, recycling and waste reduction within the University.* Over decades, there has been ongoing loss of bushland at campuses for building and fire protection impacting habitat for protected fauna species (Carnaby's cockatoo at Joondalup and the phascogale at Bunbury) and flora species (threatened orchids at Bunbury). The frequency of burning and fire control measures has impacted biodiversity where trees have died without replacement, fauna has been exposed and predated and the understory replaced with introduced weed species. This is of concern to staff and students requiring a: • Commitment to cease all clearing of native vegetation as part of all ECU contracts (procurement) • Program of restoration to protect bushland and habitat for threatened species. • Extend conservation practices beyond the campus to the precincts. • Fire clearing and burning regimes to be managed with a safety and a conservation mindset.	Non -compliance
Indigenous engagement – ECU's Reconciliation Action Plan - May 2018 to April 2021	The seven inter-connected themes in the RAP publicly articulate ECU's approach to reconciliation between Aboriginal and/or Torres Strait Islander peoples and non-Indigenous Australians. The RAP commits to continued annual reporting to University Executive and Council on progress against the Strategic Plan's KPI for Aboriginal and/or Torres Strait Islander employment and Strategic Goal for sustainability. Environmental work has socio-economic, cultural, health and political impacts. Indigenous collaborators often have a holistic world view and there are opportunities to further share and develop knowledge systems. It is an imperative that indigenous knowledge and ways of being in relation to the land and waters be included in all work on the sustainable use and management of landscapes. Emerging leaders and their elders expect this going forward. This is a key leading approach.	Opportunity for improvement
Gaps between current state and future state as it relates to the identified Targets within the mapping template for the 15 listed targets.	There are 17 UN Sustainability Development Goals (SDG). There are 15 listed targets mapped to 10 SDG. The 7 SDG not covered require a statement of rationale for materiality of priority to explain why these have not been covered: • (1) No poverty • (2) Zero hunger • (3) Good health and well-being	Partial-Compliance

Audit Area	Finding	Compliance
	• (5) Gender quality • (10) Reduced inequalities • (14) Life below water • (16) Peace, justice and strong institutions Refer suggested targets (Appendix B) and suggested opportunities.	
TEFMA (TEFAL reports) – provide a summary of energy/water consumption.	TEFMA reports 2016-2018 were reviewed. 2019 report was not reviewed. Energy and water use targets should be shared and considered more broadly as part of precinct targets.	Opportunity for improvement

The following sections discuss some of the key emission reduction options for ECU.

4 Emissions Reduction Options at ECU

Emissions Reduction options and opportunities at ECU, alternates and ballpark cost estimates are included in the following section. These are intended to provide ideas for ECU's consideration based on the findings of the audit.

4.1 Corporate Power Purchase Agreements (PPA)

The ECU Joondalup campus uses ~15,000 MWh (Carbon Neutral, 2019) and, as a large-scale consumer, can participate directly in the wholesale electricity market to secure long-term power offtake contracts with large scale renewable energy projects. This trend has been emerging since 2016, and currently most major universities in Australia engage in the Corporate PPA market to some degree (BRC-A, 2019). Such contracts can be cost competitive with existing electricity contracts, especially given the rapidly declining costs of large-scale renewable generation in recent years. The levelized cost of Large-scale PV solar electricity with storage is now comparable with the lowest cost of fossil fuel based new generation (Closed cycle natural gas) with strong downward trends not found in competing technologies (CSIRO, 2018). Meanwhile, in Western Australia the retail price faces upward price pressure due to growing system variability on the network (AEMO, 2019) relating to increased climate variability and shifting demand due, in part, to increases in behind-the-meter rooftop solar. This approach would require additional administration by ECU than purchasing electricity through a retailer, and these and other transactions costs would also need to be taken into consideration.

A pipeline of twelve major renewable energy projects are currently planned or under construction in Western Australia with 740MW of combined capacity (Climate Council, 2020). However, Retailer and PPA subscription to these projects is high and access to remaining capacity may be competitive. The Victorian Local Government Association has demonstrated that combining small and mid-level consumers can increase bargaining power in the negotiation of PPAs while sharing administration and transaction costs (BRC-A, 2019). Under this model it is possible that multiple users within the City of Joondalup could combine to bid under a consortium PPA with large scale renewable projects. ECU is well positioned to take a lead in facilitating such a consortium PPA.

One disadvantage of contracting a Corporate PPA is that prices and offtake volumes are typically locked in for a long period, generally for 10 years or more. However, a consortium agreement could leave flexibility for ECU to pursue alternate strategies over time by negotiating shifts in offtake to other parties with fewer conservation or renewable energy options.

4.2 Solar Power Installation

The Perth Metropolitan area and surrounds have an ideal geography for the generation of solar power. A ballpark estimate of solar capacity is ~1700kWh of annual electrical power output per 1kW of north facing rooftop solar installed (LG Calculator, 2020), monthly ranging from 75kWh (July) to 221 kWh (Dec). To completely replace 15,000 MWh of electricity usage by the ECU

Joondalup (Carbon Neutral, 2019) could conceivably require up to 8.8 MW of solar power production.

North facing rooftop generation capacity on the ECU Joondalup Campus, according to interviews with the School of Engineering is 4MW. Although the cost of solar panels continue to fall to as low as $0.40 per Watt, the industry rule of thumb for budgeting for installed solar on major projects is $1 per Watt to include administration, consultants fees, infrastructure, installation, inverters, electrical works, connection, insurance and commissioning. Minimal annual asset management and maintenance budgets are required in addition. Consequently, the capital expenditure for a 4MW system could be approximately $4 million AUD. Assuming a maximum yearly savings of ~$1,750,000 with a levelized retail electricity price of $0.20 per kWh gives a three (3) year Return on Investment (ROI), followed by an continued savings thereafter. With a $0.04-$0.10 AUD levelized cost of electrical power over 20 years, not installing solar power represents a significant opportunity cost from the onset (IRENA, 2018).

Additional investments in solar can also be made on West and East facing roofs, with these alternatives taking an average power production hit of 15%. However, because East facing panels peak in production earlier (10-11am) and West facing panels peaking later (2pm-3pm), this means that the University can consume more of its generated power while exporting less to the grid, resulting in additional savings due to feed-in tariffs lagging the cost of importing electricity.

Another source of solar power for the University are Solar Park Shades. 14kW units (24,000 kWh) covering double row 3 car spacing are available in units which are electric car charger ready. Assuming 80% of car parking spaces are unshaded this could amount to a ~4MW of generation capacity (PowerPark, 2020).

The Electron Science Research Institute at ECU has recently pilot trailed the operational viability of a range of transparent glass based solar windows achieving electric power outputs in excess of 25 Wp/m2, or 12% of a typical solar panel (Vasiliev and Alameh, 2018). ECU has received a $1.6 million Cooperate Research Centre grant to build a 300 sqm greenhouse to generate 50 watts/m2 (ECU, 2020). This emerging technology is rapidly maturing and could be considered for future construction or retrofit projects of additional solar energy. Community solar gardens are another recent innovation wherein surrounding housing and businesses without access to the benefits of solar power because of restrictive strata arrangements, architectural constraints, or lack of council approval can lease a solar array in a nearby community solar garden. Solar gardens can serve a dual use as community gardens as many garden plants thrive in the partial shade provided by the arrays and evapotranspiration of plants underneath keep panels cool increasing their energy yield during high temperatures (Barron-Gafford et al. 2019). ECU has additional open spaces which may be amenable to this type of community development, perhaps as a public focal point for sustainability initiatives.

4.3 Energy Storage

Deployment of energy storage as a complement to renewable energy generation is crucial for round-the-clock availability of electricity, for gaining optimal value for grid exported electricity, and for participating in any precinct scale microgrid, virtual power plant, or peer-to-peer activities. Figure 2 demonstrates that battery storage technologies are currently accelerating disruption in the renewables sector. Predictions from year to year consistently falling short of the previously predicted drop in price (Graham et al, 2019). Price trends also demonstrate independence from carbon policy due to a variety of alternative factors driving demand.

Figure 2: CSIRO Projected Capital Costs for Battery Pack Compared to Three Previous Studies

The ECU Joondalup campus possesses an alternative means of energy storage, already in place, to store excess midday solar power in the form of cooled water for the Central chilled water plant located in Plantroom 2 in Building 16, which consists of 3 off water cooled chillers and a 1.1 million litre chilled water storage tank holding water chilled to 5C. The chilled water storage is currently charged by chillers at night to take advantage of cheaper off-peak electrical power at night, and then discharged during the day as a “phantom” chiller. (ECU Planning and Design Guidelines, 2020). However, rather than drawing from the grid at night, the water could be chilled by excess solar power during the day thereby reducing night-time electricity demand. Temperature can also be used for excess solar storage in other operational contexts such as lowering the temperatures of refrigerators and freezers in late afternoon before turning them off for the evening or using heat pumps to heat and store hot water. Our interviews with the Engineering school suggested other means of energy storage which could be experimented with such as hydrogen production, water treatment of intercepted rainwater, or geothermal. District heating and cooling opportunities that could take advantage of excess behind the meter solar energy also exist with adjacent properties including the WA Police Academy, North Metropolitan TAFE, the City of Joondalup, and a variety of commercial properties.

The addition of electrical car charge points at ECU parking bays also constitute a low cost, potentially revenue positive, form of excess solar storage with broader benefits for reducing community emissions. Private vehicle travel to ECU Joondalup currently results in ~7,500 t e-CO_2 (Edith Cowan University 2017 Travel Surveys). 72% of Staff at ECU campuses currently commute along to work by car, with a further 5% carpooling, and these figures are consistent of the past 20 years with a slight upward trend. Transition of 100% of staff and student vehicles to EVs, and fully charging them from excess daytime solar electricity would at maximum abate that quantity of emissions. Taken in the context of the Joondalup campus GHG emissions of ~13,000 tCO_2-e this is significant. EV initially reduces the drivers cost of transport from $0.15/km to $0.05/km. Possible electricity subsidies or salary sacrifice options employed by the University could further reduce this significant annual cost of on average $2,000 per capita for staff and students. This approach could cushion employees and students who are experiencing economic upheavals such as during the COVID-19 pandemic. Capturing solar energy in the form of parking shade sales would also cool EVs during the day, further improving battery life.

The most recent State of Electric Vehicles report (Electric Vehicle Council of Australia, 2019) has determined that currently 8% of vehicle sales in Western Australia are EVs. Recently $300 USD Billion has been invested in electrification of global vehicle models, with many countries in Western Europe to phase out internal combustion engine sales entirely by 2030. Given these megatrends, it is inevitable that Western Australian and Australian Government Policies will in future develop to accelerate EV infrastructure investments to support EV vehicle owners. The increase in electric vehicle charging infrastructure is significant to electric vehicle adoption in Australia, given the positive correlation between the number of publicly accessible chargers, and the number of electric vehicles sold. An ECU campaign to encourage EV uptake, backed by an increased deployment of electric charge points, has the potential to accelerate uptake.

Currently the ECU fleet includes several hybrid vehicles, one EV, and only one EV charging station. During interviews, the School of Engineering suggested that the establishment of a green energy powered co-location data center is another means of utilising excess behind-the-metre renewable energy. Co-location has become a common commercial undertaking wherein an organisation provides the physical and network infrastructure for IT server and network assets and leases usage for cloud computing to data centre network operators. Certified carbon neutral data centres demand a premium price, and this could generate increased revenue for the University in comparison to exporting excess energy to the grid. A natural advantage for ECU campuses in establishing green co-location data centres are the large land areas available for horizontal deployment of low depth geothermal heat sinks which can cool servers avoiding electrical cooling. These heat sinks are relatively inexpensive to install compared to other geothermal options, and this approach can also be undertaken with other facilities requiring cooling. The ECU School of Engineering possesses expertise to maximise educational opportunities and potentially reduce management and operating costs for such ventures.

4.4 Precinct Geothermal Systems

Precinct-scale thermal energy systems (Figure 3) have the potential to:

- Provide for a diversity of heating and cooling capabilities along a water loop
- Share thermal loads between facilities for example, heating a swimming pool using waste heat from buildings
- Provide a long term and versatile infrastructure to support a wide range of energy and cost saving developments.

Reverse-cycle ground source heat pumps provide both low carbon cooling and heating capacity to building connected to the loop. The carbon footprint can be further lowered if solar panels can be used to operate the heat pumps with the loop providing energy storage as a thermal battery (as discussed above with the chiller reservoir) (Pujol, et al. 2015).

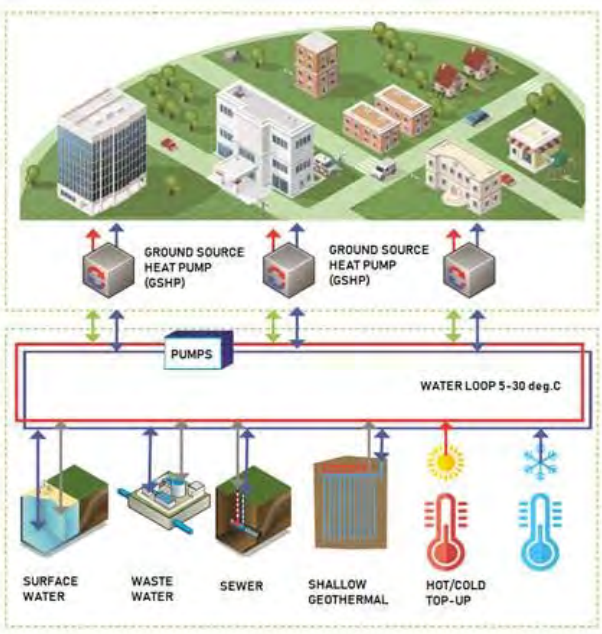

Figure 3 : Precinct Thermal System Options

Geothermal systems have a significant role to play in providing low carbon hot/cold energy to the precinct-scale energy system:

- Deep geothermal systems can be used to provide hot top-up to the loop or direct heating of pools and other high heating load infrastructure. There are 13 geothermally heated pools in Perth (M. Pujol, 2015). Geothermal heating of pools is the lowest lifecycle cost and CO2 emission solution for large pools in Perth
- Shallow geothermal systems can be used to provide cold top-up to the loop or direct cooling of computer infrastructure. The Pawsey supercomputer (2.3 MW of cooling) is cooled by a shallow geothermal system. The system is more energy efficient than conventional cooling methods and is not affected by 40°C days. (Martin Pujol of Rockwater personal communication, 01/09/2020).

4.5 Virtual Power Plant (VPP) and Plico Energy

A VPP is a network of small to medium scale, decentralised generating units with behind-the-meter battery storage that are dispatched from a central control room while remaining independent in their operation and ownership. VPPs relieve network load by dynamically distributing power from individual units during peak load, and optimally trading power between participants. Plico Energy is a local organisation which develops VPPs around a not-for-profit Association structure, with non-allocated joint revenue being reinvested in the VPP on behalf of the association. The VPP delivers a quicker ROI on renewable investments through coordinated installation and maintenance services, efficiencies and load optimisation, responsive real time dispatch services, and sophisticated information systems. Participants pay a lower "retail" price for electricity until the asset has been purchased from the VPP, which assumes the capital cost upfront through funding with equity capital (Susi Partners) (Brian Innes of Plico Energy, personal communications 26/08/2020).

In developing a VPP using the Plico Energy model that includes the Joondalup campus and nearby parties, ECU could achieve the following benefits:

- Reducing costs through taking advantage of Small-scale Technology Certificates (STCs) across multiple facilities and dwellings
- Giving each ECU business unit and School visibility and control over its own usage and footprint
- Creating an educational laboratory with data visualisation tools for students to engage with including:
  - Engineers
  - Data scientists
  - Commerce (trading)
  - Behavioural scientists
- Utilise a structure that allows minimal capital expenditure
- Engaging within the local precinct by sharing ultimate ownership with the broader community
- Virtual expansion beyond the campus geographic area to include all staff and students within the VPP.

4.6 Peer-to-Peer (P2P) trading and Power Ledger

P2P electricity trading is a disruptive technology which facilitates an incremental real-time trading of surplus renewable energy to external customers in a way is responsive to small scale changes in energy usage. By creating a more efficient market this reduces costs and maximises revenue for participants and helps to balance loads on the grid and ultimately reduce network charges.

"If combined with peer-to-peer trading, rooftop PV and storage could enable consumers to trade with their (non-solar) neighbours. This may reduce or delay the need for investment in capacity at the network level" (Economic Regulation Authority, 2018).

P2P trading is enabled by blockchain software, the technology underpinning cryptocurrencies like Bitcoin. Power Ledger, a Perth start-up, is a global leader in the development of this technology. The RENEW Nexus research project, led by a collaboration between Curtin University and Murdoch University, investigated various trials of Power Ledger trading and determined an average cost savings of 2.8% with a maximum savings of 10.2% with greater cost savings going to higher volume consumers. They also determined increased awareness and responsiveness to energy usage among participants, and reduction to the ROI of VPP systems by 38%. With the uptake of changes to market rules for Western Australia, as recommended in the Western Australian Government Distributed Energy Resource Roadmap (2020), opportunities to benefit from P2P trading are expected to increase.

4.7 Energy Efficiency and Conservation

From interviews with the School of Engineering, staff pointed to opportunities for improvements in energy efficiency on the campus, including improvements to refrigeration in chillers, ventilation, voltage optimisation, and insolation as potential upgrades or retrofits to ECU facilities with potentially larger reductions in emissions than current ECU initiatives for upgrading lighting. For example in one case study, the University of Queensland analysed the efficiency of air-conditioning chillers which accounted for 45% of energy use on campus, and installed an optimisation package reducing energy consumption by 20% saving more than $100,000 per year with a two (2) year ROI (Dept of Industry, 2010). Edith Cowan has existing systems (QFM, Greensense) for investigating and scheduling upgrades for energy efficiency at the University. Following a well-structured strategy, system and long-term commitment the University can continue to improve its energy efficiency and achieve an optimal level of significant ongoing energy and cost savings. Whilst there may be an understanding by management and facility management staff of the overall annual energy consumption (particularly cost) for the university, keeping operational staff informed regarding how to most efficiently use energy and with reference to the University's electricity tariff structure is important.

Strategic installation of metering, recording and monitoring of energy consumption at the sub-meter and individual equipment/plant level will enable an effective level 2/3 Energy Audit in order to identify energy efficiency options or to effectively monitor the savings from implemented energy efficiency initiatives. This will also enable energy tracking, trending or benchmarking in key areas of energy consumption within the University.

Where feasible a networked sub-metering system can be implemented across the University to provide relevant monitoring, metering and apportioning of energy use and efficiency. (Dr. Om Dubey of ARNOWA, personal communication 2020). Further improvements to dynamic facilities management systems which take into account weather and demand should also be considered.

4.8 Behavioural Change

The Covid-19 pandemic has demonstrated that our communities are capable of rapid and sustained behavioural change, many in areas which directly complement emissions reduction initiatives. One of the most significant behavioural changes is a switch to telepresence instead attending meetings and conferences in person. Air Travel previously accounted for 14% of ECU emissions (Carbon Neutral, 2018), and due to COVID-19 this emissions source has become minimal. A focus on maintaining telepresence technology and infrastructure into the future could keep these emissions low. Similarly, avoided student travel due to COVID-19 has demanded innovations in teaching style, materials and course delivery structures and technologies that can continue to reduce emissions into the future.

Emissions reductions in excess of 20% have been reported through behavioural change in organisations (EEA, 2013). Achieving and maintaining buy-in while avoiding negative feedbacks such as the rebound effect, where increased activity made possible by energy savings results increased emissions, is challenging. Behavioural economics research shows that human beings employ a wide range of psychological devices to preserve status quo inertia in their decision making, including discounting of future benefits or risk, filtering of complex or voluminous information, and a heightened aversion to perceived risk or uncertainty over and above unfamiliar positive benefits (Stenner and Fischle, 2018).

Social normalisation promotes energy savings in preference over both personal environmental values or economic pressures (Nolan et al, 2008). Human beings are inherently social animals. To be effective, campaigns to initiate behaviour change will include:

- Simple and positive initial framing delivered through socially meaningful channels
- A strong but achievable community target authorised at a high level and regularly communicated
- Accurate monitoring and data collection
- Positive feedback to celebrate community achievements (EEA, 2018).

Interviews with the School of Education reiterated that a positive “Strengths-Based” approach is an essential element of a sustainability curriculum.

Design and implementation of a successful ECU behavioural modification campaign will involve many considerations beyond the scope of this audit, and we offer the following suggestions as essential elements:

- Inclusion of all involved stakeholder groups in the design of the program
- A public declaration, and periodic re-commitment, of a strong emissions reduction target by the Vice Chancellor and University Executive, such as the City of Joondalup Covenant of Mayors for Climate and Energy target
- Provision of tools for self-monitoring which aggregate information around the community target. The ClimateClever app, created by a start-up in Fremantle, has

partnership program which is successfully tracking participant carbon footprint, sustainability indicator, and household energy audit information on behalf or organisations that sponsor their subscription. Existing partners include a number of Local Councils throughout Australia, as well as to Curtin University and many secondary and primary schools. This program is now broadening to include SMEs and has been highlighted on the ABC program Fight for Planet A (Low Carbon Living, 2018).

- An example of two local innovations for celebrating community achievements that the consultant has been involved with developing are Upsidedown Thermometers and Emissions Reduction Community Currency.

An Upsidedown Thermometer tracks successful abatement of community emissions as a positive "Global Warming Prevention" over business-as-usual as opposed to a "Global Warming Potential" of an emission. The Upsidedown Thermometer is calibrated according to the scientifically determined best estimate of 1.5 femptocelsius change in the Earth's temperature per tonne e-CO2 GWP. The Updsidedown Thermometer allows a positive framing of emissions reductions, that the Community's local actions have reversed global warming by a certain amount over what would have otherwise occurred.

An Emissions Reduction Currency is a local currency note issued as a unit of community emissions abatement. These currency notes carry the story of the Community's emissions reductions journey, which can be engaged with through the QR code on the back. Notes could be sold by the Student Guild as a fund raiser for sustainability projects and could be used for exchange of used goods, as gifts, and potentially for discounts in University or other Joondalup shops. Allowing exchange of emission reduction currency back into AUD less an administration fee has been shown in other local currencies to encourage uptake by local businesses (The 40 Foundation, 2012)

Figure 4: Emissions Reduction Currency (University of Vermont)

4.9 Offsetting

Offsetting is the quickest means of reducing the ECU emissions footprint, but more costly over time as payments must be repeated indefinitely to cover ongoing emissions. Emissions offsets can take the form of either abatements (avoided emissions) or sequestration (capture of carbon through tree planting). Australian Carbon Credit Units (ACCU) may be purchased as emissions offsets at a benchmark price of $14.17 per unit (Clean Energy Regulator, 2019). Offsetting ECU Joondalup Campus emissions of 12,957.69 tonnes e-CO2 (Carbon Neutral 2019) using this price would cost ~$185,000 per annum to maintain. Offsets should be considered as part of a strategic mix of approaches, particularly where other ECU stewardship values would be enhanced. Staff interviews have revealed that significant land clearing has historically occurred on ECU properties and offsets on high ecological value properties could in part “make good” on past biodiversity damage by the University. The Greening Australia Gondwana Link project, aiming to increase wildlife corridors and reduce ecosystem fragmentation in south-west Western Australia, is one such initiative. Rehabilitating degraded ECU properties could also be included in an offsetting campaign (Bradby et al, 2016) involving staff and students in related tree planting and ecological repair campaigns on these properties would be a means of fostering a campus community culture around sustainability.

5 Setting ECU Targets for Other Sustainability Aspects

Areas of opportunity should be considered within a decision-making framework (multi-criteria analysis) to focus on the areas of highest return in terms of carbon reduction.

5.1 Adopt a Precinct Approach to Target Setting and Align

The idea is to leverage improved sustainability outcomes through collaboration with WA Police Academy, Department of Water and Environment Regulation and North Metropolitan TAFE as part of the broader Joondalup precinct area. This enables scaling up of sustainability programs and enables partnerships to tackle larger goals in the local area.

5.2 Reconciliation Action Plan

ECU's Reconciliation Action Plan is due for renewal in April 2021 and provides an opportunity to refresh, strengthen and align reconciliation with sustainability. Indigenous knowledge and ways of being, in relation to the land and waters must be included in all work on the sustainable use and management of landscapes.

5.3 Biodiversity

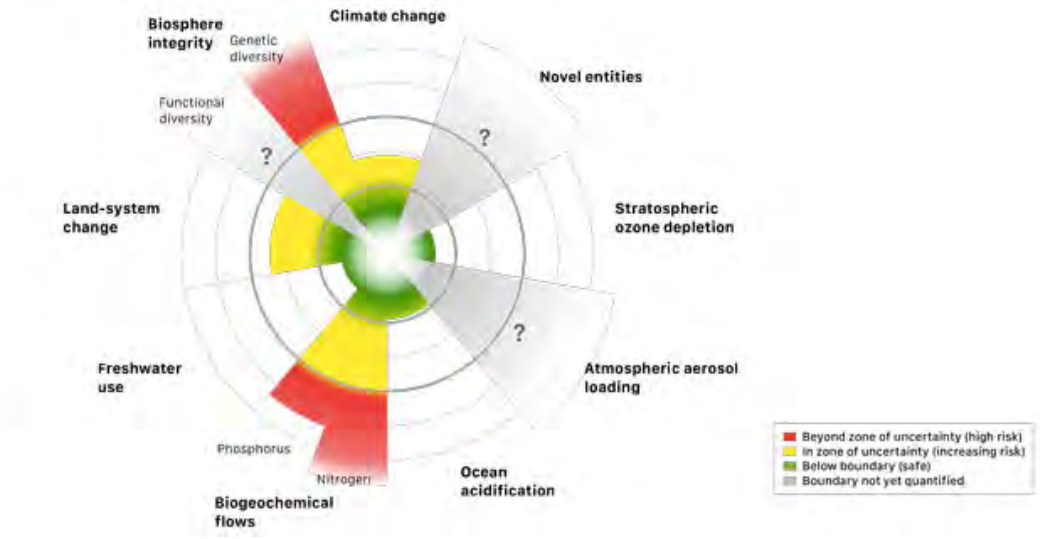

Figure 5: Relative risks from planetary scale environmental impacts negatively affecting the stability of Earth systems (Stockholm Resilience Centre)

While organisations and governments are declaring a Climate Emergency, other areas in the sustainability arena have an equal, or even more urgent quality (Figure 5).

