

THE AUSTRALIAN NATIONAL UNIVERSITY

Environmental Management Plan

Implementation Strategies

2009 to 2015

April 2009

Abstract

The Australian National University (ANU) Environmental Management Plan (the Plan) articulates sustainability targets and implementation strategies to guide ANU environmental management to 2015 and beyond. Through this Plan, ANU will provide research and study facilities that meet world's best sustainability practice. The targets and goals of the Plan exceed statutory requirements and industry standards, with the intent that ANU will innovate and lead in the global challenge of sustainability.

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List of abbreviations

ACTS	Australasian Campuses Towards Sustainability
ANU	The Australian National University
ANUgreen	The ANU Environment and Sustainability Office
BMP	Biodiversity Management Plan
BMZ	Biodiversity Management Zone
CERAM	Comparative Environmental Risk Assessment Method
CO ₂	Carbon Dioxide
CO ₂ E	Carbon Dioxide Equivalent
F&S	Facilities and Services Division ANU
GJ	Gigajoules
IARU	International Alliance of Research Universities
IAS	Invasive Alien Species
ICT	Information Communication Technology
KL	Kilolitres
LFA	Landscape Function Analysis
SLC	Sustainability Learning Community
TBE	To be estimated
The Plan	ANU Environmental Management Plan 2009-2015
VC	Vice Chancellor

Vision

The Australian National University (ANU) aims to establish a sustainable campus that demonstrates our corporate and community commitment to the environment and reflects our responsibility to future generations. ANU strives to be an international leader in campus sustainability as part of providing our graduates with the knowledge and skills needed to realise a more sustainable society.

Purpose

The ANU Environmental Management Plan (the Plan) articulates sustainability targets and implementation strategies to guide ANU environmental management to 2015 and beyond. Through this Plan, ANU will provide research and study facilities displaying world's best sustainability practice. The specified targets exceed statutory requirements and industry standards, with the intent that ANU will innovate and lead in the global challenge of sustainability.

Principles

The Plan is built on the following principles:

- Exceeding world and Australian **best sustainability practices**, in particular for energy and water use.
- Encouraging sustainability in the broader community through **outreach** activities and demonstration projects.
- **Mainstreaming** sustainability management across university decision-making processes and operations.
- Fostering an organisational culture for sustainability through **responsibility, innovation and leadership**.
- **Integrating** sustainable campus management with professional development and academic programs.

Targets

Sustainability targets are the specific performance outcomes that ANU intends to achieve within specified time-frames. Firm targets are established to 2015 and longer term aspirations have been set where this assists shorter-term planning. These targets are based on 2006 baselines so as to align with international agreements for climate change mitigation.

- Reduce energy use and neutralise **greenhouse gas emissions**:
 - 10% by 2010 15% by 2012 20% by 2015 35% by 2020
- Reduce **total water use**:
 - 30% by 2015 50% by 2020
- Remove **potable water from landscape irrigation**:
 - 50% by 2012 100% by 2015
- Reduce **material waste** by:
 - Continually reducing resource waste by applying the waste hierarchy (an emphasis on waste avoidance, reduction, reuse, recycling and disposal, in that order).
 - Reducing unsustainable procurement, and increasing re-use and recycling.
 - Reducing waste to landfill 40% by 2015 and 70% by 2020.

- Maximise **sustainable transport** by:
 - Increasing green commuting to 80% by 2015, and minimising single-occupant vehicles.
 - Reducing fleet vehicle emissions 20% by 2015, and continuing to off-set 100% of fleet emissions.
 - Off-setting 100% of the carbon dioxide equivalent load from air travel by 2015.
- Maximise **resilience** by continually reducing:
 - Residual pollution risk below a 20% baseline.
 - Stocks and flows of hazardous materials on campus.
 - Exposure to environmental hazards.
- Establish a **sustainable landscape** by:
 - Balancing vegetation losses with new assets through new protection zones and plantings.
 - Adopting sustainable landscape strategies that protect landscape values and reduce dependence on potable water.
- Foster a **culture of sustainability** by continually increasing:
 - Community engagement in campus sustainability initiatives.
 - Events and information campaigns to raise public interest in sustainability.
 - Sustainability-related professional training and development opportunities through internships, facilitated workshops, national and international alliances.
- Integrate environmental management issues into **research and teaching** by continually increasing:
 - Academic collaboration and support for student projects that address ANU campus sustainability issues.
 - Student project time devoted to practical ANU sustainability issues.
 - Opportunities for research publications on sustainable facilities management.