Biodiversity is foremost among these impacts as the Global Assessment Report on Biodiversity and Ecosystem Services (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES, 2019) points out that:

> *"The value of agricultural crop production ($2.6 trillion in 2016) has increased approximately threefold since 1970 and raw timber harvest has increased by 45 per cent, reaching some 4 billion cubic metres in 2017, with the forestry industry providing about 13.2 million jobs. However, indicators of regulating contributions, such as soil organic carbon and pollinator diversity, have declined, indicating that gains in material contributions are often not sustainable. Currently, land degradation has reduced productivity in 23 per cent of the global terrestrial area, and between $235 billion and $577 billion in annual global crop output is at risk as a result of pollinator loss. Moreover, loss of coastal habitats and coral reefs reduces coastal protection, which increases the risk from floods and hurricanes to life and property for the 100 million to 300 million people living within coastal 100-year flood zones." (IPBES 2019).*

ECU should consider ambitious targets addressing these issues.

The location of Edith Cowan University adjacent to Lake Joondalup provides an opportunity for action and support to improve the biodiversity of the Lake. The City of Joondalup is a signatory to the ICLEI – Local Governments for Sustainability's Local Action for Biodiversity (LAB) plan in 2008. The City prepared a Biodiversity Action Plan 2009-2019 and a Yellagonga Integrated Management Plan 2014-2019 (YIMP) with City of Wanneroo and Department of Parks and Wildlife. The YIMP covers the catchment of Yellagonga Regional Park, which includes Lake Joondalup. The YIMP includes groundwater and surface water monitoring and environmental advice from ECU including midge management and acid sulfate soils. With the plan due for renewal there is an opportunity that the role could be expanded with students assisting with revegetation and rehabilitation programs within the Lake and designing biofilter systems to remove nutrients before they enter the lake.

5.4 Water

In 2020, the State Government released Waterwise Perth, a plan to reach Waterwise goals by 2030 including:

- Reducing scheme water use to 110 kL/person/yr (from 126 kL/person/yr)
- 100% of irrigated open space to be audited and adopting waterwise practices
- Decrease groundwater use by 10%.

ECU's groundwater allocation for irrigation is substantial being:

- 75,000 kL/yr for Joondalup
- 67,500 kL/yr for Mt Lawley

- 22,500 kL/yr for Bunbury.

In total this is 165,000 kL/yr, roughly the annual supply of approximately 525 houses. Waterwise auditing and reducing the water use of these areas through conversion of lawn to waterwise gardens or hydrozoning to reduce water use where it is not needed could have a significant impact on groundwater use, reducing pumping costs to the university and improving water levels in Lake Joondalup.

Reducing scheme water usage will also reduce costs. The best cost and water savings typically come from the use of water efficient appliances and fixtures such as taps. Any new construction or refits at the university should consider this. Water audits and smart metering are an effective way to determine areas of significant water use, both inside and outside the facility which are undertaken at ECU. Joondalup as this has the largest turf area and number of students and would therefore be the first focus.

5.5 Waste

The Western Australian Government is taking a forward stance on waste management and recovery with measures to reduce waste generation and create a circular economy with only 15% of waste going to landfill. The WA Waste Authority, based in Joondalup, has set goals for 2030. These include:

- Decrease waste generation by 20%.
- Increase material recovery from around 50% to 75%.
- Ensure no more than 15% of waste in Perth and Peel is landfilled.

Achieving these goals will require a significant sustainable change in how West Australians consume and create waste. ECU has improved its' own waste system significantly with time, moving towards food composting systems and improving the availability of recycling facilities. Setting up campus centres for recycling of office waste (such as electronic equipment and furniture) that refurbish equipment and resell it to staff and students would assist in obtaining these goals.

The circular economy includes all the interconnected companies and governments that form our infrastructure and economy (MacArthur 2013) and to be effective communication will be key. ECU is well-placed to be a leader in this area.

6 Education

Engaging the teaching stream to focus and prioritise sustainability initiatives and to educate future generations to meet and seek sustainability and carbon minimisation strategies, is a prime opportunity for ECU. Sustainability initiatives can have socio-economic, cultural, health and political impacts and a holistic world view is required. Universities are well placed to provide students with the tools and methods to be the change.

6.1 Health Sector

Of all the areas of government combined, health is still the biggest emitter of greenhouse gases. ECU has a high profile in health, with the biggest nursing school in Western Australia. Through educating nurses on sustainability and the influence of University educated staff, ECU can make significant positive impacts towards sustainable health practices in Western Australia and beyond.

6.2 Science

Biodiversity and the importance of functioning ecosystems is already part of the teachings at ECU. There are opportunities to focus more deeply on areas that have the biggest impact on carbon reduction and carbon uptake, such as:

- Understanding and communicating the science and the importance objective scientific assessments
- Focusing on the interlinkages between biodiversity and climate change - changes in climate can damage ecosystems and accelerate biodiversity loss
- Cross-cultural ecology and environmental management to improve current practices - sharing and developing knowledge systems
- Regenerating natural systems to prevent and reverse land degradation
- Defining and prioritising carbon uptake options and biodiverse carbon outcomes e.g. increasing the abundance of Threatened and Priority flora
- Defining and prioritising focus areas for improved vegetation condition throughout the Western Australia (WA) through research and partnerships i.e targeting areas of highest return to natural capital and biodiversity outcomes such as the wheatbelt and rangelands
- Integrating Open Source Environmental Data Management approaches such as ODM2, DarwinCore, and Ecological Metadata Language to allow referencing of environmental data and preservation for future studies.

6.3 Humanities

Understanding and teaching the psychology and motivators of (and for) change in order to achieve carbon reduction locally, nationally and globally:

- Rethinking the operating system itself
- Maintain profitable and sustainable businesses
- Connection to land and Caring for Country
- Maximizing regional employment opportunities
- Secondary and alternate income streams for conservation.

6.4 School of Business and Law

Australia has had an unstable policy environment over a decade. Corresponding and changing legal requirements will be integral to the success achievement of a low carbon economy to ensure a level playing field. A suitable international set of environmental rules, standards and guidelines e.g. toxic chemicals, product labelling.

Strengthening the education of future generations of entrepreneurs, designers, chemical and industrial engineers, of procurement officers, and product managers, will be critical to completely rethink and overturn today's linear world and move to a circular economy. Examples include:

- Lifecycle assessments in the procurement process
- Development through offsets – emitter pays/certainty
- Aligning entrepreneurial endeavor and opportunities to business
- Educating students on innovative business models based on circular economy
- principles
- Finance models – property values.

6.5 Engineering and Technology

ECU engineering and technology students can integrate sustainability into the university and broader life with the potential for high returns on investment for carbon reduction. Examples include:

- Green communications and green energy generation
- Life of asset calculations and increased resilience in design
- Renewables, clean energy and improved technology to reduce emissions
- Extending the life cycle of products and assets to ensure they remain economically useful
- Leveraging technology to recover and reuse resource outputs with the aim to eliminate material leakage and maximise economic value
- Moving towards a circular economy based on the principles of designing out waste and pollution, keeping products and materials in use throughout their lifecycle
- Defining industrial symbioses and optimising supply chains

- Block chain and energy metering.

6.6 Accounting, Campus Services and Clever Communities

Climate Active is the Australian government's carbon neutral program (previously known as NCOS, the National Carbon Offset Standard). The Climate Active standards set the guidelines for becoming carbon neutral. Carbon neutral certification against the Climate Active Carbon Neutral Standard (the Standard) provides a credible stamp showing that an organisation, an event, or building, has met all the requirements of the Standard. To achieve carbon neutral certification, entities must measure emissions, reduce these where possible, offset remaining emissions and publicly report on their carbon neutrality. Certification for organisations and events can be sought through the Department. Certification allows for the use of the Climate Active carbon neutral certification trademark, which can be used to showcase carbon neutral status and climate leadership. Carbon neutral certification can result in a range of benefits for organisations and businesses taking the lead in moving towards a low carbon economy. Increased customer recognition and offers a new competitive edge achieved by:

- Provides an enhanced corporate social responsibility
- Positive social and environmental outcomes, improved employee engagement and community connection
- Energy and cost savings
- Networking opportunities with other environmentally concerned entities.

Conduct a Qualitative Comparative Analysis with COSO/WBCSD Nonfinancial Internal Control Framework Guidelines (Nelson and Rauland, 2019) to evaluate ECU internal control and reporting activities against the requirements of Climate Active, the National Carbon Offset Standard, and TEFMA and against international standards such as the WRI/WBSCD Greenhouse Gas Protocol, Australian National Greenhouse and Energy Reporting System (NGERS), ISO 14033/64, and US EPA ANSI E4.

For tree planting and native regrowth projects use FullCAM, a world best practice Australian CSIRO developed fully integrated Carbon Accounting Model (CAM). The Climate Active standards also explicitly refer to Life Cycle Assessment (LCA) techniques and international LCA Standards (such as ISO14040:2006, ISO14044:2006) as the basis for any analysis of new developments. Other greenhouse gas reporting standards, such as PAS2050:2011 and the Greenhouse Gas Protocol Product Life Cycle Standard are also based on LCA and are used as the basis for carbon footprint calculation.

Sharing of targets and progress to meet targets influences change. Similarly, under-utilised products can reduce demand for new products and their embedded raw materials. Opportunities include:

- Continue to encourage a sustainable community at the university through the ECU Student Guild to reduce carbon footprints and communicating change on campus

- Encourage behavior change in students and staff through apps such as Climate Clever which monitor and report individual greenhouse gas emissions
- Seek engagement and uplift by engaging with aboriginal communities through targeted programs e.g. planting trees and implement renewable energy programs in the communities
- Use tree planting to restore degraded landscapes in rural Western Australia, improving linkages from students to the broader community.

7 Funding Options

7.1 Emissions Reduction Fund (ERF)

The ERF is the primary legislation the Commonwealth of Australia for funding GHG emissions abatements. The ERF is a fund for purchasing, by reverse auction, GHG emissions reductions from abatement projects established in accordance with approved methodologies. The Coalition Government has ear marked an annual $200 million dollars expenditure via the ERF for the next 10 years. The most recent auction benchmark price per tonne e-CO2 of GHG abatement was $14.17 AUD. Abatements purchased under the ERF cannot be applied to the ECU emissions reduction target until after the end of the 7 years crediting period. However, given that the Covenant of Mayors target is for 2030, reductions achieved from ERF projects would apply to the target if made within the next 3 years.

Methodologies covered under the ERF include upgrades to refrigeration and ventilation fans, commercial or public lighting, air conditioning units, close control air conditioners, refrigerated display cabinets, and chillers. An Aggregated Small Energy Users Methodology would also allow ECU to act as an Aggregator for energy efficiency users, such as SMEs, in the City of Joondalup or elsewhere that would not have the resources to individually submit a project to the ERF, and where individual transaction costs might render the project infeasible.

7.2 Green Bonds

Since 2016, Monash University has successfully issued $300 million USD in Green Bonds for low carbon building and solar development under a Green Bonds program. These bond programs were undertaken in accordance with the Climate Bonds Standard and Certification Scheme (CBSCS) which insures that rigorous scientific criteria apply to bond issuers to demonstrate that they are acting in accordance with the goals of the Paris Climate Agreement. “Investors with $45tn of assets under management have made public commitments to climate and responsible investment - green bonds can help them achieve their pledges in fixed income.” (CBSCS, 2020)

7.3 Australian Renewable Energy Agency (ARENA)

ARENA is the lead Commonwealth agency to improve the competitiveness of renewable energy technologies and increase the supply of renewable energy through innovation. Under the Advancing Renewables programme ARENA provides matching funds between $100,000 to $50 million AUD for innovative renewable energy solutions which would be subeconomic without the funding. The first priority for ARENA has been solutions which better integrate renewables into the electricity system, and over $430 million AUD has been invested in these projects. Many of the innovative Energy Storage and Precinct Scale approaches included in this report would likely qualify under this priority. ARENA also provides Research and Development Funding for which in particular the Edith Cowan University research on Solar Windows might qualify.

7.4 Clean Energy Finance Corporation (CEFC)

With the backing of the Australian Government through ARENA, the CEFC makes investments for clean energy or energy efficiency projects smaller than $5 million AUD via wholesale debt facilities provided to co-financiers who use this capital to provide low cost finance. CEFC investments include solar, energy storage, small scale wind, bioenergy, hydrogen, commercial building retrofits, housing, asset purchase, and green vehicles.

7.5 Western Australian Government Changes

On 6 March 2019, the Western Australian Government launched the Energy Transformation Strategy, including a whole of system plan for the south-west, and a Distributed Energy Resource Roadmap to guide the integration of distributed energy sources into the SWIS electricity grid. A commitment to enable and maximise the value of Distributed Energy Resources (DER) has been made by the Western Australian government, which is currently in the process of policy formation. Given the high priority given to this issue by the State, a clearer picture on specific programs and funding is expected to emerge later in 2020.

On 26 July 2020 the State established and allocated a Clean Energy Fund with an initial allotment of $9.28 million AUD and an additional $10 million AUD from the Covid-19 Economy Recovery Plan. The Funds will be awarded to eligible projects over 4 years with an emphasis on regional and remote communities. The requirement of project to result in multiple community benefits aligns well with a Precinct scale approach.

Clean State is an independent initiative advocating for action on climate change and jobs in Western Australia. Clean State promote solutions that create jobs supporting businesses, families and communities and make our state a fairer, safer place to live and work. Clean State has provided a map of opportunities for the first essential steps in Western Australia's journey to a zero-carbon economy (Clean State, 2020).

7.6 WasteSorted Grants

WasteSorted Grants are administered by the WA Government Waste Authority to increase resource recovery from waste and encourage community education to change behaviour around waste and improve education around waste avoidance and resource recovery. Up to $250,000 is available for recycling infrastructure and $50,000 for community education. The recycling infrastructure grant could include:

- Expanding recycling facilities on campus for existing programs
- Expanding the types of material reused to include composting facilities to produce mulch to use on site
- Measures to better monitor volumes of waste and recycling produced.

The community education grant could include:

- Additional education to students and staff around behaviour change

- Programs to encourage waste avoidance in areas such as cafés and the library.

WasteSorted Grant applications for 2020/2021 are due on 14 September 2020. Funding for new infrastructure and programs to reduce waste and increase recycling in WA are becoming more common. Specific university initiatives, or initiatives with ECU and partners, could be defined and grants targeted accordingly.

7.7 Linkage Grants

Linkage Grants and research funding that the government matches - the Linkage Program promotes national and international research partnerships between researchers and business, industry, community organisations and other publicly funded research agencies. By supporting the development of partnerships, the Australian Research Council (ARC) encourages the transfer of skills, knowledge and ideas as a basis for securing commercial and other benefits of research.

The Linkage Projects grant opportunity supports projects which initiate or develop long term strategic research alliances to apply advanced knowledge to problems, acquire new knowledge and as a basis for securing commercial and other benefits of research.

To facilitate successful collaboration between higher education institutions and other parts of the innovation system, there are three assessment rounds for Linkage Projects for funding applied for in 2020, and funding outcomes are recommended to the Minister within six months of the application closing date for each round. The Linkage Projects scheme objectives are to:

- support the development of long-term strategic research alliances between higher education organisations and industry and other research end-users, in order to apply advanced knowledge to problems
- provide opportunities for internationally competitive research projects to be conducted in collaboration with organisations outside the higher education sector, and
- enhance the scale and focus of research in Australian Government priority areas.

8 Precinct Leadership

The scenario used in this report assumes a high-profile leadership role for ECU within the City of Joondalup precinct, with potential International visibility through the Covenant of Mayors for Climate and Energy. ECU Joondalup has natural geographical advantages in assuming this mantle that are not shared by other University campuses in Western Australia. These are due to the Joondalup campuses location at the nexus of a diversity of large-scale energy users that are tightly integrated around a growing urban centre with a City government that has undertaken a leading role through the Covenant of Mayors. Adjacent properties include two smaller Tertiary education institutions (Northern Metropolitan TAFE and the WA Police Academy), the City of Joondalup Council Chambers and Administrative buildings, a major private-public partnership Health Campus, the Western Australian principal environmental regulator (Department of Water and Environmental Regulation), a major shopping complex (Lakeside Forum), the Yellagonga Regional Park including a chain of interconnected natural wetlands, housing estates, and a mixed light commercial and light industrial business district. Lake Joondalup, Beenyup Swamp, Walluburnup Swamp and Lake Goollelal represent some of the last remaining freshwater systems in the Perth metropolitan area and are within the Cities of Joondalup and Wanneroo.

The City of Joondalup anticipates closer integration with the ECU Joondalup Campus around the domains of sustainability and energy as evidenced by their recently updated Local Planning Strategy:

> *Encourage the integration of the Joondalup Learning Precinct based in and around intensification of the Edith Cowan University (ECU) campus. Such a development should include the provision of commercial and residential floorspace and high levels of sustainable/energy efficient built form.*

City of Joondalup Covenant of Mayors commitments include “a cross-sector and holistic territorial approach”, “engagement of all relevant stakeholders within territories”, and the empowerment of a “demand responsive energy system”. Previous work by ECU has explored the potential of a lead role in renewable energy through a feasibility study to “Implement a District Energy Scheme for Joondalup”. Intriguingly, both ECU and the City of Joondalup are in the process developing new strategic plans for the coming five (5) years so the timing may support the alignment of strategic visions.

The Department of Water and Environmental Regulation is in the process of overhauling Climate (due for release in 2020) and Energy. Engagement with the Department with a practical focus on achieving City of Joondalup precinct targets could foster relationships and influence the implementation of State Government policies.

Ramsay Health Care, which owns and operates the Joondalup Health Campus, has recently instituted a $1 million Environmental Sustainability Fund to support hospitals to undertake projects that reduce greenhouse gas emissions. CEO bonuses at Ramsay are weighted according

to sustainability outcomes, and their corporate sustainability policy is “Seeking to continuously reduce energy consumption and greenhouse gas emissions”.

Reduction of electricity consumption and related environmental impact are a publicly stated priority by the Lakeside Joondalup shopping centre. The website advertises that Lakeside Joondalup shopping centre:

> *…currently has an Energy Management Plan which analyses what we can do to reduce our electricity usage and reduce our impact on the environment. The plan details what measures will give us the most energy savings down to the smaller items. We intend to roll out as many measures over the current year to significantly reduce our consumption. Other measures that are not feasible over the current year will be implemented within the next few years. Reducing our energy consumption is a focus at Lakeside Joondalup.*

9 Emissions Reduction through Professional Leadership

ECU is the primary trainer of primary care professionals for the Western Australian health sector. As such, the School of Nursing and Midwifery, particularly the Joondalup Campus is uniquely placed to promote Sustainable Health and a reduction in GHG emissions by public and private hospitals in our State.

Hospitals are the largest contributor to public sector emissions in WA and globally (30% in the UK and 32% in WA (SARGE Report 2009)). The large number of private hospitals in Western Australia will contribute considerably to that contribution, although emissions numbers are not in the public domain. Hospitals likely emit 0.5% of western Australia's direct emissions (as in Victoria) which would be equivalent to at least a factor of 15 times more that ECUs emissions.

Procurement by hospitals is likely responsible for half again as many emissions, based on UK and Victorian studies (Department of Health and Human Services, 2020). Healthcare services emit high levels of carbon dioxide due to the nature of their activities, through:

- procurement of goods and services
- energy use
- transport of staff, visitors, patients and suppliers
- generation of waste.

As major emitters, hospitals can also achieve large scale decreases in emissions. The nursing profession is well placed to provide leadership in this effort. A recent Victorian study determined that two thirds of emissions occur in Wards and Operating Theatres where nurses can have a say. Emission reduction in these settings can be responsive to low cost changes to work practices, such as avoiding bagging of non-infectious waste for high energy incineration.

During interviews with the School of Nursing and Midwifery, a suggestion was made that the best options for introducing a Sustainable Health curriculum was in Graduate level courses for training Registered Nurses and Specialist Nurses. At Graduate level there is more flexibility for introducing new content, and Graduate level students operate at a higher level within hospital hierarchies where they can exert influence over standard practices and encourage change. Participating in Sustainable Health professional networks would also be an opportunity for ECU to provide up-to-date content and maintain ongoing relationships with alumni nurses.

10 Communication and Reporting

Currently ECU reports GHG emissions under the Tertiary Educational Facilities Management Association benchmarking tool. This tool is narrowly focused on higher education, lacks tools for emissions reduction target setting and actioning, and does not facilitate alignment of climate goals within a geographic precinct.

The reporting and data management platform adopted by the Covenant of Mayors for Climate and Energy is the Carbon Disclosure Project (CDP). The CDP is an NGO that operates the largest global platform for corporate and community climate and environmental impact disclosure. The platform captures information regarding an organisations GHG emissions reduction targets, actions, and progress towards goals as well as detailed accounting of the organisations annual GHG emissions footprint. Membership provides open access to published data on other members to assist in planning and benchmarking. Joining the CDP would provide ECU with a ready-made reporting system which aligns with not only with local precinct partners, but with other universities, companies and communities globally.

Should ECU wish to further elevate sustainability issues with respect to other University business domains, the University may wish to adopt Integrated Reporting and include Sustainability indicators and management within the Annual Report.

Currently ECU does not trigger National Greenhouse and Energy Reporting (NGER) requirements and is unlikely to trigger facility level thresholds of 25 kilotonnes e-CO2 of Scope 1 and Scope 2 GHG emissions or 100 TJ of energy usage at a single campus. Likewise, with a total energy usage for ECU of 115 TJ of total energy usage, which is trending downward, it is unlikely that ECU will trigger the Corporate reporting threshold for NGERS. However, the Joondalup Campus could potentially trigger the 400 tonne fuel usage threshold for National Pollutant Inventory reporting based on the combined weight of natural gas and minor diesel storage for backup generators and fire pumps. Other than this there is no apparent regulatory reporting compliance requirement for ECU.

11 Conclusions

Actions that have the biggest impact on reducing climate emissions (on campus, for the precinct and broader) should be prioritised, targets set and a program of work initiated. Appendix B contains a summary of the 15 listed targets mapped by the ECU taskforce to 10 SDG and suggested opportunities for to the interviews undertaken as part of the audit. There are many ECU experts who can and will need to contribute to the chosen solutions.

> *Edith Cowan University has always been a leader in ways that count…. ECU has pioneered initiatives which are now mainstream* (ECU letter to Professor Chapman 26/3/2020).

An education relevant to the real-world experience of local, regional and international communities cannot be underestimated.

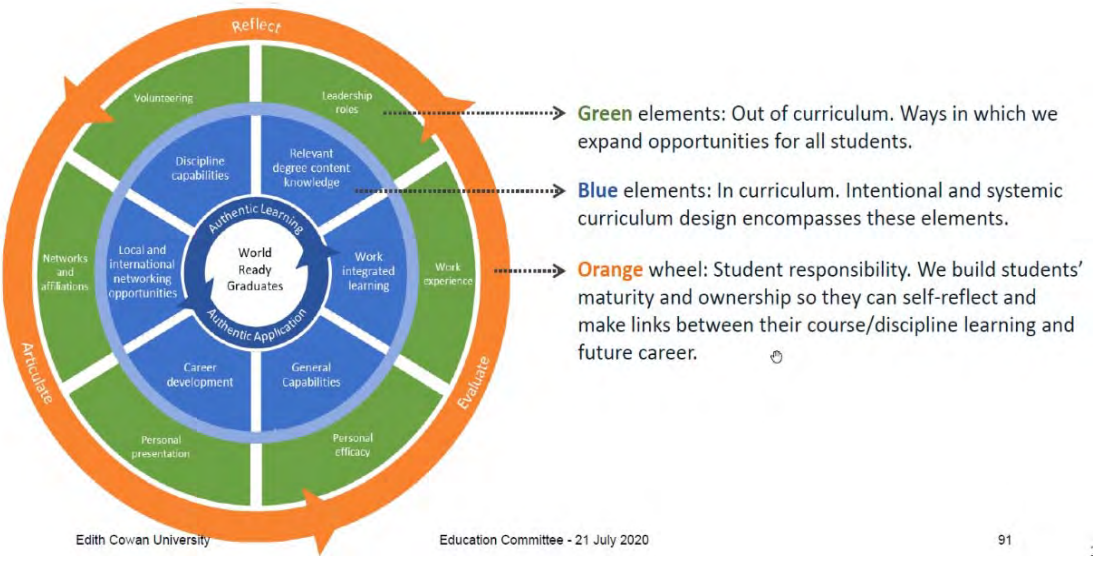

Figure 6: ECU World Ready Graduates (ECU, 2020)

There are established pathways to embed a paradigm shift into the teachings of ECU where all activities pivot around the central theme of sustainability (refer Figure 6).

11.1 Indigenous Knowledge

It is an imperative that indigenous knowledge and ways of being in relation to the land and waters be included in all work on the sustainable use and management of landscapes. Emerging leaders and their elders expect this going forward. This topic should no longer be an afterthought but a key leading approach. Indigenous and local knowledge is key to sustainable production.

11.2 Corporate Social Responsibility (CSR) - Sustainable Procurement and Investment

In 2020, as there is an increasing amount of social problems to solve, contributing to building and developing a sustainable society is considered a considered a corporate social responsibility

(CSR). Therefore, there is more demand for CSR activities and the environment is changing day by day. The environment is getting more extensive and complicated because of diversified businesses, globalization, and extended supply chains. In procuring products and services, the promotion of procurement activities with a focus on CSR elements such as the natural environment, the work environment, and human rights, as well as quality, performance, prices, and delivery conditions, will be central to procurement and investment activities.

11.3 Ensuring Organisational Sustainability

The current ECU Strategic Plan Goal 4 is Ensuring Organisational Sustainability at ECU. Organisational Sustainability in this section is defined in part as maintaining a financial surplus and pursuing service efficiencies.

In raising the profile of Environmental Sustainability at ECU there is an opportunity to integrate understandings of both Environmental and Organisational Sustainability to avoid contradiction between strategic goals. One problematic aspect of the term Sustainability is that it implies a steady, predictable halcyon state. Such a “Sustainable State”, however comforting, is not the natural state of complex systems such as ecologies and economies. Complex dynamics of growth, conservation, release and regeneration are inherent in ecological systems within the natural environment. Similar dynamics are observable in any complex system including human economies (Holling and Gunderson, 2008).

To better understand this cycle, we can use the familiar model of fire ecology of Southwestern Australian bushlands. A forest will rebound exponentially following a fire before settling into a highly conservative and competitive nutrient limited state. Eventually this stasis becomes more fragile with the accumulation of litter and debris until a bolt of lightning releases stored nutrients as ash and the forest regenerates from the fire stratified gum nuts and seeds which had been dormant in the understory. The newly regenerated forest will grow in a manner responsive to environmental variables such as a changed climatic condition.

Several lessons relevant to ECU can be drawn from research into these dynamic regeneration cycles in complex systems. One is that resilience and efficiency are opposites. A system that is uniformly efficient would be completely fragile as all overlap, duplication, and system memory would be eliminated to ensure rapid processing of resources. Similarly, a perfectly resilient system is completely stagnant. Maximum productivity occurs through maintaining a balance of organisational efficiency and institutional capacity.

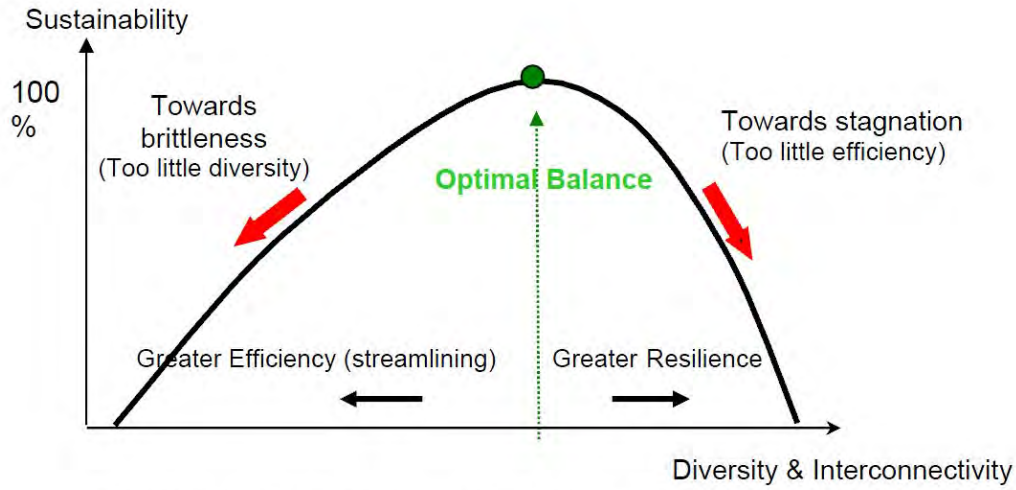

Figure 1: Sustainability curve mapped between the two polarities of efficiency and resilience. Nature selects not for a maximum of efficiency, but for an optimal balance between these two requirements. Notice that resilience is roughly two times more important than efficiency at the optimum.

Figure 7: Balance of Organisational Efficiency and Institutional Capacity

The optimal balance of efficiency and resilience and accumulating or deploying capital depends on timing within the regenerative cycle described above (Figure 7). Another useful concept from the Environmental Sustainability field of practice is that of adaptive change management (refer Figure 8). During a release phase it is important to skillfully deploy capital to allow systemic transformation and avoid systemic collapse. Passive and risk adverse investment appropriate to the preceding conservation phase is no longer appropriate. Protecting vulnerable populations during a release phase is particularly important to avoid long periods of painful societal disintegration.

A positive example of this is the current deployment of government spending to avoid economic collapse during the Pandemic. However, if this deployment does not align with systemic pressures it will not seed regeneration.

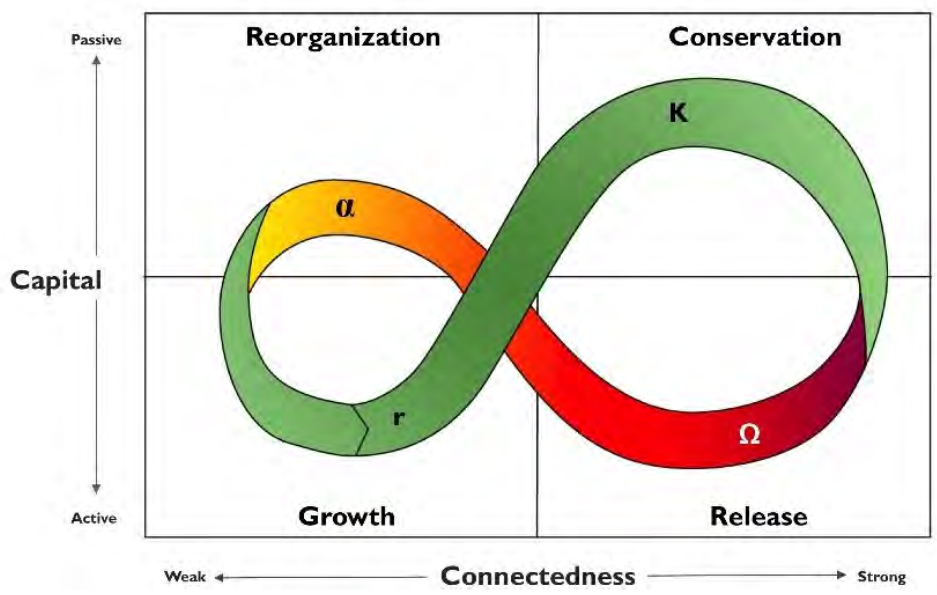

Figure 8: Cycle of Adaptive Change (Holling, 1987)

Universities have a critical role to play in addressing the realities and consequences of climate change. ECU's commitment and dedication to students, graduates that are global citizens contributing to cultural life, society, and economy whilst connecting with the community and world cannot be underestimated. As humans extract more from the earth than ever before, the benefits and opportunities from a paradigm shift in how we think and operate in a reconciled Australia are incentive enough for us all to pursue a sustainable future.

The opportunities for strategic partnerships and collaborations, promoting equality, diversity, and social responsibility are there for ECU, through demonstrated thought leadership on behalf of West Australian's, for Western Australia and beyond. The world is stepping forward to 'New Normal' amid COVID-19, and ECU is well-placed to position as the sustainability leader for Western Australia and set the example for all Universities to follow.

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13 Limitations

This report is produced strictly in accordance with the scope of services set out in the contract or otherwise agreed in accordance with the contract. In the preparation of this report, 360 Environmental has relied upon documents, information, data, and analyses ("client's information") provided by the client and other individuals and entities. In most cases where client's information has been relied upon, such reliance has been indicated in this report. Unless expressly set out in this report, 360 Environmental has not verified that the client's information is accurate, exhaustive or current and the validity and accuracy of any aspect of the report including, or based upon, any part of the client's information is contingent upon the accuracy, exhaustiveness and currency of the client's information. 360 Environmental shall not be liable to the client or any other person in connection with any invalid or inaccurate aspect of this report where that invalidity or inaccuracy arose because the client's information was not accurate, exhaustive and current or arose because of any information or condition that was concealed, withheld, misrepresented, or otherwise not fully disclosed or available to 360 Environmental.

Aspects of this report, including the opinions, conclusions, and recommendations it contains, are based on the results of the investigation, sampling and testing set out in the contract and otherwise in accordance with normal practices and standards. The investigation, sampling and testing are designed to produce results that represent a reasonable interpretation of the general conditions of the site that is the subject of this report. However, due to the characteristics of the site, including natural variations in site conditions, the results of the investigation, sampling and testing may not accurately represent the actual state of the whole site at all points.

It is important to recognise that site conditions, including the extent and concentration of contaminants, can change with time. This is particularly relevant if this report, including the data, opinions, conclusions, and recommendations it contains, are to be used a considerable time after it was prepared. In these circumstances, further investigation of the site may be necessary.

Appendices

Appendix A
Audit Feedback from Interviews

ECU School of Engineering Professor Daryoush Habibi Dr Stefan Lachowicz Associate Professor Iftekhar Ahmad Associate Professor Ganesh Kathapalli Dr Fernando Guzzomi	**Key messages/opportunities**
At the Joondalup campus there are plenty of rooftop spaces for solar (north facing covering around 5000m2) that are not shadowed. Conservatively this will allow for 4MW of power. Eastern and western roof tops can contribute to the grid. 300 sunny days/annum.	Energy and technology are key to the School of Engineering and sustainability is therefore core to the activities. It forms part of the overall umbrella. All research is around reuse of material and management of energy. **Opportunity to raise the profile and showcase the leading nature of the Engineering department's research.**
Digitisation of practices and energy consumption for digital and technology	Green ICT communications and green energy generation is an option for the campuses. Server farms powered renewably. Video streaming - data centres are not sustainable. Research to cache contents locally (hardware or software component that stores data so that future requests for that data can be served faster) and power by renewables. Power from line loses are reduced.
Solar energy is becoming cheaper and opportunity to reinvest and recap on investment in 7 years	Optimisation of micrgrids, electrical and renewable energy - the technology is available.
Joondalup campus can be carbon negative - solar storage systems are costly, heating and cooling (chillers in the day)	International trends - transition to hydrogen/electric (energy other than batteries)
Minimising travel time and aligning to time to charge at stations. Power delivery dependent on weather conditions.	Research informs the whole community - which changes the behaviour of the community. ECU's work is published in the best international journals and work is available globally. Engineering does a lot of unfunded work to showcase capability. ECU has the most capable multidisciplined lab in Australia. Block chain telehealth collecting data to secure health.
Applied research in the laboratory. Geothermal energy - solar thermal, hydrogen generation	Have 3-4 research contracts from industry. Manufacturing hand sanitisiers and facemasks for COVID19 in response to the shortage. Can scale this if required - on webpage for orders.
Water	Efficient use of rainwater - garden beds. Bore water for the garden. Mains meet ADWG.
Water and wastewater	Large research contracts with the Water Corporation. Desalinated water provides better utilisation
Hydro generator	Farming areas - energy storage in media in dam
Biofuels	Ethanol research
Lead acid batteries	Multiple options, data caching, electric vehicles, hot water tanks (renewable energy tanks) last a long time (for night power). Lithium is not easy to dispose of.
Mechanical	Heat exchangers and efficiency research.
EV's	Application of motor sport and EV's. EV trucks - hydrogen/renewable. Catalysts mixed with water and exposed to the sun makes hydrogen. World leading research (02 + H2).
Capturing carbon	Oil and gas reservoirs and research to neutralise C02.
Charing stations	Different ratings of charging stations - lacking a clear signal from government. In Europe by 2030 there will not be sales of internal combustion engines.
Tyre	Tyre recycling and their use in embankment stabilisation (an aspect of research).
Iron ore tailings	Use in tiles and building materials (part of the research consultancy)
Incentivising the right behaviours	In addition to publishing, industry comes to visit frequently to learn from the research.
Keen on making a difference at ECU - the buildings are a research lab. Whatever you build - systemic approach to sustainable engineering.	Webpage - School of Engineering - the home page of the School also has a clear message about what we are trying to achieve: https://www.ecu.edu.au/schools/engineering/overview
	The emphasis on environmental sustainability can be seen in the welcome message (slide 2), the call to students for two new engineering clubs (slide 3), and on the last slide (slide 7).
	No sustainability mandate for the whole of ECU although it is part of the culture and teaching at Engineering.
	

ECU School of Science Dr Dave Blake – Lecturer, Environmental Science Dr Eddie Van Etten – Senior Lecturer Dr Rob Davis – Senior Lecturer Vertebrate Biology Professor Pierre Horwitz – Professor	**Key messages/opportunities**
Ongoing loss of bushland at campuses impacting protected species (Carnaby's cockatoo, phascogale and threatened orchids - Bunbury)	Ensure procurement contracts prevent clearing of any future native vegetation as this is difficult for students to reconcile. Opportunity to **restore bushland** that has been impacted and **cease the encroachment into remnant and adjacent bushland and the associated impacts to habitat. Retain all remaining habitat** as part of good governance. **Management Plans and a Biodiversity Strategies** for the campuses are required.
Carbon accounting	Carbon footprint to account for loss of carbon uptake from previously cleared land. Carbon debt from historic clearing. Students look at the clearing since 1995, and the carbon accounting provides a false picture of impact.
Educational opportunities	Bachelor of Science and Conservation Biology, Ecology, Restoration, water management and fire ecology, ecosystem resilience and conservation ecology.
Natural assets within the precinct and beyond	Opportunity with wetlands and Yellagonga Regional park in the precinct, partnerships with degraded areas beyond the campus. Environmental Centre at lake Joondalup and field study areas. ECU students (pre COVID19) travel to Bhutan for education opportunities. P**artnerships with Greening Australia and Yarra Yarra catchment (400km north of Perth). This is Australia's largest revegetation project based on carbon capture and biodiversity.**
Taskforce	Used SDGs as a framing device - which goals ECU could look at to reduce it's carbon footprint.
Sustainability is in the DNA	Opportunity to elevate the academic areas which are excelling in sustainability. There is much knowledge that resides at the School of Science.
Institutional barriers and opportunities	Currently a full work load and a need for integrated reporting to the Board level. A Chief Sustainability Officer on the Board level would assist communicate with stakeholders and seek external funding opportunities which would have multiple benefits and productivity gains.
Water and waste reduction	No plastic bottles, waterless urinals encourage students to use resources wisely. Integrating research and education into operation of campus though audits (waste audits as part of the units).

ECU School of Business and Law Dr Mehran Nejati Ajibisheh – Senior Lecturer Dr Mohammad Iranmanesh – VC Research Fellow Associate Prof Ferry Jie Dr Reza Kiani Mavi – Senior Lecturer Associate Prof Simone Domenico Scagnelli – Director Accounting and Finance Dr Azadeh Shafaei Darastani – Research Fellow Dr Judy Lundy – Lecturer	**Key messages/opportunities**
The School of Business and Law - the case for sustainability	By managing and raising the profile for sustainability there has been an increase in enrolments in our undergraduate sustainability unit MAN2610.
ECU is Enactus aligned and committed to sustinable outcomes	**Enactus** is the world's largest experiential learning platform dedicated to creating a better world while developing the next generation of entrepreneurial leaders and social innovators. The Enactus network of global business, academic and student leaders are unified by our vision—to create a better, more sustainable world.
As an **advanced signatory to the Principles for Responsible Management Education** (PRME)- PRME's vision is to realize the Sustainable Development Goals through responsible management education.	Dr Mehran Nejati is a senior lecturer in Sustainability and the Director of **PRME** and Sustainability at ECU School of Business and Law
Sharing Information on Progress (SIP) Reporting	Opportunity to improve reporting practices and align to existing knowledge and work being undertaken within ECU. Best practices within Australia for students. **SIP will be available in November 2020.**
Social and education	Inclusive leadership in terms of research. SDG 4.7 Quality education - seeing the importance of this and **mapping all courses and units against the SDG.** 80 staff have been contacted to assist with this and currently compiling a map. **Few universities are doing this (Deakin).** SDG 11.7 - the idigenous point of view is key, as is being culturally sensitive and inclusive of LGBTIQ. Important to do and not to preach, focusing in sustainability targets. Act first - define projects that make an impact. SDG 12 - responsible change, SDG13 - climate action and SDG 8 decent work.
World Climate Simulation on decisions used in undergraduate class	Provide an overview of climate-science for policy and political decision-making. Formerly called the Copenhagen Climate Exercise.
Research and research services	Informs policy makers, green supply chain, CSR, global resource efficiency and addressing environmental degradation, stakeholder and industrial collaboration. Tom Barrett - **'gig' economy** and its implications for workers, organisations, public policy and society. Of the 35 OECD countries Australia comes 13th (transportation and moving from traditional modes of transport to e-vehicles/behavioural change - supporting Transperth and incentivisations for students e.g fee charging, cheap loans for EV's).
New Colombo Plan and Bhutan Sustainability Tour	While many nations are struggling to reduce their carbon emissions, the **Kingdom of Bhutan is already carbon negative**: it takes more greenhouse gasses from the atmosphere than it emits. As a result, according to its own figures, this nation of around 750,000 people removes nearly three times as much CO2 as it produces. Students do 2 weeks community work for a community academic credit.
Community support for an inclusive society e.g ECU Tax Clinic	SDG 17.6 - free tax returns on a voluntary basis (ECU north of River and Curtin south of the river). Community Development Mechanism (CDM) transfering knowledge to developing countries where their activites/actions produce less carbon than developed countries. **Journal of Cleaner Production.** Symbolic social responsibility does not pay back, **substantive social responsibility** pays back and leads to greater employee-outcomes such as job satisfaction, pride and meaningfulness through work.
Modern slavery research into the supply chain	Researching 47 factories to define how the supply chain should operate. 26 supply chains throughout Australia which have more weight/importance. Australia has the Act for Modern Slavery (2018).
Open pantry/staff and student initiatives	In collaboration with the City of Wanneroo - food items are provided. Donating second hand clothing items, collecting bottle tops and knitting beenies/supplying beenies for the homeless. Sustainability committee has a range of initiatives - well-being newsletter, cultural buisness intelligence. GIVE initiative which has encouraged SBL staff to give unwanted clothing and items a second life.
AACSB International (AACSB), a global nonprofit association, connects educators, students, and business to achieve a common goal: to create the next generation of great leaders.	AACSB is the world's largest business education alliance, connecting educators, learners, and business to create the next generation of great leaders. **The Association to Advance Collegiate Schools of Business (AACSB)** connects educators, students, and business to achieve a common goal: to create the next generation of great leaders. Accreditation team led by Bruno Santarelli at ECU.

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Questions	**Response**
Are you aware of ECU's sustainability policy and who has responsibility for those within the organisation?	*- (x2) Yes I am aware there is a policy, however I am not across the responsibility's the policy imposes.*
Are there sustainability goals you would like to see.	*- (x2) More emphasis put on solar/renewable power sources for ECU buildings.* *- timed sensors for room lighting maybe as there are many lights often left on after hours with no one using them*
What are your main concerns around sustainability?	*-That recycling bins at the university are not disposed of in the correct manner. I am currently unsure as to how they are recycled.* *- at times after finishing with my rubbish I'm at a loss as to which bits need to go in which bin so I often just red bin the lot (landfill). I can't be the only one that is confused. Perhaps only selling composting items from campus vendors would help with food containers? Similar to Perth Stadium's bins?* *- shared or carpool transport initiatives combined with a reduction of parking costs maybe to help alleviate parking pressures, particularly at the JO campus.*
Do you think there are opportunities to bring cross-cultural ecology and environmental management to improve current practices ?	*- Indeed, as was the case with the Balgas/Grass Trees being transplanted before land clearing occurs. This wasn't the case originally as everything being mulched was as 'green' as we got. When people learn about and connect with plants, animals and the land (Boodja) they find ways in which they can, and should, care for country in a contemporary manor. Learning an Aboriginal perspective about something often results in a different meaning about something resonating for people involved in the project.*
Often environmental work has socio-economic, cultural, health and political impacts. Indigenous collaborators often have a holistic world view and there are opportunities to share and develop knowledge systems.	*- Absolutely, as above.*
Where are the top three opportunities where non-Indigenous and Indigenous people can work together and/or better understand each other in terms of sustainability.	*- Land clearing – what happens when you clear the land (do you salvage plants or collect seed, save significant plants and incorporate to the design etc)* *- Land restoration – what do you plant, where does it come from, when, why and how etc* *- Working together to remove negative connotations and naming conventions from a time in the past (both from a racist and sexist perspective)*
Indigenous engagement – ECU's Reconciliation Action Plan - May 2018 to April 2021	Due for renewal and an opportunity to refresh and align to sustainability goals.

ECU Strategic Procurement Duane Redden - Manager, Strategic Sourcing and Contracts	**Key messages/opportunities**
Procurement and contracting documents	Legal integrity for tenders - reviews contracts and templates for ECU contracts. https://www.ecu.edu.au/about-ecu/professional-services contains the sustainability questions for tenderers.
Sustainability	Sustainable procurement guidelines - refer Appendix C. Sustainable procurement has been defined by the UK Government Sustainable Procurement Taskforce as "…a process whereby organisations meet their needs for goods, works and utilities in a way that achieves value for money on a whole life basis in terms of generating benefits not only to the organisation, but also to society and the economy, whilst minimising damage to the environment."
Choosing suppliers who can provide products which are Earth Friendly; have Green Star rating; GECA (Good Environmental Choice Australia) certification; or are accredited with ISO 14001: Environment Management Systems (or environmental management practices) is preferable.	**Supplier Assessment and Selection** -opportunity to preferentially select sustainable organisations with local supply chains. **Whole of life assessments should be undertaken.** **Sustainable Procurement** - oportunity to strengthen the Risk and Opportunity Assessment and Procurement Strategy for procured service and goods Contract and Supplier Management
Projects and Planning Team	Come to Strategic Procurment to run tender. **Local content is not assessed.** This should be reviewed. Only managing tier 1 suppliers -not tier 2 (and what they source and where they source it). **Needs executive suport to change procurement procedures.**
The Finance & Business Services Centre seeks that the University Executive endorse the proposed new approach to Aboriginal and Torres Strait Islander supplier engagement and request the University Executive provide a statement of executive support which will allows engagement with the wider business to implement these strategies.	Refer attachment (Appendix C) Aboriginal and Torres Strait Islander Supplier Engagement Strategy proposal
GECA (Good Environmental Choice Australia) certification	**First higher education institute to take this pledge.** http://geca.eco/about-us/positive-procurement-pledge/

ECU School of Medical and Health Sciences Prof Amanda Devine – Assoc Dean - Public Health and OSH	**Key messages/opportunities**
Collaborative effort to drive connection horticulture, agriculture and health. Nutrition, public health and community development units.	From paddock, to plate, to gut health. Seeking sustainable and regenerative farming supporting natural capital and encouraging good food choices.
Published papers	Dr Steph Godrich https://foodcommunity.com.au/home/ Marg Miller https://www.refreshedschools.health.wa.gov.au/ President of World Public Health Nutrition Association World Congress of Public Health Nutrition Ros Sambell World Congress of Public Health Nutrition Dr Ruth Wallace https://snacwa.com.au/ https://www.ecu.edu.au/schools/education/research-activity/projects/projects/farm-to-fork-video-game-to-help-adolescents-understand-bare-supermarket-shelves
UN SDG alignment	Students are reminded of the alignment - food vision and public health aligns to the SDG goals. Virtual water in food waste. Science and public health - crosses portfolios (Department of Health, Department of Food and Agriculture, occupational health and hygiene, Safety e.g. silicosis, PFAS)
Taskforce	ECU School of Medical and Health Sciences is not represented on the taskforce.

ECU Digital and Campus Services (Waste) Kerry Devine – Manager Campus Operations and Support Services	**Key messages/opportunities**
From a facilities perspective there are 12 measures that make a great University Are facilities efficiently designed – UFA/GFA? Do facilities meet demand – GFA/EFTSL? Are campuses maintained – maintenance cost per m2 GFA? Are buildings operating efficiently – building operating cost per m2 GFA Are facilities well maintained – backlog liability % of ARV? Are campuses secure – Total security costs per EFTSL and security costs per m2 GFA? Are campuses clean – Total cleaning cost per m2 GFA and cleaning cost per EFTSL? Are campus grounds well maintained – Cost of grounds/ha? Do the campuses use minimal energy – cost per m2 GFA and energy consumed (GJ) per m2 GFA? Do the campuses use minimal water – Water consumption/EFTSL+FTE? Is there minimal waste sent to landfill – KG per EFTSL? Is there a reduction in carbon emissions – Scope 1&2 per EFTSL + FTE?	2016,2017 and 2018 TEFMA reports. **There is a substantial amount of excellent work ECU has and is doing to reduce its carbon footprint and to drive a range of sustainability initiatives across its campuses**. **ECU is a sector leader in terms of carbon emissions, energy cost/consumption and waste output.**
The Facilities and Services Centre at ECU is certified to ISO14001, Environmental Management Systems. It operates the following environmental programs: Waste Environmental Improvement Program Water Environmental Improvement Program Energy Environmental Improvement Program	One of ECU's goals is to reduce its carbon footprint through actions that include decreasing waste to landfill, water usage and energy consumption. ECU seeks to align the University's goals with Government policy targets.
ECU offset 91 tonnes of carbon emissions in 2018 through the surrender of Biodiverse Reforestation Carbon Offsets in the Yarra Yarra Biodiversity Corridor	Offset opportunities
ECU actively drives initiatives to reduce the environmental footprint, and is proactive in engaging with our recycling partners do determine where recycled material ends up after it leaves the campuses	Waste cycle - whole of life
Urbi is a bike sharing service with stations located on the Joondalup Campus and around the Joondalup CBD.	Health and carbon initiative
ECU uses an online tool **Greensense View** to monitor water, energy usage and water consumption. This environmental data monitoring system is updated every three minutes to enable ECU to review live data which assists to: - produce efficient environmental reports to support our Environmental Management System; - educate and inform staff and students of environmental impacts; and - save money.	Monitoring available to students. Consider carbon accounting and auditing, in a similar way that students undertake waste audits.

ECU Digital and Campus Services (Water and Energy) Kevin Hall – Manager Buildings and Maintenance	**Key messages/opportunities**
From a facilities perspective there are 12 measures that make a great University Are facilities efficiently designed – UFA/GFA? Do facilities meet demand – GFA/EFTSL? Are campuses maintained – maintenance cost per m2 GFA? Are buildings operating efficiently – building operating cost per m2 GFA Are facilities well maintained – backlog liability % of ARV? Are campuses secure – Total security costs per EFTSL and security costs per m2 GFA? Are campuses clean – Total cleaning cost per m2 GFA and cleaning cost per EFTSL? Are campus grounds well maintained – Cost of grounds/ha? Do the campuses use minimal energy – cost per m2 GFA and energy consumed (GJ) per m2 GFA? Do the campuses use minimal water – Water consumption/EFTSL+FTE? Is there minimal waste sent to landfill – KG per EFTSL? Is there a reduction in carbon emissions – Scope 1&2 per EFTSL + FTE?	2016,2017 and 2018 TEFMA reports. **There is a substantial amount of excellent work ECU has and is doing to reduce its carbon footprint and to drive a range of sustainability initiatives across its campuses**. **ECU is a <u>sector leader</u> in terms of carbon emissions, energy cost/consumption and waste output.**
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Building design	The ECU Planning and Design Guidelines provides guidance to designers in respect to Ecological Sustainable Design ("ESD"). ESD means to design buildings with longevity and minimal impact on the existing biodiversity and there are three key ways to achieve this: - Compliance with the six environmental performance indicators - Incorporating **Green Star building design features** to a minimum standard of 4 stars with the target of reaching **5 stars. ECU does not apply for Green Star accreditation certificates but does aim to incorporate green star design features into its building design.** -Meeting the requirements for design documentation and review according to the process
All fleet carbon emissions being offset	Offset opportunities
The School of Engineering contributes to ECUs overall sustainability agenda through (1) its teaching programs, (2) research activities and (3) implementation of new technologies into the work place. 1.The Engineering curriculum has three programs with a high degree of focus on sustainability: i.Bachelor of Engineering (Civil and Environmental) Honours ii.Bachelor of Engineering (Electrical & Renewable Energy) Honours iii.Master of Engineering (Electrical & Renewable Energy) 2.There are a significant number of research activities underway within the school with a significant emphasis on sustainability. Examples include: i.Renewable energy and smart energy systems ii.Environmental monitoring technologies iii.Water and wastewater management iv.Recycling waste as building materials and for the enhancement of foundations v.Environmental catalysis for clean production of hydrogen and hydrocarbons vi.Materials and processes for energy efficient reverse osmosis	Education and hands on monitoring on campus
Energy Technology ECU has, in recent years invested considerable amounts of resources into exploring the feasibility of establishing alternate sources of energy to power its campuses. A project to establish District Energy Scheme to supply 70% of the Joondalup campus's base load power was thoroughly explored in 2016. A similar project to establish a solar array on the Bunbury campus was also undertaken; however, neither project came to fruition due principally to an inability to reach agreement on commercial terms with prospective partners.	**Align carbon emission targets to alternate sustainable energy options at a precinct level. This will require Executive Leadership.**

West Australian Academy of Performing Arts (WAAPA) Mr Cameron Malacari – Production Manager Mount Lawley	**Key messages/opportunities**
Performance stages use energy (electricity) to power: lighting; audio; LED screens; projection equipment; and many other special effects.	WAAPA investigate equipment (heating/cooling, lighting, sound, special effects, transportation, freight) for installation or use, and compare energy consumption requirements. Utilising energy efficient equipment saves operational budget over the long-term, but may also reduce associated labour and consumables costs.
Electricity can be sourced from Permanent mains power; or Temporary mobile generation plant. Regardless of where energy is sourced, reinforcing a mindset of efficiency through all levels of the team will reduce the amount of energy required to power an event/show/concert, and subsequently save money.	The Mt Lawley campus has some older theatres with old air conditioners (no VMS) with leaks (tin roof and leaks). Some of the lighting infrastructure is heavy log based systems when digital systems are now the norm. Fixtures are becoming more viable for LED (lower power and multi use). Having a maintenance contract - tends to be a lean to cheaper fixtures. Some effects require incandescent (an electric light with a wire filament heated until it glows), as do training and teaching (approximately 60 percent incandescent).
http://liveperformance.com.au/greener_live_performances/resources. Five streams: Stage management, lighting, sound, costume, props and scenery.	Greener Live Performances provides an excellent tool kit for live performances that WAAPA refer to. Live Performance Australia provides case studies for different auditoriums.
The Enright Studio is a flexible black box space with a floor area of 10.7m x 12.9m. It is equipped with 70 removable seats and platforms enabling the venue to be configured in a variety of production formats or to be cleared completely to be used as a rehearsal studio. Named in honour of the late great Nick Enright. Round House Theatre (site an audience capacity of 194), Richard Gill auditorium (seats 200 patrons comfortably) and Geoff Gibbs Theatre (a proscenium arch theatre that has a maximum seating capacity of 297). The Geoff Gibbs theatre is the oldest theatre and has the oldest rig, technology and lacks infrastructure.	**An Energy Management Program for each theatre needs to be hand in hand with the maintenance contract.** Four theatres is not enough and others can be hired e.g. His Majesties (being refurbished) and Subiaco.
Mt Lawley campus may move to the City (considering near Yagan Square to a $70M new development).	Refurbishment is behind pending a decision on the move. There will be a considerable energy footprint with a new build. COVID19 requires live streaming which requires an integrated digital base. Requires real time telemetry (dual redundant fibre optic). Facilitated via Riedel Communications - Comprehensive Theatre Communications at Singapore's Lasalle College of the Arts. Copyright sensitivities/IP protections.
Costumes and sets are recycled.	Up to 80 percent of costumes are recycled. 1 8 tonne truck annually - recyclables, steel elements to Balcatta and plywood. Have quadrupled the recyclability of sets.
Sustainability themes are 1 in 6.	Now have workshops at Campus west and Joondalup. Paints are imported (Belgium and UK).

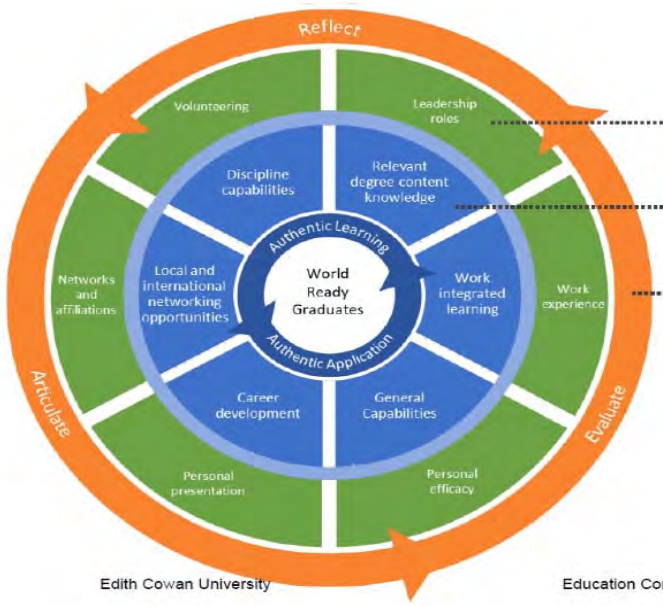
School of Education - Mount Lawley Prof Mindy Blaise – Professor of Education Julie Boston – Academic Coordinator	**Key messages/opportunities**
Research around rethinking education for the young. Broader vision includes the community. Teach teachers to be teachers from Kindergarten to Year 12.	Sustainability is taught through the lens of the curriculum. Cognisant of the concept of sustainability, however the requirement is for education. Teaching 4,500 pre-service teachers. School of Education is in all three campuses making it the biggest faculty in WA.
Australian Curriculum, Assessment and Reporting Authority (ACARA). The Australian Curriculum sets the expectations for what all young Australians should be taught, regardless of where they live in Australia or their background. ACARA draws on the best national talent and expertise, and consults widely to develop the Australian Curriculum and resources. The **Tertiary Education Quality and Standards Agency (TEQSA)** is Australia's independent national quality assurance and regulatory agency for higher education. This legislative instrument is made under subsection 58(1) of the Tertiary Education Quality and Standards Agency Act 2011 (TEQSA Act 2011). Can change with each government.	Teachers are intelligent and are reluctant to react to simplistic memes when the jury is still out around anthropogenic change for some. E.g. Does is really have an impact if we recycle? Nature understanding is strong versus an alarmist pedagogy. Sustainability is part of ACARA.
The **Australian Institute for Teaching and School Leadership (AITSL)** was formed in 2010 to finalise and validate the Australian Professional Standards for Teachers (the Standards) in order to promote excellence in the profession of teaching and school leadership across all Australian schools.	AITSL provides national leadership for the Australian State and Territories in promoting excellence in the profession of teaching and school leadership. AITSL reports to the Minister for Education.
Need multiple degrees to understand the science	Complex to frame climate science for children and teachers. Opportunity to reframe sustainability from the unknown to a positive and **strength based framework**. Education does have a role. Teacher certification comes at an expense. Thinking and the expectation of critical thinking.
A **paradigm shift is required** and there is a need to challenge the current curriculum and **attend to the complexity.**	**The stewardship notion (stewardship is a concept that has inspired the activities of organisations whose mission is to preserve, protect and maintain natural, social and economic assets for the benefit of stakeholders and communities) must stop**. The foundational nature/culture divide of Western humanism provides the structuring logic for our human-centric practices, and the challenge of decentring the human within the decidedly humanist practice of social science research cannot be underestimated. Education has a role working with communities. Young children are connected and education strips that away. Mining is not going away and we need to reckon with colonial waste.
For a paradigm shift - what research should happen?	If a fundamental change in approach or underlying assumptions is required perhaps research should relate to government policy. What if Universities should not be making people work ready? **Universities should be for the greater good.** Philosophy has gone.
Extra curricular activities - often are entirely dependent on an activist teachers and should be a governmental not an individuals responsibility. Taught on top of the curriculum e.g. Roots & Shoots Australia is a youth-led action program (inspired by Dr Jane Goodall).	The **Australian Sustainable Schools Initiative (AuSSI)** is a partnership of the Australian Government and the States and Territories that supports schools to develop a whole school approach to **Education for Sustainability (EfS)**. **Waterwise Schools Program** and S**ynergy Schools Solar Challenge 2018** - developed in partnership with the Science Teachers Association of WA (STAWA). **If sustainability was mandated it would be taught (what is assessed is what is taught).** As teachers and people become more interested Sustainability could be taught as part of a Masters of Education, however you do not earn any more money for having a Masters of Education. Comes down also to a social justice (often a female) responsibility.
The **Common Worlds Research Collective** is an interdisciplinary network of researchers concerned with our relations with the more-than-human world. Members work across the fields of childhood studies, early childhood education, children's and more-than-human geographies, environmental education, feminist new materialisms, and Indigenous and environmental humanities.	Common worlds researchers are involved in two strands of inquiry. One strand experiments with feminist common worlds methods. The other strand features inquiries into children's common worlds relations with place, with the material world, and with other species.
Linkage Grants - research funding that the government matches	The Linkage Program promotes national and international research partnerships between researchers and business, industry, community organisations and other publicly funded research agencies. By supporting the development of partnerships, the **Australian Research Council (ARC)** encourages the transfer of skills, knowledge and ideas as a basis for securing commercial and other benefits of research. The Linkage Projects scheme objectives are to: - support the development of long-term strategic research alliances between higher education organisations and industry and other research end-users, in order to apply advanced knowledge to problems; - provide opportunities for internationally competitive research projects to be conducted in collaboration with organisations outside the higher education sector; and - enhance the scale and focus of research in Australian Government priority areas.

School of Arts and Humanities - Bunbury Dr Naomi Godden – VC Research Fellow Social Work Dr Danielle Brady – Senior Lecturer (apology) Dr Marilyn Palmer - Lecturer	**Key messages/opportunities**
Social inequity and injustice. Gender, social justice and collective responses.	Not enabling a dysfunctional system - with no intention to abandon it's corporate sponsors.
Social work placement for students to build knowledge and expertise	Key aspect is financial investment and funding.
On 2-3 December 2019, a workshop was held on ECU South West Campus on Wardandi Boodja, bringing together Noongar elders, community leaders, and ECU academics across multiple disciplines to share their ideas and opportunities for an aspirational and transformational agenda for research and action in the face of the climate crisis. **Transformational actions** came out of the workshop.	**Boodja Justice Research Group** Attendees mapped potential transformational actions that the Boodja Justice Research Group could engage with.
Letter from staff to VC signed on 26/3/2020.	Declaring a climate emergency and seeking net zero emissions by 2030.
Bunbury has transport improvements. Progress since 2010 has been slow. The Sustainable Steering committee is no longer.	Aim to attract funding and resources and go forward in 2020.
Limits to growth. Anarchy/chaos models - don’t' focus on the damage and harm.	Emerging fundamental crisis - growth mentality has to be challenged. Not individual behaviours rather the system is where the shift is required. There is a desire for transformation.
Transform to a justice system that is fair and equitable. Social capital.	Systemic analysis. ECU's role in building social capital. ECU has the least dependence on international students.
ECU's submission to the Department of Health	Climate health enquiry
Being part of a social change process for climate health. Revolutionary work.	Seeking funding for a centre: People Place Planet (Pierre Horwitz). University has world-ready branding - innovative and young (<50) and does not have deep funding into mining. International funding opportunities for research. **ECU to be a world leader in sustainability. Support a Chief Sustainability Officer at the executive level and a matrix of action.** Important that it is a collection of movement with a collective structure (bottom up) and the job description is put together as a collective. Opportunity to look at different models - outward and inward focussed. Look at the curriculum and modify the elements.

School of Nursing and Midwifery SW Dr Fiona Foxall – School of Nursing and Midwifery	**Key messages/opportunities**
Clinical labs and simulation wards - **Health has one of the largest carbon footprints** just by the nature of the services. **Small changes in Health can be significant in terms of carbon reduction**. Since ECU is health focussed this is a good area to identify the low hanging fruit to reduce carbon emissions e.g. waste reduction. **PPE is a new pollution source** - the volumes have increased significantly with COVID 19.	Produce an significant amount of waste with 2,500 students, 30 nurse practitioners and 800 post graduates and skills simulation centres. **Nursing uses a significant amount of disposable items. Waste is behaviourally driven.** By using less materials and placing the materials in the right places this will avoid municipal solid waste. Data is not necessarily available or front of mind for waste or water (water use has increased with COVID19 and hand washing).
Discussed the Climate Clever App to track and reduce waste	For the community of practicing nurses this could be a tool to change behaviours and if it were to be trialled nursing would be a good area to do that. **Simple behavioural shifts can make big impacts.** Can motivate by either: - Thinking others are doing it, and/or - Being part of a community that is doing it
When nurses are placed they tend to fall into the hierarchy. **Behavioural shifts can have a large effect.**	**Nursing is a hierarchical profession, so targeting behavioural change would be at the Registered or Senior nurse level.** Nursing has an extensive alumni and alumni networks. Post Graduate students doing Masters and a network that could be influenced to reduce emissions. Three new hospitals; Fiona Stanley, New Perth Children's Hospital and New Royal Perth Hospital 2032. Charlie Gairdner has older buildings and by switching off older equipment the gains can be significant. Private facilities - Ramsay Health, aged care (Bethany and Armana). Some GP Clinics are large and will have significant waste.
Sustainability considerations	Nursing students do a leadership unit and there is a big drive for nurses to do the unit (leadership theory) as on new wards their is always a Senior Nurse on a commissioning team. Curriculum is full however finding where it fits in the existing units could work. **Sustainability could sit in the Leadership Course.** Trends include: - Fires and respiratory risk - People vulnerable to climatic risks - Asthma and respiratory disease and the affect climate has on this

School of Science SW Dr Sora Marin-Estrella - Academic	**Key messages/opportunities**
WA Climate change strategy open for comments	Many comments received
People and organisations	Need to change behaviours and act. The government is not tracking at the speed required to make the changes.
Solar panels and EV's - thinking ahead to batteries and recharging electric cars which become the homes battery.	Weight of responsibility for change compared to the polluters. Seem to be focussed on adaptation not the outcome. The government are not requiring the polluters to address their impacts. **Government's represent society.** One way is to educate the students as to their carbon footprint as we are not aware of the carbon footprint we are having. Focus is on growth, growth, growth. In developing countries social rights are not secure.
Large area of bushland within the SW campus which is subject to controlled burns by DBCA.	Fire breaks were created causing clearing. Fire ecology is important.

Centre for Teaching and Learning Professor Rowena Harper	**Key messages/opportunities**
One strategy is to develop sustainability modules that can be embedded into coursework with contextualising materials and learning activities wrapped around them.	Unit coordinator embeds the modules
Existing embedding requirements include communication, inter-cultural knowledge, skills and attitudes, and digital literacies.	Process: 1) identify a lead to consult with institutional experts in sustainability education and benchmark practice; 2) develop a framework and institutional learning outcomes with Schools and relevant service units; 3) obtain endorsement from key stakeholders and committees; 4) CLT coordinates professional development and support for implementation. Need to recognise that some Schools have an existing focus in curriculum on sustainability (ie. Engineering). We discussed the relevance of carbon reduction education for health disciplines.
Major Course Review and Re-accreditation Procedure - procedure supports the Curriculum Evaluation and Review Policy PL245 and is endoresd by the ADTL Group.	Refine with the Dean and Education Committee to endorse the new areas of sevices and then together with the unit coordinators the services are delivered.



Green elements: Out of curriculum. Ways in which we expand opportunities for all students.

Blue elements: In curriculum. Intentional and systemic curriculum design encompasses these elements.

Orange wheel: Student responsibility. We build students' maturity and ownership so they can self-reflect and make links between their course/discipline learning and future career.

Appendix B
ECU Climate Initiative Taskforce Targets mapped to the UN SDGs

Commercial In Confidence and Working Targets Only

AREA	TASKFORCE TARGETS	SDG ALIGNMENT	ECU EXPERT/S	ECU ACTIONS TO DATE	IDENTIFIED GAPS
BIODIVERSITY	**1.** Ensure that ECU lands are used for their best and most productive purpose with a strong emphasis on maintaining and encouraging biodiversity.	**15.A** *(Life on Land)* Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems. 	**School of Science:** • Dr Eddie Van Etten • Dr Rob Davis • Dr David Blake • Dr Anna Hopkins • Dr Sora Marin Estrella • Prof Pierre Horwitz • Prof Ray Froend	ECU Environmental management plans for all campuses.	**Tighten procurement documents to ensure native flora and fauna is protected for all forward works on all campuses**. All remaining trees and native vegetation to be retained and shift to a restoration focus within the campuses and precincts. Urbanisation has placed pressure on the ecological communities within the campus precincts (particularly the Cities of Joondalup and Bunbury). **Protect, restore and rehabilitate functioning ecosystems** on campuses. Commence restoration and enhancement for remaining habitat on ECU campuses, with a focus on those species at the highest risk (particularly Joondalup and Bunbury campuses). Closely **balance fuel reduction to mitigate fires with conservation.** Understory clearing at the Bunbury campus to reduce fuel loads has removed native species, exposed fauna to

AREA	TASKFORCE TARGETS	SDG ALIGNMENT	ECU EXPERT/S	ECU ACTIONS TO DATE	IDENTIFIED GAPS
					predation and resulted in weed intrusion. Investigate the opportunity to work with the City of Joondalup on the Biodiversity Action Plan 2009–2019 which is due for renewal. This may be an opportunity for ECU to work with the City on ecological priorities around threatening processes.
	2. Strengthen ECU's education, resilience and capacity to mitigate, adapt and respond to climate-related hazards and integrate climate change measures into policies, strategies and planning.	**13.1** *(Climate Action)* Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries. 	**<u>School of Arts and Humanities:</u>** • Dr Naomi Godden • Dr Sue Bailey • Dr Marilyn Palmer **<u>School of Science</u>:** • Dr Aaron Jenkins • Prof Pierre Horwitz • Prof Ray Froend	**<u>School of Arts and Humanities:</u>** Dr Naomi Godden is leading a project with the WA community sector to mainstream climate justice mitigation, adaptation, and disaster response, across all areas of the organisation (including policies, strategies and planning). This project may provide useful input for ECU.	Establish ECU's priorities aligned to the precinct and beyond: • Engineering – rising sea levels and heat effects • Health – education and rising temperatures • Indigenous land practices • Biology – ecosystem risks and adaptation • Wetlands • Bushfire • Restoration ecology
		13.3 *(Climate Action)* Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.	**<u>School of Arts and Humanities:</u>** • Dr Naomi Godden • Dr Sue Bailey • Dr Marilyn Palmer • Dr Danielle Brady **<u>School of Science</u>:**		Consider path and rail networks along and within adjacent bush reserve. Connecting to existing trails and path networks, include indigenous signage identifying the natural and heritage

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			• Dr Eddie Van Etten • Dr Aaron Jenkins • Prof Pierre Horwitz • Prof Ray Froend • Prof Angus Morrison-Saunders • Dr Kat O'Mara • **School of Science Courses:** Bachelor of Sustainability degree; Masters of Environmental Management (c/work)		features of the area, such as local Aboriginal heritage values, and the more recent history of the area (i.e. interpretative signage). Partnerships with DBCA, DWER and LGA.
	3. Aim to contribute research and education that informs sustainable land and water management, that assists in the reduction of degradation of natural habitats, halts the loss of biodiversity, and protects and prevents the extinction of threatened species.	**15.3** *(Life on Land)* By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world. 	**<u>School of Arts and Humanities:</u>** • Dr Naomi Godden • Dr Sue Bailey • Dr Marilyn Palmer • Dr Danielle Brady **<u>School of Science</u>:** • Dr Eddie Van Etten • Dr Rob Davis • Dr David Blake • Dr Anna Hopkins • Prof Pierre Horwitz • Prof Ray Froend		Focus partnerships and research in areas where desertification, degraded landscapes (land and soil) and the loss of biodiversity occur e.g. rangelands and the wheatbelt. Coordinate with indigenous land practices and knowledge.
		15.5 *(Life on Land)* Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the	**<u>School of Science</u>:** Most academics in the natural sciences.	**<u>School of Science</u>:** Many projects are underway, or have been completed	Assist focus State priorities for degrading natural habitats and focus ECU's research accordingly e.g. Swan Coastal Plain wetlands,

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		extinction of threatened species.  			salinity, degradation of the rangelands. Coordinate with indigenous land practices.
		15.B *(Life on Land)* Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation.  	**School of Science:** • Dr Eddie Van Etten • Dr David Blake • Dr Anna Hopkins		ECU to develop a **sustainable procurement strategy** for acquiring goods or services from suppliers to ensure procurement has the most positive environmental, social and economic impacts possible over the entire life cycle. Include diversity and indigenous employment initiatives. Focus on incorporating **indigenous land practices and knowledge** into conservation and reforestation teaching. Include School of Engineering and School of Business and Law to ensure continued focus on: • **sustainable design**, **procurement, construction and operation** for infrastructure projects and assets.

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					• sustainable **supply chain** to ensure sustainable forest management • **Circular economy principles**.
ENERGY AND TECHNOLOGY	**4.** Explore opportunities for ECU to understand and take advantage of sustainable energy sources.	**7.2** *(Affordable and Clean Energy*) By 2030, increase substantially the share of renewable energy in the global energy mix. 	**<u>School of Engineering:</u>** • A/Prof Iftekhar Ahmad • Dr Octavian Bass • Prof Daryoush Habibi • A/Prof Ganesh Kothapalli • Prof Stefan Lachowicz **<u>Digital and Campus Services:</u>** Kevin Hall – Manager Buildings and Maintenance	**<u>ECU Student Guild:</u>** Reduce carbon footprint by decreasing printed copies of documents and mainly moving to the cloud where documents are being easily accessible by all staff and senate. **<u>Digital and Campus Services:</u>** Manage the Energy Environmental Improvement Program which: • Identifies opportunities to reduce energy consumption. • Stay below the mean average for energy consumption per EFTSL for Australian Universities.	There are significant untapped opportunities to mitigate ECU's carbon footprint through **the generation of clean and renewable energy on site and within the precinct.** Establish an **integrated energy plan** which entails exploration of various green energy sources, installation opportunities, timelines, risks and conversion requirements and logistical requirements.
		7.B *(Affordable and Clean Energy)* By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable			Include School of Engineering and School of Business and Law to provide and share information on:

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		energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support. 			• Technology and advancements in renewable energy • Fit for purpose designs - microgrids, hydrogen, geothermal, solar. • Benefits of renewable energy – financial and emissions reduction Share widely ECU's journey to providing renewable, precinct-wide energy.
		9.4 *(Industry, Innovation and Infrastructure)* By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities. 	**<u>School of Engineering:</u>** Most academics in engineering	**<u>School of Engineering:</u>** Significant research is being undertaken at ECU to increase the efficiency in the use of materials and energy in different industries, with particular focus on reducing the environmental impact.	Include School of Engineering Look to further support Australian technologies and the application internationally.

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	5. Led by ECU Researchers, enhance research that encourages innovation and support leading to upgrades of sustainable technological capabilities across applicable industry sectors.	**9.5** *(Industry, Innovation and Infrastructure)* Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending. 			Include: • School of Education • Centre for Teaching and Learning • School of Engineering • School of Arts and Humanities • School of Nursing and Midwifery Look to further support Australian technologies and their application internationally. Continue to publish in international reputable journals. Share widely: • ECU's journey to providing renewable, precinct-wide energy including green ICT communications and green energy generation • The student's journey to reducing emissions begins with understanding and capturing emissions • Health sector carbon emissions • How sustainability integrated into all disciplines of the University

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		9.C *(industry, Innovation and Infrastructure)* Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020. 			Include School of Engineering and School of Business and Law to provide and share information. Continue to publish in international reputable journals. Continue New Colombo Plan and Bhutan Sustainability Tour. Implement alternate communication methods as a result of COVI19.
		13.2 *(Climate Action)* Integrate climate change measures into national policies, strategies and planning. 	**<u>School of Science</u>:** • Prof Ray Froend • Prof Paul Lavery • Prof Pierre Horwitz	Integrate climate change measures into ECU policies, strategies and planning.	Include School of Engineering and School of Business and Law to provide and share information on: • Climate change and the impacts - understanding and communicating the science • Interlinkages between biodiversity and climate change • The importance objective scientific assessments
SOCIAL AND EDUCATION	**6.** Provide access to safe, inclusive, and accessible green and public spaces on ECU campuses, with emphasis for women and	**11.7** *(Sustainable Cities and Communities)* By 2030, provide universal access to safe, inclusive,	**<u>School of Business and Law:</u>** SBL Researchers in areas of Diversity and	**<u>ECU Student Guild:</u>** Student Gardens accessible to all staff and student outside of building 9 which is	ECU to develop a **sustainable procurement strategy** for acquiring goods or services from suppliers to ensure

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	children, older persons and persons with disabilities.	and accessible green and public spaces, in particular for women and children, older persons and persons with disabilities. 	Workplace Inclusion, inclusive leadership, and bullying from the School of Business and Law including: • Dr Uma Jogulu • Dr Azadeh Shafaei • Prof Maryam Omari • Dr Mehran Nejati	a public green space in ECU Joondalup campus. **South West Campus:** The Community Garden is an accessible public space that students and staff co-manage and enjoy.	procurement has the most positive environmental, social and economic impacts possible over the entire life cycle. Include diversity and indigenous employment initiatives. Refer ECU's diversity policy.
	7. The attainment of knowledge and skills needed to promote sustainable practices through the promotion and delivery of educational content integrated into existing coursework, units, workplace integrated learning opportunities, and research projects.	**4.7** *(Quality Education)* By 2030, ensure that all learners acquire the knowledge and skills needed promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development.	**School of Science:** Sustainability Degree **School of Arts and Humanities:** • Dr Naomi Godden • Dr Sue Bailey • Dr Marilyn Palmer • Dr Danielle Brady **School of Business and Law:** SBL PRME and Sustainability Steering	**School of Science:** Sustainability Degree **School of Arts and Humanities:** The Social Work program integrates climate change across the course as a key context for social injustice and action. Naomi Godden provides a social work field placement program that focusses on climate justice action research. **School of Business and Law:** The School of Business and Law formally became an advanced signatory to the UN Principles for	Include: • School of Education • Centre for Teaching and Learning • School of Nursing and Midwifery • Kurongkurl Katitjin, Centre for Indigenous Australian Education and Research Opportunity to focus on innovative business models based on circular economy. Support First Nations businesses, including the tourism sector to create more opportunities for Aboriginal communities to live and thrive on Country e.g. WA Indigenous Tourism Operators Council (WAITOC).

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			Committee led by Dr Mehran Nejati	Responsible Management Education (PRME) in 2019. This warranted a more focused commitment to responsible management education and incorporating sustainability, SDGs, responsible management and ethics in our curriculum. At the school, we have continued to develop and compile new SDG-related content to enhance the knowledge and skills needed to promote sustainable development. Just as an example, in Semester 2 of 2020, students in the *Managing for Sustainability* Class led by Dr Mehran Nejati will participate in the World Climate Role-Play Simulation which enables them to discuss the implications of climate change for business and society and evaluate the importance of global cooperation in addressing the climate urgency through critical thinking and deductive reasoning through an experiential learning experience. **ECU Student Guild:** Events as conducted and organized to meet the targets of: sustainable development and	Look to partner with organisations that are advancing sustainable development e.g. • Supply Nation - provides Australia's largest national directory of verified Aboriginal and Torres Strait Islander businesses • Indigenous Business Sector Strategy (IBSS) supported by the West Australian Indigenous Business and Employment Hub.

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				sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development etc. i.e. Succulent shenanigans where Guild Student Assist Officer provide Succulents to students during stressless week; Garden Gurus in partnership with ECU Counselling and ECU Guild where important topics are discussed like how to better manage stress during exams/ assessments while gardening together; World Peace day where Student Clubs are supported by the ECU Guild to have a peaceful march around ECU Joondalup and also the release of doves.	
	8. Utilise appropriate socially and environmentally responsible procurement policies and procedures to improve ECU resource efficiency and minimise ECU's environmental footprint in consumption and delivery of university business.	**8.4** *(Decent Work and Economic Growth)* Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on	**<u>School of Business and Law:</u>** • Dr Mohammad Iranmanesh • A/Prof Ferry Jie • Dr Flavio Romero Macau • Dr Mehran Nejati • Dr Reza Kiani Mavi • Dr Azadeh Shafaeu	**<u>School of Business and Law:</u>** Research on green human resource management and demonstrating its impact on improved environmental performance and sustainable supply chain management, as well as studies on lean manufacturing practices and responsible consumption	ECU to develop a **sustainable procurement strategy** for acquiring goods or services from suppliers to ensure procurement has the most positive environmental, social and economic impacts possible over the entire life cycle. Include diversity and indigenous employment initiatives.

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		sustainable consumption and production, with developed countries taking the lead. 		behaviours (See for example: Iranmanesh et al., 2019; Nejati et al., 2017; Shafaei et al., 2020; Zailani et al., 2019)	
	9. Participate in global partnerships for sustainable development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of ECU sustainability goals, while promoting research leadership in these areas.	**17.16** *(Life on Land)* Enhance the global partnership for sustainable development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology, and financial resources, to support the achievement of the sustainable development goals in all countries, in particular developing countries. 	**School of Science:** • Prof Angus Morrison-Saunders • Prof Pierre Horwitz **School of Business and Law:** • Dr Mehran Nejati • A/Prof Simone Scagnelli SBL PRME and Sustainability Steering Committee **School of Arts and Humanities:** Boodja Justice Research Group (led by Naomi Godden) is a new collective of 25 academics and Noongar elders focussing on climate justice-related	**School of Science:** Sustainability Degree **School of Business and Law:** Becoming an advanced signatory to the United Nations Principles for Responsible Management Education (PRME) by ECU School of Business and Law, reporting to them on our progress every two years, and being an active member of the PRME Australia and New Zealand Chapter, organising joint and collaborative sustainability-related initiatives with other public universities in WA such as ANZAM SDG Pitch Challenge, and the upcoming Sustainability Week Challenge, as well as	Goal 17 is Partnerships for the Goals. Currently refers to Life on Land. Environmental work has socio-economic, cultural, health and political impacts and therefore a multi-disciplined approach is essential for all partnerships.

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			research and action. ECU members include: • Dr Naomi Godden • Dr Sue Bailey • Dr Marilyn Palmer • Prof Kathy Boxall • Prof Pierre Horwitz • Dr Danielle Brady • Dr Sora Marin Estrella • Prof Mindy Blaise • Dr Zoe Leviston • Dr Jane Merewether • Elisabeth Taylor • Dr Jonathan Marshall • A/Prof Trudi Cooper • Dr Stephanie Godrich • Dr Donna Mazza • Renee Newman • Dr Deirdre Drake • A/Prof Justine Dandy	other initiatives such as the GIVE initiative which has encouraged SBL staff to give your unwanted clothing and items a second life.	
TRANSPORT	**10.** Identify sustainable transport strategies that enhance the staff and student experience as it relates to sustainability within our campuses and broader community.	**11.2** (Sustainable Cities and Communities) By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.	**School of Engineering:** • A/Prof Iftekhar Ahmad • Dr Octavian Bass • Dr Nando Guzzomi • Prof Daryoush Habibi • Dr Kevin Hayward • Prof Ganesh Kothapalli • Prof Stefan Lachowicz	**School of Engineering:** Significant research is being undertaken at ECU to solve the technological challenges for the use of renewable energy in different industries, with particular focus on the transport industry and the uptake of electric vehicles. **ECU Student Guild:** In good partnership and support of active promotion	There are significant untapped opportunities to mitigate ECU's carbon footprint through transport efficiencies. Strategic procurement - Supplier Assessment and Selection - opportunity to preferentially select sustainable organisations with local supply chains. Whole of life assessments should be undertaken. Establish an integrated transport plan which accelerates EV use from

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			**Digital and Campus Services:** Kerry Devine – Manager Campus Operations and Support Services	with URBI which is an environmentally friendly bike share service for staffs and students to ride bikes around ECU Joondalup campus, Joondalup Station, Joondalup Health Campus and also various areas around Joondalup. **Digital and Campus Services:** • Developing a parking strategy which will impact active transport. • Developing a proposal for a secure bicycle compound at the Mt Lawley Campus. • Managing University pool vehicles choosing hybrid and smaller fuel-efficient vehicles including a fully electric Nissan Leaf. • Promoting use of smart rider cards as an alternative to using fleet vehicles where appropriate. • ECU provides a financial contribution to the free CAT bus service between ECU Joondalup Campus and Joondalup railway station. • Coordination of the Urbi bike sharing services	charging stations, to funding and incentivising students. For research consider future technology, ITS, smart freeways and ramp metering to improve congestion, access and emissions resulting from vehicles. Focus research on areas with the greatest emission reduction opportunities.

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				located at Joondalup Campus. • Coordinating Car Share service – a convenient and simple car hire system targeted at students.	
WASTE	**11.** Develop a framework for on-going waste management.	**11.6** *(Sustainable Cities and Communities)* By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management. 	**School of Science:** • Dr Eddie Van Etten **School of Business and Law:** • Dr Edmund Goh • Dr Mohammad Iranmanesh • A/Prof Ferry Jie • Dr Mehran Nejati • Dr Flavio Romero Macau • Dr Reza Kiani Mavi • Dr Azadeh Shafaei	Reducing ECU's adverse per capita environmental impact **School of Business and Law:** Dr Edmund Goh from ECU School of Business and Law has been collaborating with City of Joondalup for a research study which explores residents' adoption of the three-bin waste system, their attitudes towards waste and recycling, and how well they sort their household waste into the three bins.	Highlight the work ECU is undertaking around waste management, leverage funding opportunities, set and share ambitious goals and targets broadly. Target areas with the highest return. The Western Australian Government is taking a forward stance on waste management and recovery with measures to reduce waste generation and create a circular economy with only 15% of waste going to landfill. The WA Waste Authority, based in Joondalup, has set goals for 2030. These include: • Decrease waste generation by 20%. • Increase material recovery from around 50% to 75%. • Ensure no more than 15% of waste in Perth and Peel is landfilled.

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SUSTAINABLE RESOURCE MANAGEMENT	**12.** Develop a framework for on-going sustainable consumption of resources and efficient production of outputs.	**12.1** *(Responsible Consumption and Production)* Implement the 10-year framework of programmes on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries.  	**School of Business and Law:** • Dr Edmund Goh • Dr Mehran Nejati	**School of Business and Law:** At SBL, the PRME and Sustainability Steering Committee has trialled the GIVE initiative which has encouraged SBL staff to give your unwanted clothing and items a second life. This appeared to be a successful initiative and has been continuing to date. In terms of impact, in 2019, this project led to giving a second life to more than 44kg of used clothing, shoes, handbags and accessories and saving them from ending up in landfills. This translates into saving more than 8800 Littre of water.	**Sustainable procurement strategy** for acquiring goods or services from suppliers to ensure procurement has the most positive environmental, social and economic impacts possible over the entire life cycle. Include diversity and indigenous employment initiatives. Procurement policies for industry and government are dominated by the lowest price. In the current environment it has become clear that there are other strategic considerations that support greater local content, such as supply alternatives, the development of local skills, local employment, local taxes, future jobs, value adding, greater quality etc. By introducing the concept of 'Netback benefits' for local content procurement, there can be a standardised and calculatable way to evaluate local and international content for social, economic and environmental benefits. For instance, a multiplier effect or benefits of local

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					taxes and employment have a tangible and quantifiable benefit. Potentially State Treasuries could champion a standardised Netback table of calculations which could be incorporated in procurement processes. It would seem this would remove some of the guess work around current local procurement evaluation and more importantly also include social and environmental benefits.
		12.2 *(Responsible Consumption and Production)* By 2030, achieve the sustainable management and efficient use of natural resources. 	**<u>School of Engineering:</u>** • A/Prof Yasir Al-Abdeli • A/Prof Mehdi Khiadani • Dr Tushar Sen • Dr Masoumeh Zargar	Achieving the sustainable management and efficient use of ECU's natural resources	Energy and water consumption at ECU premises can be improved through cost-effective measures. Focus waste reduction efforts in areas with the greatest carbon footprint ie. Health on and off campus.
		12.3 *(Responsible Consumption and Production)* By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses		Progressively reduce food waste from ECU campus retailers and consumers	Include the School of Medical and Health Sciences - from paddock to plate to gut health.

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		along production and supply chains, including post-harvest losses. 			
		12.4 *(Responsible Consumption and Production)* By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment. 	**<u>School of Science</u>:** • Dr Kat O'Mara • Dr Aaron Jenkins	Achieve the environmentally sound management of chemicals and all wastes and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the local environment.	Include School of Business and Law to ensure continued focus on: • **Resource optimisation** • **sustainable design**, **procurement, construction and operation** for infrastructure projects and assets. • sustainable **supply chain** engaging circular economy principles.
		12.5 *(Responsible Consumption and Production)* By 2030, substantially reduce waste generation		Substantially reduce ECU's waste generation through prevention, reduction, recycling and reuse.	**Sustainable procurement strategy** for acquiring goods or services from suppliers to ensure procurement has the most positive

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		through prevention, reduction, recycling and reuse.  		**ECU Student Guild:** Supporting students to use reusable keep cups where possible. Providing free Keep Cups for orientation day during each semester. Supporting club activities by providing them with reusable metal straws and cutleries as gifts for prizes. Actively encouraging students to use reusable water bottles on campus instead of single use plastic bottles. Host the 'Coffee cup free day' each semester with BERMUDA at ECU JO, GRINDHOUSE at ECU ML, and at KULBARDI cafe ECU BU, for free coffees to students who bring their own keep cups on that day. Organized a Clean Up Australia day in partnership with Clean Up Australia at the beginning of the year to promote awareness regarding reducing, reusing and recycling.	environmental, social and economic impacts possible over the entire life cycle. Include School of Business and Law, School of Science and School of Engineering to raise the importance of: • **resource optimisation** • **sustainable design**, **procurement, construction and operation** for infrastructure projects and assets • sustainable **supply chain** engaging circular economy principles.
			Digital and Campus Services: Kerry Devine – Manager Campus Operations and Support Services	**Digital and Campus Services:** Manage the Waste Environmental Improvement Program which:	

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				• Works with ECU waste provider to implement and communicate a Waste Education Program to all Centres/Schools. • Improves the management of existing and new waste streams (i.e. consolidating biohazardous waste into the ECU Waste Management Contract). • Identifying and expanding the number of recycling streams to result in an increase in visibility and accountability of what is being recycled. • Continuing to support the planning for the waste transfer stations project for South West Campuses. • Construct a Mount Lawley Waste Compound (dependant on funding).	
		12.7 *(Responsible Consumption and Production)* Promote public procurement practices that are sustainable, in accordance with national policies and priorities.		Promote public procurement practices that are sustainable, in accordance with national policies and priorities.	Include School of Business and Law, School of Science and School of Engineering to raise the importance of: • **resource optimisation** • **sustainable design**, **procurement,**

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					**construction and operation** for infrastructure projects and assets • sustainable **supply chain** engaging circular economy principles.
	13. Encourage procurement processes that adopt sustainable practices and integrate sustainability information into reporting cycles.	**12.6** *(Responsible Consumption and Production)* Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle. 	**School of Business and Law:** • A/Prof Simone Scagnelli • Dr Mehran Nejati	**School of Business and Law:** Through research in sustainability reporting, corporate social responsibility, and ethics, School of Business and Law has been informing companies and organisations about the business case for sustainability and responsible business practices, leading to improved firm image, reputation, performance, and stakeholder relations, among others. Also, some of our units cover sustainability reporting in their teaching and learning modules.	Include School of Business and Law, and School of Engineering to raise the importance of: • **resource optimisation** • **sustainable design**, **procurement, construction and operation** for infrastructure projects and assets • sustainable **supply chain** engaging circular economy principles • diversification of the global supply chain and relocation of strategic manufacturing operations.
	14. Ensure that ECU staff and students have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.	**12.8** *(Responsible Consumption and Production)* By 2030, ensure that people everywhere have the relevant information and awareness for sustainable	**School of Arts and Humanities:** Social Work academics: • Dr Naomi Godden • Dr Sue Bailey • Dr Marilyn Palmer • Dr Danielle Brady	ECU conducts research and delivers courses that contribute to an awareness of sustainable development and lifestyles in harmony with nature.	ECU Sustainability Leadership – raise the sustainability profile. There has been an increase in enrolments in the School of Business and Law undergraduate

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		development and lifestyles in harmony with nature.  	**School of Business and Law:** SBL PRME and Sustainability Steering Committee	**School of Business and Law:** We have researchers at the School of Business and law who work on responsible business management and SDG-related research areas such as workplace wellbeing (related to SDG 8), ethical and inclusive leadership (related to SDG 8, 9 and 10), workplace bullying (related to SDG 8 and 10), sustainable cities and communities (SDG 11), responsible consumerism (related to SDG 12), Life Cycle Asset Management (related to SDG 12), and residents waste source behaviour (related to SDG 12), green human resource management (related to SDG 13), to name a few. Also, in terms of Teaching and Learning, the School of Business and Law formally became an advanced signatory to the UN Principles for Responsible Management Education (PRME) in 2019. This warranted a more focused commitment that led to the establishment of the School of Business and Law's	sustainability unit MAN2610. School of Science offers a Bachelor of Sustainability – opportunity to promote this degree further and consider a multidisciplined approach. Refer: • Strategic Business Leader (SBL) • Enactus network of global business, academic and student leaders are unified by the vision to create a better, more sustainable world. • The Association to Advance Collegiate Schools of Business (AACSB) connects educators, students, and business to achieve a common goal: to create the next generation of great leaders. • Sharing Information on Progress (SIP) Reporting Consider carbon accounting and auditing, in a similar way that students undertake waste audits.

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				PRME and Sustainability Steering Committee. In addition to the explicit commitment to sustainability by SBL leadership, the School has used a bottom-up process for integrating sustainability and ethics in its teaching and learning, research and operations through forming a PRME and Sustainability Steering Committee. The team has been led by Dr. Mehran Nejati (appointed as the Director of PRME and Sustainability at SBL) and has representatives from various stakeholders and disciplines including students and professional staff. School of Business and Law drafted its school-specific Sustainability Strategy in 2020 and has progressively incorporated values and principles of sustainability and global responsibility in its teaching, research and operations. **ECU Student Guild:** Able to share information on awareness for sustainable development and lifestyles in harmony with nature on our socials such as Monthly Newsletters to all students,	

AREA	TASKFORCE TARGETS	SDG ALIGNMENT	ECU EXPERT/S	ECU ACTIONS TO DATE	IDENTIFIED GAPS
				Facebook and Instagram. Also able to reach students through surveys and suggestions of what their awareness level is at in regards to sustainable development and lifestyles in harmony with nature.	
WATER	**15.** Develop a framework for ongoing water resource management.	**6.5** *(Clean Water and Sanitation)* By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate. 	**<u>School of Engineering:</u>** • A/Prof Mehdi Khiadani • Dr Tushar Sen • Dr Masoumeh Zargar **<u>School of Science</u>:** • Prof Pierre Horwitz • Prof Ray Froend • A/Prof Mark Lund **<u>Digital and Campus Services:</u>** Kevin Hall – Manager Buildings and Maintenance	**<u>Schools of Engineering and Science:</u>** There are many active research projects at ECU dealing with the management of water resources and the treatment of wastewater. **<u>School of Science</u>:** Large number of undergraduate and postgraduate projects undertaken over the last 20 years **<u>Digital and Campus Services:</u>** Manage the Water Environmental Improvement Program which: • Improves and innovates in the area of water conservation and efficiency. • Identifies and recommends	Highlight the work ECU is undertaking for Water Sensitive Urban Design, Urban Water Management and water resource management. Leverage funding opportunities, set and share ambitious goals and targets broadly. School of Medical and Health Sciences – virtual water in food waste and awareness.

AREA	TASKFORCE TARGETS	SDG ALIGNMENT	ECU EXPERT/S	ECU ACTIONS TO DATE	IDENTIFIED GAPS
				opportunities to reduce both scheme and ground water consumption. • Minimise negative impacts to water quality.	

Need to include where these goals are not covered above and why the UN SDG goals were chosen over other sustainability tools.

Include relevant considerations from other tools as applicable, for example those of Infrastructure Sustainability Council of Australia (ISCA):

Leadership and Strategy

- Risks and Opportunities for all key decisions including environmental, community and financial considerations
- Knowledge Sharing

Sustainable Procurement

- Risk and Opportunity Assessment and Procurement Strategy
- Supplier Assessment and Selection
- Contract and Supplier Management

Resilience

- Resilience Strategy
- Climate and Natural Hazards
- Innovation

Options Assessment & Business Case for new Projects

- Options Assessment
- Economic and Financial Sustainability

- Benefits Mapping

Energy & Carbon

- Energy and Carbon Reduction
- Renewable Energy
- Offsetting

Green Infrastructure

Environmental Impacts

- Receiving Water Quality
- Noise
- Vibration
- Air Quality
- Light Pollution

Resource Efficiency

- Resource Strategy Development
- Contamination Remediation Material
- Management of Acid Sulfate Soil

Resource Recovery

- Adaptability
- Material Lifecycle Impact Measure and Management
- Sustainability Labelled Products

Water Use

- Appropriate Use of Water Sources

Ecological Assessment and Risk Management

- Ecological Monitoring

Stakeholder Engagement

- Stakeholder Engagement Strategy Development

- Stakeholder Engagement Strategy Implementation
- Leaving a Lasting Legacy

Heritage Assessment and Monitoring

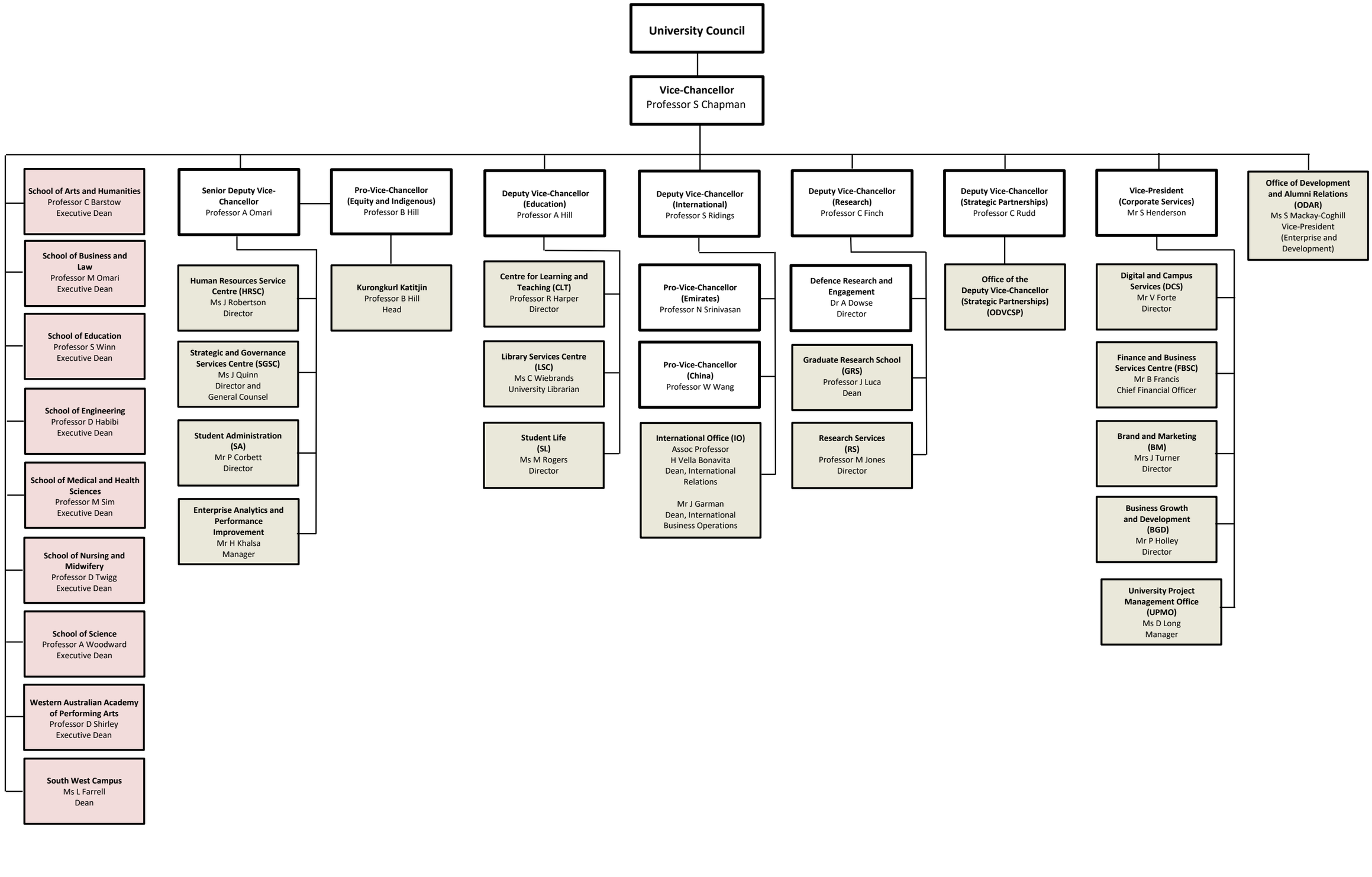
Workforce Sustainability

- Strategic Workforce Planning
- Jobs and Skills
- Workforce Culture and Wellbeing
- Diversity and Inclusion
- Sustainable Site Facilities

Appendix C
Audit Evidence

ECU Organisational Chart

(as at 24 July 2020)



Edith Cowan University
Environmental Declaration

Edith Cowan University is committed to environmentally sustainable development; that is, development

> *that meets the needs of the present without compromising the ability of future generations to meet their own needs. …in the end, sustainable development is not a fixed state of harmony, but rather a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with future as well as present needs.*
>
> *(World Commission on Environment & Development, 1987, 9-10)*

The members of Edith Cowan University community join with others in seeking to make positive proposals and fundamental changes to the ways in which we conduct ourselves environmentally. The University acknowledges the scale and scope of the environmental problems facing the world today. It also recognises and promotes the opportunities that exist for developing innovative responses that contribute to the resolution of these problems.

Universities have a major role to play in education, research, policy formation and information exchange necessary to achieve environmental sustainability. Edith Cowan University aims to provide leadership and support, and to mobilise internal and external resources to respond to these challenges. The University will do this by:

1. Raising public, government, industry, foundation and institutional awareness by publicly addressing the need to move towards an environmentally sustainable future.

2. Encouraging staff and students to engage in education, research, policy formation and information exchange on population, environment, and environmentally sustainable development.

3. Offering programs and conducting research in environmental management, sustainable economic development and related fields that enhance the environmental literacy of its graduates.

4. Setting an example of environmental responsibility by establishing and maintaining processes of resource conservation, recycling and waste reduction within the University.

5. Encouraging the involvement of the community including government, industry and the professions, in supporting university research, education, policy formation and information exchange in environmentally sustainable development, and developing solutions to environmental problems.

6. Encouraging collaboration between academic leaders and environmental practitioners to develop research, policy and information exchange programs for an environmentally sustainable future.

7. Establishing appropriate partnerships with primary and secondary schools to support programs that educate about population, environment and environmentally sustainable development.

8. Working with relevant international, national and local organisations to promote a worldwide university effort towards an environmentally sustainable future.

9. Fostering environmental literacy within the University community.

10. Integrating this Declaration into University policy, planning, procedures, and quality reviews as considered appropriate.

References:

World Commission on Environment & Development, (1987), *Our Common Future,* Oxford: Oxford University Press.

This declaration is modelled on the Talloires Declaration. Grateful acknowledgment is made to its authors. For the full, original text see http://iisd1.ca/educate/declarat/talloire.htm.

Policy Title: Sustainability

Policy Owner: **Director, Facilities and Services Centre and Information Technology Services Centre, Chief Information Officer**

Keywords: **Environment** **Carbon footprint**

Policy Code: **PL249 [ad089]**

1. INTENT

This policy sets the strategic scope of Edith Cowan University's commitment to sustainability in the appropriate management of the organisation and its operations, the engagement of students and staff in principles and applications of sustainability and the engagement of and collaboration with the broader community.

2. ORGANISATIONAL SCOPE

All ECU students, staff and contractors

3. DEFINITIONS

TERM	DEFINITION
Sustainability	Meeting the needs of the present without compromising the ability of future generations to meet their own needs.

4. POLICY CONTENT

4.1. Commitment

ECU is committed to:

- A broad understanding of sustainability that includes personal, social and environmental elements;
- Creating and supporting a sustainable future through the manner in which it conducts its business and the form of the outputs which it generates;

- Conducting its business in ways that address sustainability and which raise awareness both within itself and the broader community of the needs and requirements for a sustainable future; and
- Driving continuous improvement and complying with relevant legislative requirements to provide ongoing benefits in the protection of the environment and prevention of pollution.

4.2. Sustainability Principles

ECU staff will:

- encourage all staff and students to establish personal goals for their well-being;
- undertake activities in teaching and research that engage students, staff and the broader community in the principles and applications of sustainability;
- conduct all its operations in an environmentally sensitive manner, minimising waste and maximising efficiency;
- include in its policies and plan, aims and activities to support diversity across staff and student profiles and to support the health and well-being of all ECU staff and students
- engage and collaborate with industry, government and the broader community in environmental decision making and project partnerships; and
- incorporate sustainability considerations in all levels of organisation and decision making.

4.3. Reporting Sustainability at ECU

All Schools and Service Centres at ECU will include sustainability goals within their annual operational plans and report to the University Executive on their outcomes and achievements through Executive Deans of Schools and Centre Directors.

5. ACCOUNTABILITIES AND RESPONSIBILITIES

In relation to this policy, the following positions are responsible for the following

Policy Owner

The Policy Owner Director, Facilities and Services has overall responsibility for the content of this policy and its operation in ECU.

Staff, students and contractors are required to comply with the content of this policy and to seek guidance in the event of uncertainty as to its application.

All members of the University community are expected to comply with University Policy.

6. RELATED DOCUMENTS:

6.1 Other documents which are relevant to the operation of this policy are as follows:

- *ECU Environmental Declaration*
- *Environmental Management of Information Technology (PL116)*
- *Strategic Procurement Policy (PL260)*

7. CONTACT INFORMATION

For queries relating to this document please contact:

Policy Owner	Director, Facilities & Services Centre and Information Technology Services Centre, Chief Information Officer
Telephone:	08 6304 3737
Email address:	v.forte@ecu.edu.au

8. APPROVAL HISTORY

Policy Approved by:	Vice-Chancellor
Date Policy First Approved:	11 July 2013
Date last modified:	25 June 2019
Revision History:	Replaced *Environment Policy* (fs034) on 11.07.2013 Changes to position titles to reflect new organisational structure (August 2017). Removal of Sustainable Communities Steering Committee on 25.06.2019
Next Revision Due:	July 2022
HPCM File Reference	SUB/49570

26th March 2020

Dear Professor Chapman,

RE: Proposal for an ECU commitment to net zero emissions by 2030.

The idea for this proposal arose at workshop held in December 2019 on the South West Campus. Noongar elders, community leaders, and ECU academics across multiple disciplines shared their ideas and suggested opportunities for research and action in the face of the climate crisis. One outcome of this meeting was the possibility of canvassing support for ECU declaring a climate emergency and committing to a 2030 emissions goal.

We accept the overwhelming scientific advice that reducing carbon emissions is urgently needed to limit global warming. Universities have a vital role to play in supporting scientific opinion and there is an opportunity for ECU to be a leader. Over the past two months an online proposal has been circulated staff member to staff members to call on you to:

1. Declare a Climate Emergency
2. Set a 2030 net zero emissions target for ECU.

Following is a list of the 122 signatories and a selection of de-identified comments up until 26 March, 2020. Signatories include academic and professional staff members from seven schools, all campuses and all service centres. Fifteen are members of the professoriate. The exact text of the proposal survey distributed through Qualtrix is included in the Appendix.

The proposal is purposely simple and does not pre-empt how to achieve the goal, as there are many experts available in our University who could contribute to the solution. The 2030 target was informed by a multi-university letter to the Council of Australian Governments (COAG) Energy Council calling for a "National Agreement on Greenhouse Gas Emissions Reductions"[1], which itself flowed from the Paris agreement[2]. A declaration of climate emergency is considered by many to be an essential first step to counter persistent denial, for example the Alliance of World Scientists declaration with 11,000 signatories[3].

Edith Cowan University has always been a leader in ways that count. Not burdened by history or status, ECU has pioneered initiatives which are now mainstream, such as alternative entry pathways, LGBTI inclusivity and the smoke-free campus. We now have an opportunity to demonstrate our core value of rational inquiry and take real action on carbon emissions in line with scientific advice. ECU can be a leader in the tertiary sector, provide a role model on how to achieve change and attract students by showing that their future is part of our present.

Please accept the proposal made by ECU staff to declare a climate emergency and set a 2030 net zero emission target for ECU.

On behalf of the Climate Justice Group,

Dr Danielle Brady, Dr Sora Marin-Estrella, Dr Naomi Godden, Professor Pierre Horwitz, Dr Zoe Leviston, Dr Jonathan Marshall, Dr Marilyn Palmer

[1] Dr Hugh Finn, Curtin University Law School.
[2] Conference of the Parties, United Nations Framework Convention on Climate Change, Report of the Conference of the Parties on Its Twenty-First Sessions, Held in Paris from 30 November to 13 December 2015 – Addendum – Part Two: Action Taken by the Conference of the Parties at Its Twenty-First Session, Dec 1/CP.21, UN Doc FCCC/CP/2015/10/Add.1
[3] William J Ripple, Christopher Wolf, Thomas M Newsome, Phoebe Barnard, William R Moomaw, World Scientists' Warning of a Climate Emergency, *BioScience*, 70 (1), 8–12, https://doi.org/10.1093/biosci/biz088

Signatories in alphabetic order of surname

Ms Jennifer Alamdar, Digital & Campus Support Services SW

Ms Claudia Alessi, WAAPA ML

Ms Floeur Alder, WAAPA ML

Mr Casper Avenant, School of Science JO

Dr Sue Bailey, School of Arts and Humanities SW

Mr Mike Bandurski, School of Education SW

Mrs Claire Blankley, Research Services JO

Dr David Blake, School of Science JO

Ms Nadia Bordas, School of Science JO

Professor Kathy Boxall, School of Arts and Humanities SW

Associate Professor Mary Boyce, School of Science JO

Dr Danielle Brady, School of Arts and Humanities ML

Ms Shannon Burchert, School of Science JO

Ms Rebecca Burns, School of Arts and Humanities SW

Professor Mindy Blaise, School of Education ML

Ms Amy Cairns, Library Services Centre JO

Professor Trevor Cullen, School of Arts & Humanities ML

Dr Christine Cunningham, School of Education ML

Ms Susie Conte, WAAPA ML

Ms Zina Cordery, School of Education JO

Mr Ryan Costello, NTEU ECU Division

Dr Trudi Cooper, School of Arts and Humanities JO

Mr Rob Czarnik, School of Science JO

Associate Professor Justine Dandy, School of Arts and Humanities JO

Dr Melissa Danks, School of Science JO

Dr Julie Dare, School of Health & Medical Sciences JO

Ms Karen Dare, School of Arts and Humanities JO

Dr Rob Davies, School of Science JO

Professor Amanda Devine, School of Medical and Health Sciences JO

Professor Neil Drew, Kurongkurl Katitjin

Ms Michelle Duryea, Research Services JO

Dr Lydia Edwards, School of Arts and Humanities ML

Dr Jude Elund, School of Arts and Humanities ML

Dr Philip Everall, WAAPA ML

Mr Andrew Ewing, School of Arts and Humanities ML

Dr David Field, School of Science JO

Dr Neil Ferguson, Graduate Research School ML

Ms Georgina Ferreira, Business Growth & Development SW

Ms Tina Fleming, Centre for Learning & Teaching JO

Ms Anna Maria Frouws, School of Science JO

Dr Naomi Godden, School of Arts and Humanities SW

Dr Stephanie Godrich, School of Medical and Health Sciences SW

Mr John Gordon, Library Services SW

Dr Christina Gray, School of Education ML

Professor Lelia Green, School of Arts & Humanities ML

Professor Rowena Harper, Centre for Learning & Teaching JO

Dr Kay Hearn, School of Arts & Humanities ML

Associate Professor Cathy Henkel, School of Arts & Humanities ML

Dr Susan Hill, School of Education ML

Professor Cat Hope, WAAPA ML

Dr Anna Hopkins, School of Science JO

Dr Lekkie Hopkins, School of Arts and Humanities JO

Dr Lucy Hopkins, School of Arts and Humanities JO

Dr Luke Hopper, WAAPA ML

Professor Pierre Horwitz, School of Science JO

Mr Greg Pryor, School of Arts & Humanities ML

Ms Anna Hueppauff, School of Arts and Humanities ML

Professor Glenn Hyndes, School of Science JO

Ms Sally Hyslop, WAAPA ML

Dr Deborah Ireson, School of Nursing & Midwifery SW

Dr Stuart James, WAAPA ML

Ms Julia Jarel, WAAPA ML

Dr Nicola Kaye, School of Arts & Humanities ML

Associate Professor Annette Koenders, School of Science JO

Professor Geoffrey Lancaster, WAAPA ML

Professor Paul Lavery, School of Science JO

Ms Emily Lette, School of Science JO

Dr Zoe Leviston, School of Arts and Humanities JO

Ms Nina Levy,WAAPA ML

Ms Abigail Lewis, School of Health & Medical Sciences JO

Mr Andrew Lewis Smith, WAAPA ML

Katrina Liddiard, School of Health & Medical Sciences JO

Dr Susan Main, School of Education ML

Dr Sora Marin-Estrella, School of Science SW

Dr Jonathan Marshall, WAAPA ML

Mr Anton Mazandarani, WAAPA JO

Dr Donna Mazza, School of Arts and Humanities SW

Dr Maggie McAlinden, School of Education ML

Mr Michael McAuley, Centre for Learning & Teaching ML

Ms Roisin McCallum, School of Science JO

Ms Karen McDavitt, School of Arts and Humanities SW

Dr Paul McLaughlan, Library Services Centre ML

Associate Professor Kathryn McMahon, School of Science JO

Professor Pere Masque, School of Science JO

Dr Stuart Medley, School of Arts & Humanities ML

Dr Jane Merewether, School of Education ML

Dr Harriet Mills, School of Science JO

Marziya Mohammedali, Graduate Research School ML

Dr Shaun Molloy, School of Science SW

Professor Angus Morrison-Saunders, School of Science JO

Dr Renee Newman, WAAPA ML

Professor Rob Newton, School of Health & Medical Sciences JO

Dr Emma Nicoletti, Centre for Learning & Teaching JO

Ms Rowe Oakes, Research Services JO

Ms Marnie Orr,WAAPA ML

Ms Caitlyn O'Dea, School of Science JO

Dr Marilyn Palmer, School of Arts and Humanities SW

Ms Heather Pate, Centre for Learning & Teaching JO

Ms Rachel Pietracatella, School of Arts & Humanities ML

Dr Marcella Polain, School of Arts & Humanities ML

Dr Jo Pollitt, School of Education ML

Dr Brendan Ritchie, School of Arts & Humanities SW

Dr David Rhodes, School of Education SW

Ms Gloria Salgado Gispert, School of Science JO

Mr Christian Salinas, School of Science JO

Ms Nicola Sallery, Finance & Business Services JO

Mr Bruno Santarelli, School of Business and Law JO

Ms Sue Starcken, School of Arts & Humanities ML

Dr Simon Stevens, School of Arts and Humanities ML

Ms Nicole Stinton, WAAPA ML

Dr Lily Taylor, School of Education JO

Dr Paul Uhlmann, School of Arts & Humanities ML

Ms Tania Visosevic, School of Arts & Humanities ML

Ms Lisa Webb, Library Services Centre JO

Ms Chanelle Webster, School of Science JO

Mrs Sallyann Webster, Research Services JO

Mr Axel Werner, School of Science JO

Mr Andrew Westnidge, Student Administration JO

Mr Russell Tassicker, Research Services JO

Ms Jill Thompson-White, School of Education SW

Mr Michael Whaites, WAAPA ML

Professor Mel Ziman, School of Medical and Health Sciences JO

The following are de-identified comments received from signatories to this proposal

(at 26/3/2020)

- I am so proud to be an employee of this progressive, equitable and inclusive university. I am sure that collectively we can become an even more sustainable institution and help set the standard for the sector here in WA. We have everything to gain and nothing to lose by showing leadership on this issue.

- Someone has to lead on this. We see and sell ourselves as world ready, as forward-looking, as prepared and excited for the future. Let's live up to our image and step up before it's really too late.

- I fully support this proposal. As our university is ranked as world leaders in Ecology and Environmental Science we should be aiming to show leadership in reducing our emissions.

- I think this is of the utmost importance that ECU is a leader in this area as not only is it beneficial for us an organisation to do this but we have the ability to influence thousands of students on this issue as they progress through the years of study here at ECU. We will be the role models that they can look up to, to help to lead future generations in making the world a better place.

- I would be very proud to work for an organisation that took the lead.

- Yes please, I fully support this initiative. Plenty of space for solar panels on the roofs.

- I support the proposal for ECU to take responsibility and action for its own part in addressing climate change. I note that the ambition to be net zero by 2030 is not actually very ambitious. Many organisations with a far greater extent of emissions have already accomplished this target. To be a leader and set a good example, it would be great to see ECU seek to net positive in terms of emissions (i.e. to extract more CO2 from the atmosphere than it contributes) within this time frame.

- Given the recent spate of fires and the apparent denial or inertia by the current government, institutes like ECU should be leading by example. I therefore endorse this proposal fully.

- Great idea and fully supportive. I teach about climate change in my units. ECU must be a leader in this area.

- I am prepared to make any changes necessary for ECU to achieve zero emissions.

- I believe we need to aim to get to zero by 2030 if at all possible - not just by 2050.

- I believe we need to make active and visible commitments to show that ECU supports evidence-based policy on climate change and is willing to lead by example; taking action for the future of our students.

- I completely support and endorse the above proposal.

- I fully support this initiative and urge ECU management to lead by example here.

- I fully support this proposal. Very important for universities to lead thinking and action in the community.

- I support ECU becoming a leader in combating Climate Change through a declaration of a climate emergency and supporting zero carbon emissions at ECU by 2030.

- I think it is clear that as Greta Thunberg states, ""our house is on fire"" - literally and all of us urgently need to do something about it. Further, the proposed changes to the anti protest laws need to be addressed by all of us, the time for procrastination is over."Jail has no terror like the destruction of life on Earth"" - Bob Brown.

- I wholeheartedly support this.

- In addition to the many comments made, I would refer the VC and my colleagues to the wise words of my former supervisor Prof Joy Damousi on behalf of the Australian Academy of Humanities, which notes that now is a time for both reflection and action, for those across the disciplines to come together to advocate and lead in these times of crisis. De-carbonisation is an essential part of that

- It's hard to imagine a School at ECU that couldn't contribute to greater community awareness of this crisis. This seems a noble use of taxpayer dollars and external grants.

- Obviously, this is required in order to sustain the planet, environment and those living within it. However, it is also a very good marketing tool and one that many young, amd not so young people would be drawn to.

- Australians are desperate for leadership in this. I feel sure other universities will fall in behind us.

- Thank you for initiating this.

- My area of expertise is listening to young children's perspectives and I am keen to ensure that children and also the more-than-human world are included in conversations around climate emergency.

- Very keen to support and encourage ongoing discussions on how a net zero emissions target can be met. Maybe a third call to action could be for the VC to commission and resource a group of ECU experts to advise him on strategies and actions to achieve the net zero goal. All the very best with this ... happy (as a non expert) to assist in any way I can.

- We are in a climate emergency and must act as such.

- Would love to see this commitment. In the meantime it would also be great to have some guidance (and on campus promotion) on things we can do, as individuals in the workplace, that will genuinely have an impact. There are a lot of myths around, but we presumably have plenty of experts in this field who can provide us with useful daily strategies?

APPENDIX

Exact Qualtrics Survey Text

ECU internal use only: please do not post to social media.

On 2-3 December 2019, a workshop was held on ECU South West Campus on Wardandi Boodja, bringing together Noongar elders, community leaders, and ECU academics across multiple disciplines to share their ideas and opportunities for an aspirational and transformational agenda for research and action in the face of the climate crisis. One outcome of this meeting was the possibility of canvassing support for ECU declaring a climate emergency and committing to a 2030 emissions goal.

Since meeting in December, Australia has experienced an unprecedented bushfire emergency across multiple states. We must work to make 2020 the year in which the Australia commits to do what science tells us is necessary to reach carbon neutrality in 2050 and to limit global warming to no more than 1.5°C. The Vice-Chancellor has recently stated his support for "ensuring ECU is a sector leader in pursuing and promoting sustainability in every aspect of our operation".

We now ask for your support to call on the Vice Chancellor to:

1. **Declare a Climate Emergency**
2. **Set a 2030 net zero emissions target for ECU.**

These commitments will show that ECU supports evidence-based policy on climate change and is willing to lead by example; taking action for the future of our students.

If you support this proposal, please add your name with any comments or suggestions.

The supporters list on the next page is being updated alphabetically as names are received.

This list will be used only within ECU.

ECU Staff member name
<text entry>

name@ecu.edu.au
<text entry>

Any comments, qualifications or suggestions.
<text entry>

Sustainable Procurement Guidelines

1. DEFINITION

Sustainable procurement has been defined by the UK Government Sustainable Procurement Taskforce as "…a process whereby organisations meet their needs for goods, works and utilities in a way that achieves value for money on a whole life basis in terms of generating benefits not only to the organisation, but also to society and the economy, whilst minimising damage to the environment."

(Procuring the Future, Sustainable Procurement Task Force, 2006).

2. INTRODUCTION

Incorporating sustainability into the decision making process when purchasing means that the product or service itself is sustainable.

Choosing suppliers who can provide products which are Earth Friendly; have Green Star rating; GECA (Good Environmental Choice Australia) certification; or are accredited with ISO 14001: Environment Management Systems (or environmental management practices) is preferable.

3. ENVIRONMENTALLY FRIENDLY PRODUCTS

Purchasing environmentally friendly products such as those which have been recycled, remanufactured, have low toxicity, save energy and reduce waste and water use contributes to the continuing viability of any organisation.

3.1 Recycled

Always consider whether a product is available which consists of recycled content. This information would be specified by the manufacturer.

Examples of where recycled content can be considered include:

- Recycled paper (or paper sourced from renewable forests or made from sugar cane);
- Copiers and printers that can be used with recycled content products such as paper and toner cartridges;
- Compost, mulch and other organics including recycled biosolid products;
- Cement and asphalt concrete containing glass cullet, recycled fibre, plastic, tyre rubber;
- Re-crushed cement concrete aggregate and asphalt;
- Recycled content for construction, building and maintenance products such as plastic lumber, carpet, tiles, insulation;
- Recycled plastic outdoor wood substitutes such as benches, fencing, signs and posts; and
- Recycled content for transportation products including signs, cones, parking-stops, delineators, and barricades.

3.2 Remanufactured / Re-refined

Some products are remanufactured or re-fined. Examples of these types of products are:

- Re-refined lubrication, hydraulic oils, and antifreeze; and
- Remanufactured laser printer toner cartridges.

3.3 Low Toxicity

The use of toxics and the generation of pollution should be minimised to reduce risks to health, safety, and the environment by:

- Purchasing toner cartridges which use vegetable based inks;
- Refraining from purchasing cleaning or disinfecting products containing carcinogens, mutagens, or teratogens;
- Refraining from purchasing chlorofluorocarbon-containing refrigerants, solvents and similar products;

- Purchasing readily biodegradable surfactants and detergents that do not contain phosphates;
- Maintaining buildings and landscapes, and managing pest problems through the application of prevention techniques and physical, mechanical and biological controls;
- Purchasing products with the lowest amount of volatile organic compounds (VOCs), highest recycled content, and low or no formaldehyde in materials such as paint, carpeting, adhesives, furniture and casework;
- Reducing or eliminating the use of products that contribute to the formation of dioxins and furans, including, but not limited to:
  - Paper, paper products, and bathroom paper products that are bleached or processed with chlorine or chlorine derivatives;
  - Products that use polyvinyl chloride (PVC), including, but not limited to, office binders, furniture, flooring, and medical supplies;
  - Products and equipment with lead or mercury. For products containing lead or mercury, give preference to those with lower quantities of these metals and to suppliers with established lead and mercury recovery programs; and
  - Diesel powered vehicles. Switch to vehicles that use compressed natural gas, biobased fuels, hybrids, electric batteries and fuel cells.

3.4 Energy and Water Savings

Recognising that the generation of electricity is a major contributor to air pollution and global warming issues, and that clean water is a finite resource, the University values products that minimise the use of these valuable resources such as:

- Energy-efficient equipment with the most up-to-date energy efficiency functions, including, but not limited to, high-efficiency heating and cooling systems;
- Efficient lighting with energy-efficient equipment;
- Products for which the Energy Star certification is available and which meet Energy Star certification, when practicable. When Energy Star labels are not available, choose energy-efficient products that are in the upper 25% of energy efficiency; and
- Water-saving products.

3.5 Waste Reduction

The University has a contracted waste management supplier to assist with strategies to reduce waste to landfill, reduce recyclables to landfill and increase the volume of waste recycled. Choosing suppliers who deliver products with minimal packaging or suppliers who remove packaging and recycle/re-use the packaging in a responsible manner are to be favoured.

Suppliers who have a commitment to waste reduction can obtain advice from The Packaging Stewardship Forum (PSF) who delivers programs focused on increasing recycling and reducing litter arising from packaging products. https://www.afgc.org.au/.

4. SOCIALLY RESPONSIBLE / ETHICAL PURCHASING

In demonstrating a commitment to sustainability and seeking to ensure safe and healthy workplaces for the people who make products for the University, staff members are to strive to purchase products that meet International Labour Organization (ILO) manufacturing standards and Fair Trade Labelling standards.

5. CONTACT

For further advice on Sustainable Procurement please contact Strategic Procurement on procurement@ecu.edu.au for clarification of product information.

REPORT

For: **University Executive Meeting, Date**

Subject: **Aboriginal and Torres Strait Islander Supplier Engagement Strategy**

Prepared by: Finance & Business Services Centre

Date:

Purpose
To seek endorsement from the University Executive for an alternative strategy for Aboriginal and Torres Strait Islander supplier engagement.

Background
Edith Cowan University's vision for reconciliation is: *to provide an environment that values Aboriginal and/or Torres Strait Islander peoples and knowledges, and which contributes to a society in which Aboriginal and/or Torres Strait Islander peoples have equal and equitable opportunities as other Australians and which respects diversity, equality and equity, and the contributions of all its citizens*.

ECU's fourth Reconciliation Action Plan (RAP), for 2018-2021, was developed through the former RAP Working Group and *Reconciliation Australia*, in consultation with stakeholders. ECU's RAP objectives are guided by its Strategic Plan 2017 – 2021: World Ready.

ECU is comitted to working in partnership with Aboriginal and/or Torres Strait Islander communities towards reconciliation. 'Theme One – Leadership and governance' within ECU's RAP aims to manage and govern the University to drive change through reconciliation and establish ECU as an exemplar of good practice and institutional integrity in reconcilation for our communities and partners. The current RAP targets ECU with endeavouring to engage directly with Aboriginal and/or Torres Strait Islander Suppliers as articulated at RAP Item 6 below.

Action	Deliverable Target	Timeline	Responsibility
6. Increase the representation of Aboriginal and/or Torres Strait Islander suppliers on ECU's procurement database.	a) Achieve the target 2.5% annualised growth in for spend with Aboriginal and/or Torres Strait Islander suppliers on ECU's Finance and Business Services procurement spend dashboard.	Each Year	D FBSC
	b) Investigate Supply Nation's services and consider their potential value add to ECU's supplier diversity strategies	Dec 2019	VP (CS) D FBSC
	c) Develop policy and guidance notes on the identification of, and engagement with, Aboriginal and/or Torres Strait Islander business owners for procurement of goods and services	Sep 2019	VP (CS) D FBSC
	d) At least one new contract in place with an Aboriginal and/or Torres Strait Islander provider where value for money has been demonstrated	Dec 2019	VP (CS) D FBSC

Proposal

In reality, the target at Item 6 (a), has been difficult to achieve. ECU has a broad strategy of outsourcing the vast majority of our integrated facility services and the related consumables. This limits ECU's ability to engage the typical Aboriginal and Torres Strait Islander suppliers that are small to medium enterprise size.

In light of these challenges there is a need to develop an alternative strategy to engage our current supply base to report on their spend with Aboriginal and Torres Strait Islander suppliers and employment targets. We are therefore proposing the following alternative strategy:

- Require prospective suppliers to provide a statement about their Reconciliation Action Plan and how this would be applied to their contract with ECU in the tendering process.
  - This would need to be included in contracts and managed by the Contract Owners and the strategy incorporated into the Contract Management Plans to ensure that the desired outcomes are met.

- Include Aboriginal Spend targets and Aboriginal Employment targets with our current strategic suppliers.
  - Our current strategic suppliers (MSS Security, ISS Facility Services, Brookfield Group Integrated Service) all have a strong track record in delivering outcomes to other clients in this regard.

- Look at products that we can purchase through our distribution network such as Complete Office Supplies Muru Office Wares range.
  - Many Aboriginal businesses have stated this is their preferred method of engagement as they gain access to a larger customer base with wider distribution, marketing and payment terms than they would be able to manage on their own.

Employing these strategies would allow ECU to report on direct and indirect spend, and would allow ECU to achieve more meaningful outcomes than the current plan and target.

Consultation

The following ECU staff have been consulted in the development of an alternative strategy:

- Duane Redden, Manager Strategic Sourcing and Contracts
- Procurement Advisory Group
- Tony Wilson, Manager Strategic Procurement and Business Services
- Bradley J Francis, Chief Financial Officer
- Scott Henderson, Vice-President (Corporate Services)

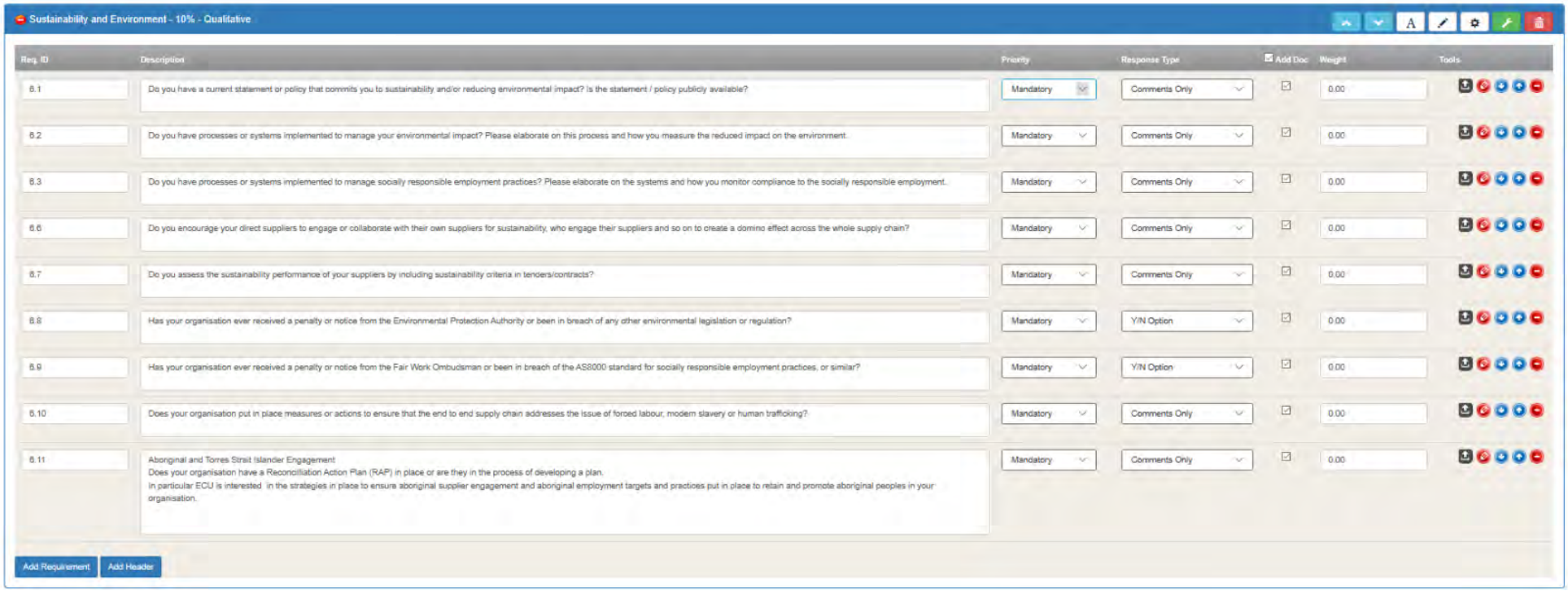
Recommendation

That the University Executive endorse the proposed new approach to Aboriginal and Torres Strait Islander supplier engagement and request the University Executive provide a statement of executive support which will allow us to engage with the wider business to implement these strategies.

Braden Hill, Pro-Vice-Chancellor, Equity and Indigenous

Photos - Appendix C6 Sustainability Questionairre for tenderers.png

See all photos | Add to | Edit & Create | Share



Sustainability and Environment – 10% - Qualitative

Req. ID	Description	Priority	Response Type	Add Doc	Weight	Tools
6.1	Do you have a current statement or policy that commits you to sustainability and/or reducing environmental impact? Is the statement / policy publicly available?	Mandatory	Comments Only	☑	0.00	
6.2	Do you have processes or systems implemented to manage your environmental impact? Please elaborate on this process and how you measure the reduced impact on the environment.	Mandatory	Comments Only	☑	0.00	
6.3	Do you have processes or systems implemented to manage socially responsible employment practices? Please elaborate on the systems and how you monitor compliance to the socially responsible employment.	Mandatory	Comments Only	☑	0.00	
6.6	Do you encourage your direct suppliers to engage or collaborate with their own suppliers for sustainability, who engage their suppliers and so on to create a domino effect across the whole supply chain?	Mandatory	Comments Only	☑	0.00	
6.7	Do you assess the sustainability performance of your suppliers by including sustainability criteria in tenders/contracts?	Mandatory	Comments Only	☑	0.00	
6.8	Has your organisation ever received a penalty or notice from the Environmental Protection Authority or been in breach of any other environmental legislation or regulation?	Mandatory	Y/N Option	☑	0.00	
6.9	Has your organisation ever received a penalty or notice from the Fair Work Ombudsman or been in breach of the AS8000 standard for socially responsible employment practices, or similar?	Mandatory	Y/N Option	☑	0.00	
6.10	Does your organisation put in place measures or actions to ensure that the end to end supply chain addresses the issue of forced labour, modern slavery or human trafficking?	Mandatory	Comments Only	☑	0.00	
6.11	Aboriginal and Torres Strait Islander Engagement Does your organisation have a Reconciliation Action Plan (RAP) in place or are they in the process of developing a plan. In particular ECU is interested in the strategies in place to ensure aboriginal supplier engagement and aboriginal employment targets and practices put in place to retain and promote aboriginal peoples in your organisation.	Mandatory	Comments Only	☑	0.00	

Add Requirement | Add Header

Edith Cowan University

Sustainability at ECU

Contents

Sustainability at ECU

Sustainability is key element of how ECU conducts all aspects of its business. There is a high degree of focus throughout the campus community on developing and implementing strategies which improve the University's overall environmental footprint.

The following paper provides an overview of ECU's strategic approach to sustainability along with examples of enduring programs which put the broader vision into very day practice. Whilst there is a good deal of empirical data to support ECU's environmental credentials, the University remains vigilant of the need to continue to drive for continued improvement. To this end the paper, will also outline our future plans for new initiatives.

ECU Strategic Plan

One of ECU's strategic goals is to ensure organisational sustainability with infrastructure that supports our broader objectives. In this regard, one of ECU's goals is to reduce its carbon footprint through actions that include decreasing waste to landfill, water usage and energy consumption. We also seek to align the University's goals with Government policy targets.

Sustainability Policy

ECU's approach to sustainability is further formalised by the existence of the Sustainability Policy. The policy references the main principles which underpin the policy along with the organisation's data collection and reporting commitments. The policy can be found at http://policysearch.ecu.edu.au/WebDrawer.PolicySearch/Record?q=recAnyWord%3Asustainability&sortBy=

Environmental Certification

The Facilities and Services Centre at ECU is certified to ISO14001, Environmental Management Systems:

Figure 1:


CERTIFICATE OF REGISTRATION

Edith Cowan University

ISO 14001:2015

ENVIRONMENTAL MANAGEMENT SYSTEMS

IAF

COMPASS

It operates the following environmental programs:

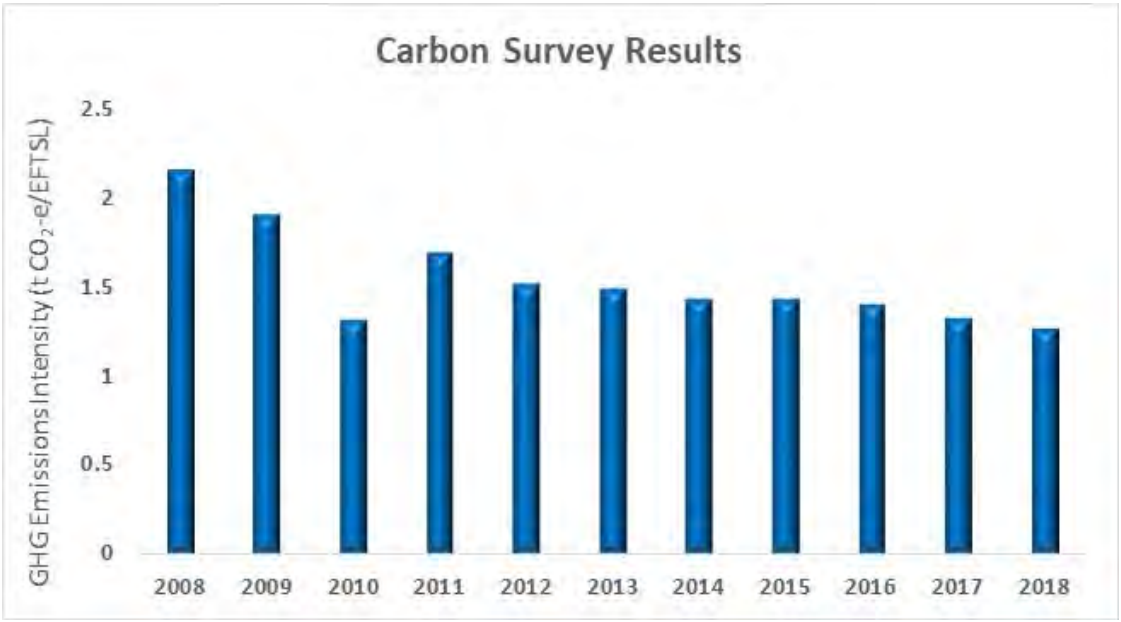
- Waste Environmental Improvement Program
- Water Environmental Improvement Program
- Energy Environmental Improvement Program

A Manager is assigned responsibility for each program and a group meets regularly to drive continuous improvement in each area.

Reducing our Carbon Footprint

ECU has been measuring its Carbon Footprint since 2008, see chart below, and conducts an annual carbon survey.

Figure2

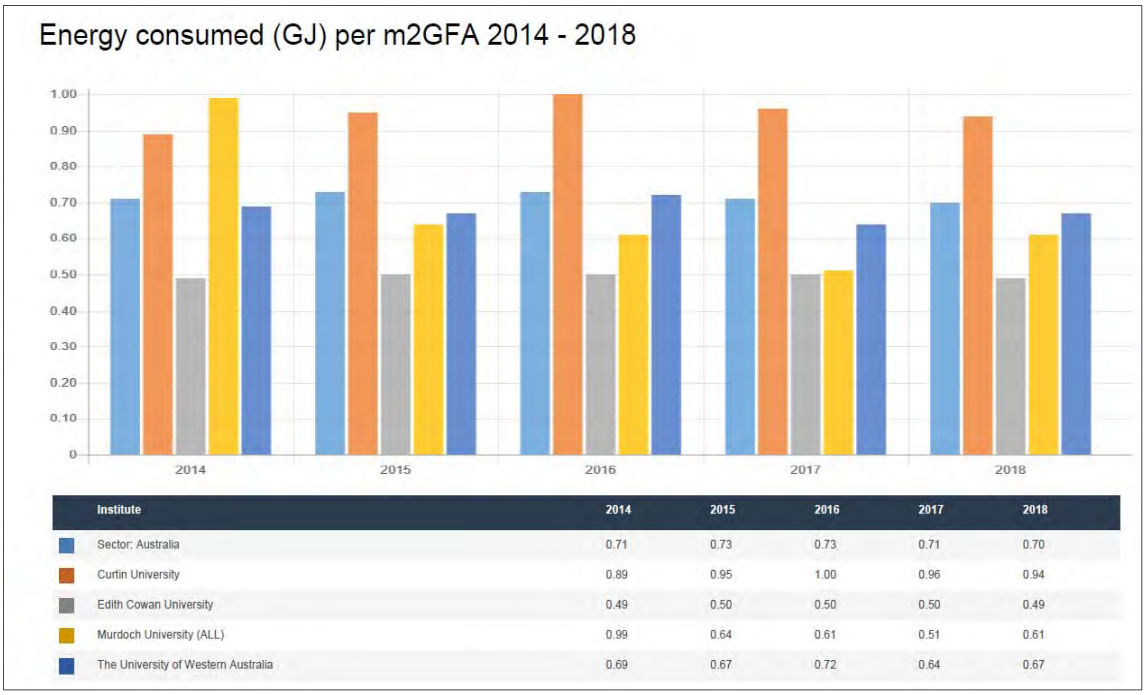


The reduction in carbon (Scope 1 and Scope 2 in National Greenhouse Energy Reporting) of over 41% is a result of ECU demolishing old inefficient buildings on the previous Churchlands Campus and replacing these with modern and energy efficient buildings on the Joondalup and Mount Lawley campuses.

Energy Consumption

ECU is amongst the most efficient consumers of energy in the Australian University Sector. Only four other institutions reported better performance levels in the 2018 TEFMA Benchmarking report. ECU's combination of efficient buildings coupled with advanced BMS technology helps to drive this level of sustained performance.

Figure 3



Institute	2014	2015	2016	2017	2018
Sector: Australia	0.71	0.73	0.73	0.71	0.70
Curtin University	0.89	0.95	1.00	0.96	0.94
Edith Cowan University	0.49	0.50	0.50	0.50	0.49
Murdoch University (ALL)	0.99	0.64	0.61	0.51	0.61
The University of Western Australia	0.69	0.67	0.72	0.64	0.67

Waste Output

Over the last ten years ECU has been at the forefront of a mission within the wider community to improve its levels of divergence of waste to landfill. ECU has implemented a number of key strategies in that time including (a) installation of uniform recycling bins within buildings and across the campuses, (b) increased waste recovery streams including Organic, Hazardous, oils, Batteries Green and Electronic Waste, (c) creating of a waste recycling station and (d) partnering with progressive commercial organisation who have invested heavily in technologies such as Cleanaway who commissioned Australia's largest Materials Recovery Facility (MRF) in 2018.

The below listed chart is an extract from ECU's monthly waste report. The data reveals that divergence rate of 51% across all campuses for the 9 months to September 2019. It is also important to note that the University now has 14 separate recycling streams.

Figure 4

Weight collected by Waste stream

Reporting Month	(All)
site_city	(All)

	Weight (tonnes)
E-Waste	3.84
General Waste	185.74
Comingle Waste	81.45
Green Waste	5.08
Confidential Waste	4.34
Fluoro Tubes	0.67
Mixed Builders	10.80
Toner Cartridge	0.20
Metal	0.42
Liquid Waste	64.55
Cardboard	12.11
Organics	2.60
Batteries	0.44
Light Gauge Steel	4.90
Cooking Oil	0.53
Grand Total	**377.68**

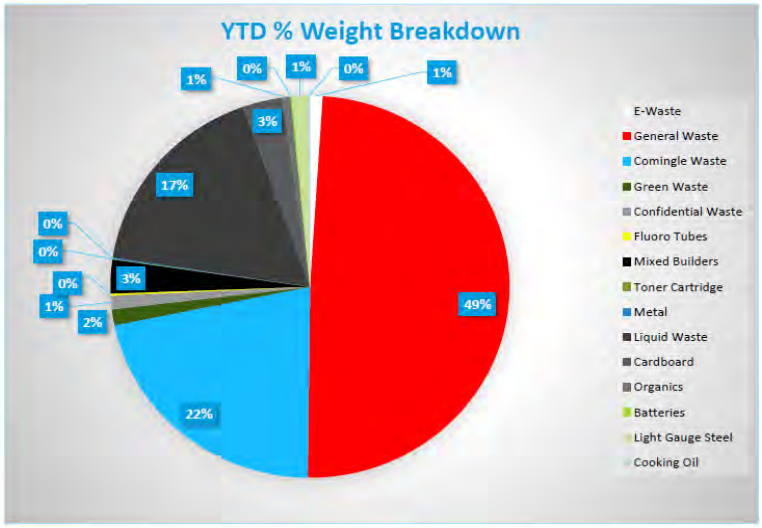
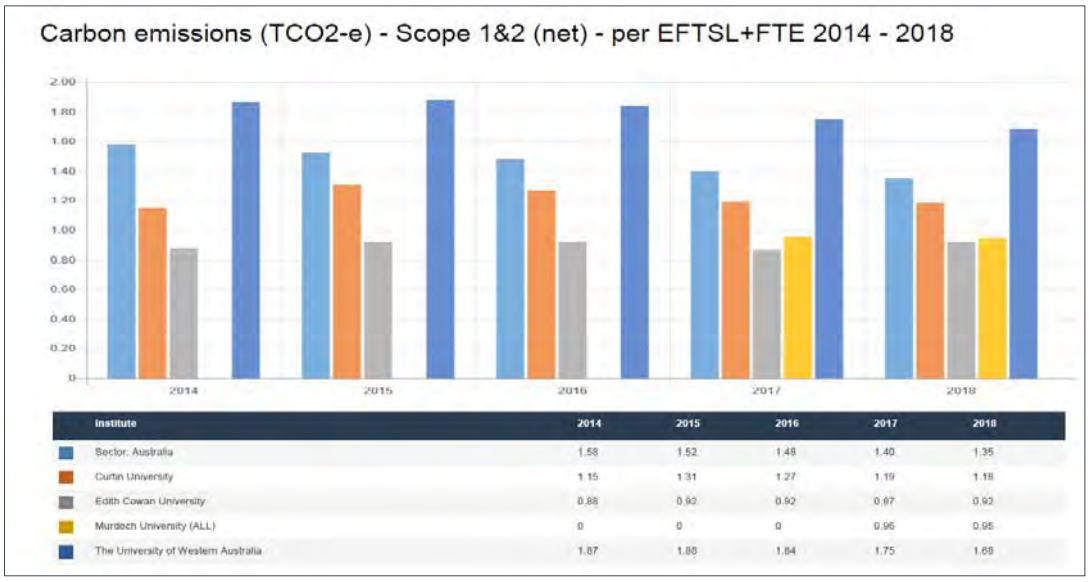


Figure 5 is an extract from the 2018 TEFMA benchmarking survey. This chart measures ECU's scope 1&2 emissions outputs as function of combined EFTSL and FTE populations and contrasts performance levels against other WA Universities and the Australian University as a whole. ECU's output levels are 30% lower than the sector average and a more detailed review of the granular data reveals that only 3 other Universities returned better results in 2018.

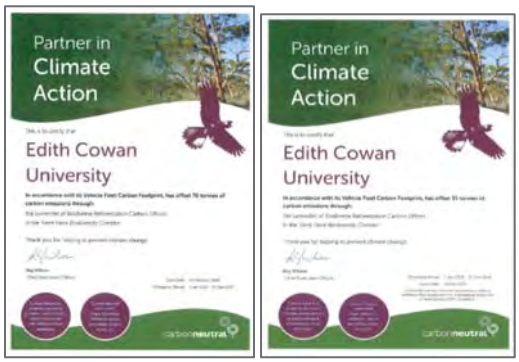
Figure 5



Institute	2014	2015	2016	2017	2018
Sector: Australia	1.58	1.52	1.48	1.40	1.35
Curtin University	1.15	1.31	1.27	1.19	1.18
Edith Cowan University	0.88	0.92	0.92	0.97	0.92
Murdoch University (ALL)	0	0	0	0.96	0.95
The University of Western Australia	1.87	1.88	1.84	1.75	1.68

In addition, ECU offset 91 tonnes of carbon emissions in 2018 through the surrender of Biodiverse Reforestation Carbon Offsets in the Yarra Yarra Biodiversity Corridor

Figure 6



Targeted Reductions in Plastics from ECU Campuses

In 2018, ECU's Vice-Chancellor announced that ECU was restricting the use of single use bottled water from its campuses. By the commencement of Quarter 2, 2019, this initiative was fully operational via the launch of three separate strategies:

1. Through consultation with café and vending operators, plastic water bottles were removed from sale across the three campuses. Plastic bottles were replaced with glass and biodegradable cardboard cartons.
2. Installation and upgrade of 30 filtered water refilling stations across all campuses.
3. The provision of free reusable water bottles at ECU events such as orientation and the sale of subsidised reusable PBA free bottles at most cafes.

Each of the refill stations is equipped with flow meters, and based on data collected at the end of September, it is estimated that 215,000 375ml bottles will have been removed from the environment in during the 5 months this initiative has been running. Based on current volumes it is estimated that the ongoing reduction level will be in the order of 400, 000 bottles per annum.

In a further effort to combat the level of plastic being consumed, all Café outlets have made significant progress in moving towards biodegradable packaging, plates cutlery and straws etc. These same sustainable practices are also incorporated in all ECU corporate events.

Down Stream Waste Management

Whilst ECU actively drives initiatives to reduce our environmental footprint, we have also been proactive in engaging with our recycling partners do determine where recycled material ends up after it leaves our campuses. Figure 7 provides a snapshot of where how recyclable materials are used when they leave the Cleanaway MRF.

Figure 7

Transport

ECU provides students and staff with transport options for University or course-related business.

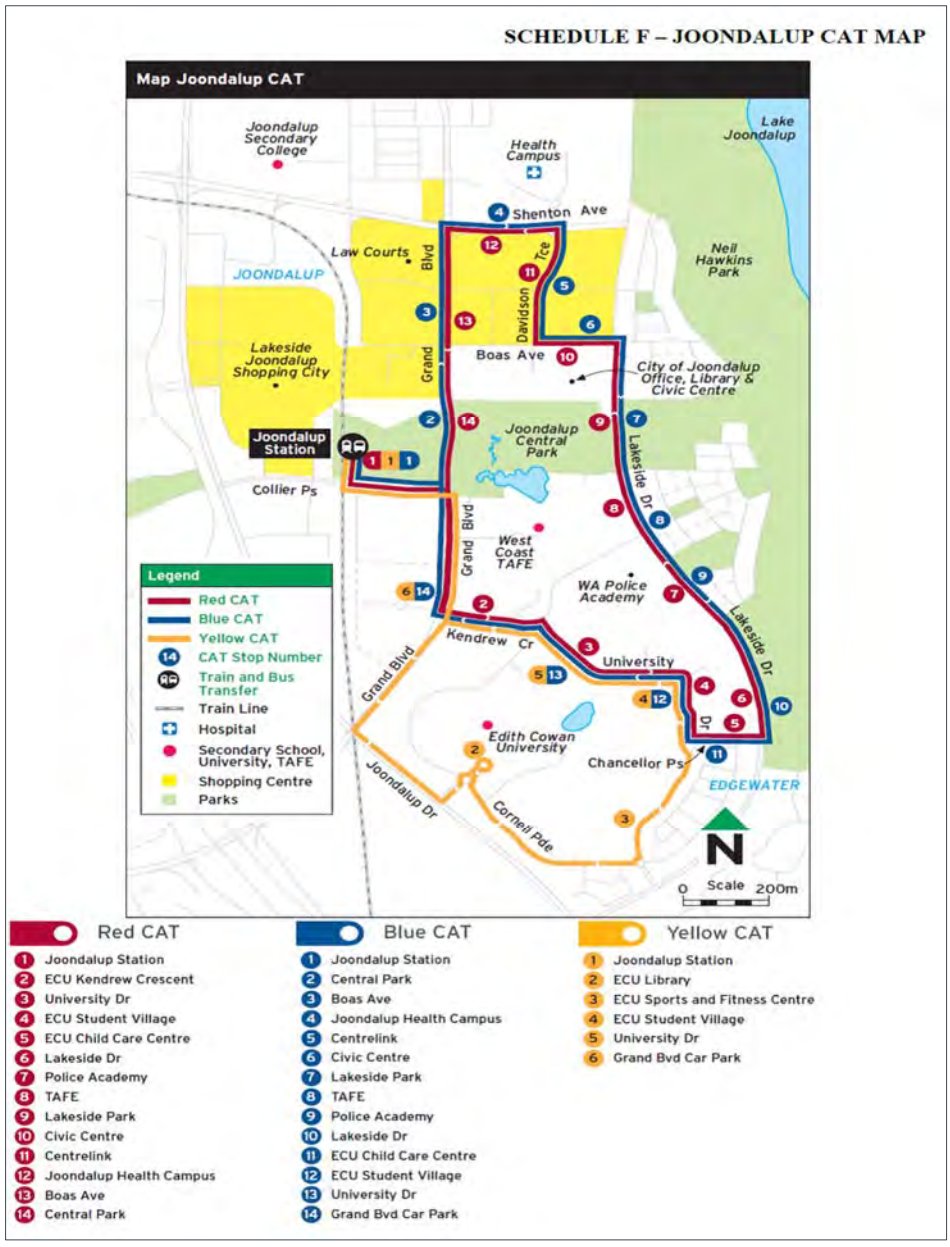
Pool vehicles are available, with all fleet carbon emissions being offset. In addition, ECU makes available and strongly encourages the use of Smartrider cards as an alternative inter-campus travel option.

In line with the University commitment to reduce our environmental impact, ECU fleet runs hybrid, smaller and more fuel efficient vehicles including a fully electric Nissan Leaf.

The Carbon Neutral Report released in February 2019 for the period January - December 2018 show the emissions from the direct burning of fuel in fleet vehicles reduced from 197.08 t CO2-e in 2008 to 88.88 t CO2-e in 2018 (-55%).

Public transport is a quick and convenient option for travelling to the University. TransPerth run a free CAT bus service from ECU Joondalup campus to the Joondalup railway station. ECU makes a financial contribution towards this service.

Figure 8 Joondalup CAT Bus Routes



Urbi Bikes

Urbi is a bike sharing service with stations located on the Joondalup Campus and around the Joondalup CBD.
Figure 9

Student Car Share

Car Share is a convenient and simple car hire system targeted at students. It operates from central pick-up, drop-off locations. The vehicles are available to use within a 300km radius when not booked, students just select the required time block and lock it in. It is a great asset to utilise in a situation where students need a vehicle short-term, saving them the hassle of per-day rental, worrying about their own transport and even parking on a regular basis where that is difficult.

Live Environmental Data

ECU uses an online tool Greensense View to monitor water, energy usage and water consumption. This environmental data monitoring system is updated every three minutes to enable ECU to review live data which assists to:

- produce efficient environmental reports to support our Environmental Management System;
- educate and inform staff and students of environmental impacts; and
- save money.

Sustainable Building Design

The ECU Planning and Design Guidelines provides guidance to designers in respect to Ecological Sustainable Design ("ESD"). ESD means to design buildings with longevity and minimal impact on the existing biodiversity and there are three key ways to achieve this:

- Compliance with the six environmental performance indicators
- Incorporating Green Star building design features to a minimum standard of 4 stars with the target of reaching 5 stars. Please note ECU does not apply for Green Star accreditation certificates but does aim to incorporate green star design features into its building design.
- Meeting the requirements for design documentation and review according to the process

This document provides a step-by-step guide which will allow the design to be reviewed prior to proceeding to the next stage of design development. However this section is not a complete guide to the sustainable features to be included in building design and for a complete understanding of sustainable building features this section must be read in conjunction with other sections of the Guidelines.

This document is a guide to the various green building approaches and technologies available to designers. There are many guidelines and case studies, and much literature on this subject, and designers are expected to be aware of best practice and able to apply it to ECU projects.

Benchmarking

ECU participates in the annual Tertiary Education Facilities Management Association (TEFMA) benchmarking exercise where the University compares its services, processes and outcomes to other Australian universities. The benchmarking exercise considers the following 12 factors:

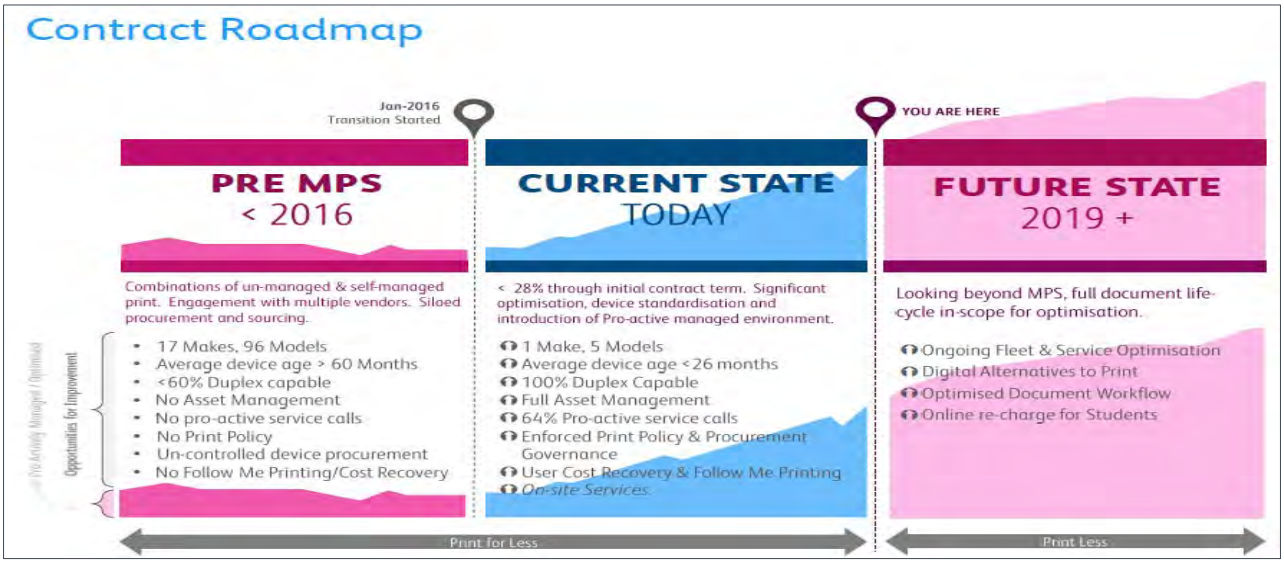
1. Are facilities efficiently designed – UFA/GFA (Useable Floor Area/Gross Floor Area)?
2. Do facilities meet demand – GFA/EFTSL (Gross Floor Area/Equivalent Full Time Student Load)?
3. Are campuses secure – Total security costs per EFTSL and GFA?
4. Are campuses clean – Total cleaning cost per GFA?
5. Is there minimal waste sent to landfill – waste per EFTSL, FTE and recyclables?
6. Carbon emissions per GFA?
7. Do the campuses use minimal energy – cost per GFA and consumption per GFA?
8. Maintenance cost – as a % of asset replacement value and cost per GFA?
9. Building Operating costs per GFA?
10. Do the campuses use minimal water – Water cost per GFA, consumption per EFTSL and consumption per hectare?
11. Are facilities well maintained – cost of backlog maintenance?
12. Are campus grounds well maintained – Cost of grounds/ha?

ECU is a sector leader in terms of carbon emissions, energy cost/consumption and waste output.

Printing and Copying

ECU has embedded enhanced printing and copying technologies across all campuses. Figures 10 & 11 outline the benefits of this new technology and highlight the operational and environmental gains that have been delivered. It isn't possible to accurately quantify what copying / print volume savings have been achieved as we didn't have good base line data at the commencement of the project. The printer / copier fleet has been reduced by 35% (120 devices) and the model count streamlined from 96 models to 5. Inbuilt capabilities such as B&W default settings, follow me print, and automatic print cancelling after 12 hours have reduced the environmental impact of excess print practices.

Figure 10



The Paper-Cut technology within the print environment automatically cancels redundant jobs, which remain unprinted after 12 hours. This technology has saved over 1.7 million sheets of paper in the last 12 months and delivering a saving of $320K. We will shortly reduce that cancellation window from 12 to 4 hours.

Figure11 – Unreleased print jobs

Unreleased jobs paper saving - summary

For the period of Sep 30, 2018 to Oct 1, 2019.

Trees Saved	*The amount of trees that have would have been consumed to make paper.*
CO2 Saved	*The greenhouse gases that would been released in the production of the paper.*
Equivalent Bulb Hours	*The manufacturing energy saved from not producing paper represented as the energy consumed by a standard light bulb in hours.*

Sheets:	1,712,076
Total Printed Pages:	2,354,347
Color Pages:	279,367
Grayscale Pages:	2,074,980
Value Saved:	$320,558.93
Jobs:	123,524
Trees Saved:	21.27 trees
CO2 Saved:	7,704.3 kg
Equivalent Bulb Hours:	485,088.2 hours

Food Recovery Networks

Several of ECU's café operators are actively engaged in contributing to food recovery / redistribution programs. The operators of Café 6, Cafe23 and Café 10 have been collaborating with Ozharvest for several years, by donating excess food. Another exciting tri-party trial is currently underway on the Joondalup campus. ECU researcher Therese O'Sullivan is presently trialling an app which will in time connect food outlets with shelters and other community groups. Bermuda café and the ECU Student Guild are presently assisting the *Refood* trial in a test environment within the University.

Figure 11: Bermuda Café makes the first food donation to the Student Guild in the Refood trial.

Radiation, Biosafety and Hazardous Substances

ECU has established a committee that provides advice and assistance to the University on applying legislation, policy and guidelines that govern radiation, biosafety and hazardous substances. The Radiation, Biosafety and Hazardous Substances Committee (RBHSC) is inclusive of the Institutional Biosafety Committee requirement.

The committee is made up of representatives from Schools and Service Centre's including specialists from a variety of disciplines such as occupational health and safety and external persons.

The process of disposing of hazardous waste has recently been transferred to FSC and will be managed under the central ISS waste contract. This will ensure a more consistent approach to the treatment of this type of waste.

ChemAlert

The ChemAlert system is used to assist ECU in managing chemicals including hazardous substances in the workplace. For Schools/Service Centres with hazardous substances ChemAlert Administrators are available to assist with queries.

School of Engineering

The School of Engineering contributes to ECUs overall sustainability agenda through (1) its teaching programs, (2) research activities and (3) implementation of new technologies into the work place.

1. The Engineering curriculum has three programs with a high degree of focus on sustainability:
   i. Bachelor of Engineering (Civil and Environmental) Honours
   ii. Bachelor of Engineering (Electrical & Renewable Energy) Honours
   iii. Master of Engineering (Electrical & Renewable Energy)

2. There are a significant number of research activities underway within the school with a significant emphasis on sustainability. Examples include:
   i. Renewable energy and smart energy systems
   ii. Environmental monitoring technologies
   iii. Water and wastewater management
   iv. Recycling waste as building materials and for the enhancement of foundations
   v. Environmental catalysis for clean production of hydrogen and hydrocarbons
   vi. Materials and processes for energy efficient reverse osmosis

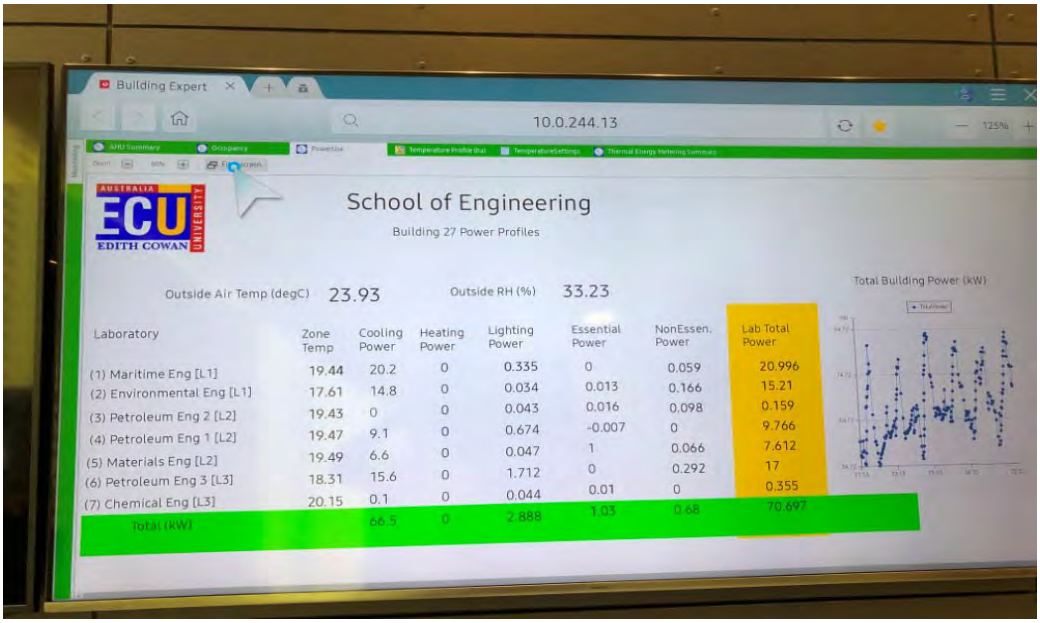
Figure 12 : Research Assistant Amro Qandauo, displays a piece of surveillance technology, which is assisting Water Corp. to detect unauthorised access to water catchment facilities in WA. Maintaining secure and contaminant free water supply is a significant contribution by ECU to the broader environment and WA communities.

Figure 13 depicts Associate Dean (Research) Mehdi Haji Khiadani with a porotype piece of equipment developed by ECU researchers, which uses low grade waste heat to convert contaminated water in to clean filtered water.

Figure 13: Another example of ECU developed technology which has the potential to generate significant environmental gains.

3. The built environment within the Engineering Precinct provides a working platform for students to experiment with new technologies in a real life context. Smart energy labs in B27A allow students to work with a variety of energy sources and energy storage devices to power the building, while variable Building Management Systems (BMS) enable Engineering staff and students to set the parameters in B27 to achieve different performance outcomes.

Figure 14: Remote Building Management Systems provide real time energy consumption data



School of Business and Law

The School of Business and Law (SBL) became an Advanced Signatory to the *Principles for Responsible Management Education* (PRME) in 2019. Founded by the former United Nations Secretary-General Ban Ki-Moon in 2007, PRME is essentially a movement by leading business schools worldwide to implement the six PRME principles as a mechanism to achieve the United Nations Sustainable Development Goals (SDGs). The six principles of PRME are designed to educate students on the importance of becoming responsible leaders who have a sense of accountability to others and are capable of balancing the demands of business with economic, social and environmental sustainability. School of Business and Law ensures achieving this through embedding the principles of sustainability, ethics and responsible management across the School's curriculum and courses, research, and operations.

Figure 15: The 17 UN Sustainable Development Goals

In addition to the explicit commitment to sustainability by SBL leadership, School of Business and Law has used a bottom-up process for integrating sustainability and ethics in its teaching and learning, research and operations through forming a PRME and Sustainability working group. The team is led by Dr. Mehran Nejati (appointed as the Director of PRME and Sustainability at SBL) and has representatives from various stakeholders and disciplines including students and professional staff.

The following shows a selection of teaching, research, and operation-related activities at the School of Business and Law in support of sustainability and SDGs:

Guest Lecture on social inclusion and diversity, and their role in creating sustainable organisations: The lecture was presented by Paul Fleay (Chief Executive Officer of Australian Inclusion Group) and included examples of what works and what doesn't in practicing inclusiveness and diversity.

Category: Teaching & Leaning

Supported SDGs:

Figure 16: Paul Fleay (CEO of presenting to students on social inclusion and diversity

Urban Pantry Initiative:
Urban Pantries (or Street/Free Food Pantries) are small and open structures, filled with donated food and other household items, and are designed to assist those in need within the neighbourhood. The concept behind these pantries are "take what you need, give what you can" - allowing those with a need to give to be able to donate and those with a need for food, to be able to be food secure. A donation box has been located in the SBL staffroom and staff are encouraged to contribute to this good cause.

Category: Operations

Supported SDGs:

Figure 17: Items donated by SBL staff to Urban Pantry in October 2019

GIVE Initiative:
In collaboration with SCR Group, SBL started this initiative to encourage staff to give their unwanted items to people across the world who need them. The Give Initiative aims to promote more responsible consumerism and avoid having unwanted items end up in landfills.

Category: Operations

Supported SDGs:

Figure 18: Best Paper Award by Associate Professor Hadrian Geri Djajadikerta and Dr Tricia Ong at the 2019 Accounting & Finance Association of Australia and New Zealand (AFAANZ) Conference for their paper on "Impact of Company Size and Financial Performance on CSR Disclosure and Performance: Using an Enhanced GRI-based Measuring Tool"

Category: Research
Supported SDGs:

Women in Technology WA Tech [+] 20 Award Winner 2019: Dr Helen Cripps from the School of Business and Law was awarded by the Women in Technology WA Inc. (WiTWA) for being a role model in technology and diversity.

Category: Research / Teaching & Learning

Supported SDGs:

Figure 19

Figure 20: Dr. Mehran Nejati (Director of PRME and Sustainability at the ECU School of Business and Law) with students from the Managing for Sustainability Unit who recently took part in the ACT4SDGs global challenge to identify ways in which their University could further reduce its carbon footprint.

Future Sustainability Initiatives at ECU

Printing and Copying

1. Fuji Xerox will soon install *Pop-up Warnings* when users attempt to print a document >100 pages. The warning will alert users to the cost of printing the material and question whether they really need a hard copy.
2. The time frame in which jobs will automatically be cancelled, will soon be reduced from 12 hours to 4 in order to further save on redundant printing.

Waste Management

1. A funding application has been lodged with the Department of Water and Environment in support of the following three initiatives:
    a. Creation of a Waste Compound similar to the existing Joondalup campus facility at the ML Campus
    b. Establishment of a GG-100H SoilFoodTM system (gas) to transform food, compostable bags, bio-pak products and garden waste generated by onsite cafes, tenancies and gardeners into an organic fertiliser for use on ECU campus grounds.
    c. Development a comprehensive waste education strategy that supports ECU's waste infrastructure and provides a consistent and coordinated approach to waste and resource recovery education. It will inform our community of the waste hierarchy and provide practical steps to reduce waste output and to minimize ECU's environmental impact.
2. ECU is actively engaged in a market assessment to identify suitable organizations with sufficiently developed organic waste processing capability to allow ECU to further expand its food waste program. At present only food waste from kitchens gets captured in this organic waste stream. The intention is to install organic bins front of house in cafes to capture food scraps and bio-degradable packaging. Our initial market scan reveals that whilst there are a good number of operators in the market, there is no clear technological leader with the capacity to manage significant volumes of biodegradable packaging at this time.

Using ECU's IP to Advance the Campus Environment

ECU has developed some exciting technologies within its Schools. There is potential to expand the application of some of this IP within ECU's campuses. Closer collaboration between ITSC, FSC and Schools such as SSCI, SBL and SENG may give rise to a more holistic approach to ECU's sustainability objectives. There appears to be a strong desire amongst the ECU community to establish a framework, which would enable the Schools to weave some University wide sustainability initiatives into the curriculum. In doing so, the University may be in a position to leverage off some relatively inexpensive research output.

Energy Technology

ECU has, in recent years invested considerable amounts of resources into exploring the feasibility of establishing alternate sources of energy to power its campuses. A project to establish District Energy Scheme to supply 70% of the Joondalup campus's base load power was thoroughly explored in 2016. A similar project to establish a solar array on the Bunbury campus was also undertaken; however, neither project came to fruition due principally to an inability to reach agreement on commercial terms with prospective partners. Whilst these two projects failed to materialize, the University will continue to seek out and assess alternate sustainable energy options.

Active Transport and Parking Strategies

ECU will continue to explore initiatives which will encourage students and staff who drive a vehicle to campus to seek more sustainable modes of transport. FSC has had preliminary discussions with ride share and carpooling technology providers about how these services could be introduces in a practical manner across the University. Any meaningful gains in this space will in reality need to form part of a broader parking strategy.

Lighting Upgrades

Exterior lights throughout the campuses are progressively being upgraded to LED technology. LED lights are typically 50% more efficient than incandescent lights and have a life span 3 times longer than existing technologies.

Strategic Procurement

ECU's procurement guidelines (sustainable procurement guideline) provides a framework for the sourcing of products which are environmentally friendly and have been procured from supply chains with responsible / ethical sourcing arrangements. The guidelines spell out clear strategies for sourcing products with high levels of recycling content and guard against products with toxicity risks. Sustainability also forms part of the selection criteria the appointment of key suppliers. The targeted development of sustainability KPIs in the near future will further help to provide a level of rigor around supply contracts. It should also be noted that ECU has also taken the GECA positive procurement pledge to ensure that the University is compliant with the ISO 20400 International Standard for Sustainable Procurement.

Promoting ECU's Sustainability Achievements

This paper has highlighted much of the excellent work which ECU is doing to reduce its carbon footprint and to drive a range of sustainability initiatives across its campuses. We know from the 2017 SSAFE Survey that students want to be part of an institution which has strong environmental credentials. One of the issues which has become quite prominent whilst preparing this paper is that many students and staff have no real sense of what is happening on the sustainability front outside of their immediate work environment. ECU would benefit from a better mechanism for reporting its achievements to the broader University community on a regular basis.

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Appendix C – Financial Estimates against carbon reduction

NOTE:

Red = Costs associated with undertaking an initiative are represented by negative $ values
Black = Savings achieved by undertaking an initiative are represented by positive $ values

		Years											Year 5	Year 10
		0	1	2	3	4	5	6	7	8	9	10		
		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2025	2030
Estimated Annual Carbon Output JO Campus (Tonnes) (Baseline)		**16,371**	**16,371**	**16,371**	**16,371**	**16,371**	**16,371**	**16,371**	**16,371**	**16,371**	**16,371**	**16,371**	**16,371**	**16,371**
Initiative														
1	*Install Roof Top PV Panels at JO*	-	- 1,434	- 2,868	- 4,302	- 4,302	- 4,302	- 4,302	- 4,302	- 4,302	- 4,302	- 4,302	- 4,302	- 4,302
2	*Solar Shade Parking*	-	-	-	-	- 1,683	- 3,366	- 5,050	- 5,050	- 5,050	- 5,050	- 5,050	- 3,366	- 5,050
3	*HVAC Conversion and Upgrades (Optimization Package)*	-	-	-	-	-	-	-	- 1,077	- 1,077	- 1,077	- 1,077	-	- 1,077
4	*Behaviour Change Initiatives*	-	- 62	- 62	- 62	- 62	- 62	- 62	- 62	- 62	- 62	- 62	- 62	- 62
5	*LED Lighting Conversion*	-	- 98	- 195	- 293	- 391	- 488	- 488	- 488	- 488	- 488	- 488	- 488	- 488
6	*Purchasing Carbon Offsets*	-	- 4,954	- 3,423	- 1,891	- 110	- 8,152	- 6,469	- 5,392	- 5,392	- 5,392	- 5,392	- 8,152	- 5,392
Revised Carbon Footprint		**16,371**	**9,823**	**9,823**	**9,823**	**9,823**	-	-	-	-	-	-	-	-
		100%	60%	60%	60%	60%	0%	0%	0%	0%	0%	0%		
Investment													**Total Spend**	**Total Spend**
Initiative														
1	*Install Roof Top PV Panels at JO*	$0	($1,333,333)	($1,333,333)	($1,333,333)	$0	$0	$0	$0	$0	$0	$0	($4,000,000)	($4,000,000)
2	*Solar Shade Parking*	$0	$0	$0	$0	($1,662,889)	($1,662,889)	($1,662,889)	$0	$0	$0	$0	($3,325,778)	($4,988,667)
3	*HVAC Conversion and Upgrades (Optimization Package)*	$0	$0	$0	$0	$0	$0	$0	($200,000)	$0	$0	$0	$0	($200,000)
4	*Behaviour Change Initiatives*	$0	($10,000)	($10,000)	($10,000)	($10,000)	($10,000)	($10,000)	($10,000)	($10,000)	($10,000)	($10,000)	($50,000)	($100,000)
5	*LED Lighting Conversion*	$0	($200,000)	($200,000)	($200,000)	($200,000)	($200,000)	$0	$0	$0	$0	$0	($1,000,000)	($1,000,000)
6	*Purchasing Carbon Offsets*	$0	($70,205)	($48,501)	($26,797)	($1,561)	($115,515)	($91,663)	($76,400)	($76,400)	($76,400)	($76,400)	($262,578)	($659,841)
Total Cost on Initiative		**$0**	**($1,613,538)**	**($1,591,834)**	**($1,570,130)**	**($1,874,450)**	**($1,988,404)**	**($1,764,552)**	**($286,400)**	**($86,400)**	**($86,400)**	**($86,400)**	**($8,638,356)**	**($10,948,508)**
Expected Expenditure Savings													**Total Savings**	**Total Savings**
Initiative														
1	*Install Roof Top PV Panels at JO*	$0	$124,100	$248,199	$372,299	$372,299	$372,299	$372,299	$372,299	$372,299	$372,299	$372,299	$1,489,195	$3,350,689
2	*Solar Shade Parking*	$0	$0	$0	$0	$145,669	$291,337	$437,006	$437,006	$437,006	$437,006	$437,006	$437,006	$2,622,035
3	*HVAC Conversion and Upgrades (Optimization Package)*	$0	$0	$0	$0	$0	$0	$0	$93,220	$93,220	$93,220	$93,220	$0	$372,881
4	*Behaviour Change Initiatives*	$0	$5,401	$5,401	$5,401	$5,401	$5,401	$5,401	$5,401	$5,401	$5,401	$5,401	$27,003	$54,006
5	*LED Lighting Conversion*	$0	$8,453	$16,907	$25,360	$33,813	$42,266	$42,266	$42,266	$42,266	$42,266	$42,266	$126,799	$338,131
6	*Purchasing Carbon Offsets*	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Cost reduction through Initiative		**$0**	**$137,953**	**$270,506**	**$403,059**	**$557,181**	**$711,303**	**$856,972**	**$950,192**	**$950,192**	**$950,192**	**$950,192**	**$2,080,003**	**$6,737,741**
Net Saving (Investment - Expected Savings)													**Net Result**	**Net Result**
Net Savings / (Costs)		**$0**	**($1,475,585)**	**($1,321,328)**	**($1,167,071)**	**($1,317,269)**	**($1,277,101)**	**($907,581)**	**$663,792**	**$863,792**	**$863,792**	**$863,792**	**($6,558,353)**	**($4,210,766)**

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