Context

The Plan commences at a time of unprecedented national and international interest in sustainability. The ANU meets the sustainability challenge from a strong ten-year track record of effective systems, corporate commitment and ongoing momentum for sustainable facilities management. ANU received 14 awards for outstanding environmental management over the life of its 2003-2008 Plan. The University achieved previous targets for water reductions, vehicle fleet CO₂ emissions and community awareness-raising and made substantial progress towards targets for energy use, CO₂ emissions from electricity and gas, waste reduction, environmental risk and biodiversity management.

ANU sustainability leadership is supported by strong linkages within and outside the university. A culture of excellence already exists throughout ANU communities and many have a primary focus on sustainability. Sustainability leaders include ANUgreen, the Sustainability Learning Community, SEE Sustainability @ Work Green Office Program, green residents groups, The Recyclery, the Human Ecology Forum, a range of student environment groups, the GreenSteps Program and many more. ANU is a sustainability leader within peer groups of Higher Education Facilities Managers, Australasian Campuses Towards Sustainability (ACTS) and the International Alliance of Research Universities (IARU).

Summary of Programs and Implementation Strategies

Cooperative efforts are needed to achieve our Sustainability Targets. Experience suggests that the best outcomes are achieved by applying implementation strategies across three parallel programs – People, Place and Performance. An overview of core strategies for each program is given below.

- **People** – Sustainability gains require both day-to-day activities and long-term strategic engagement of the entire university community. This will be achieved through:
 - **outreach activities**, information campaigns, sustainability commitment programs, and other public education initiatives.
 - hosting sustainability **events** including celebrations, debates, film nights, lecture series, and more,
 - facilitating sustainability **professional development** programs including staff training and awareness sessions, inductions and professional short courses.
 - supporting **student projects** that address practical sustainability issues.
- **Place** – The natural and built environment of the campus can demonstrate sustainability to staff and students. The physical spaces of the University can be enhanced through:
 - engineered improvements to **buildings**, drawing on the VC's Green Loan Fund.
 - protecting and enhancing the natural heritage of the university's **sustainable landscape** assets.
 - reducing the extent of weeds, especially targeting weeds of regional and national significance.
 - building upon the historical legacy of ANU through appropriate management and conservation of cultural and architectural **heritage**.
 - providing infrastructure and programs to support **green transport** choices.
- **Performance** – Resource use will be carefully considered across the campus with particular attention to:
 - reducing **energy and CO₂ emissions** through a mix of behaviour change campaigns/programs, improved infrastructure, green energy purchase and carbon offset programs.
 - native plantings and recycled water to remove **potable water** from landscape irrigation.
 - Implementing **waste reduction** by mainstreaming sustainable materials and product use, recycling and disposal, and;
 - monitoring and minimising **environmental risk** and pollution potential.

A fourth program focuses on the integration of the People, Place and Performance programs. The Integration Program addresses the Plan's vision of leadership in campus sustainability through an emphasis on management, innovation, leadership and resilience.

Responsibility

The responsibility for the Plan's implementation rests with the Vice Chancellor, with coordination and management to be undertaken by the Director, Facilities and Services Division (F&S). The ANU Environment and Sustainability Office (ANUgreen) will execute the Implementation Strategies as overseen by campus representatives on the Environmental Management Planning Committee which will report annually to the Vice Chancellor, through the F&S Director.

Evaluation

Evaluation of implementation strategies will apply relevant standards for excellence to achieve the highest professional quality. Both implementation and performance outcomes will be evaluated using a mix of internal and external criteria. Accountability, accuracy and transparency will be achieved through a range of techniques including refereed publications, contributions to public databases and participation in external sustainability programs. Reporting will clearly signal and encourage opportunities for performance improvements.

Indicators

The ANU Environmental Management Plan 2002-2008 established quantitative indicators for performance measures such as energy and water use, greenhouse gas emissions, waste, recycling, and other throughputs. But few quantitative indicators were adopted to show progress with cultural change or the physical spaces at the university. Despite this, ANU environmental managers found that significant and ongoing performance improvements were only achieved when the university community took part, and when physical improvements were made.

This Plan adopts new structures, programs and performance indicators to better align the monitoring and reporting with the implementation of sustainability strategies. All of the previous indicators are retained in this new Plan. Some new indicators are adopted based on relevant published standards. Some other new indicators are suggested and methodologies described. These may be adapted, replaced or discarded through the life of this plan, but are intended as a starting point for balanced, meaningful and transparent sustainability reporting. Proposed headline indicators are listed in **blue, bold font**.

The full set of indicators is presented in the Appendix to this Plan.

Strategies

The strategies listed in latter sections of this Plan are the long term plans of action designed to achieve the vision and targets specified above. These strategies are expected to grow and change through the life of the Plan as implementation proceeds.

*The italicised strategies are new proposals and at the time of writing are unfunded. They are therefore aspirational rather than current core business. **Strategies listed in bold-italics will be taken up if ANU is selected as a national Green Precinct.***

Programs

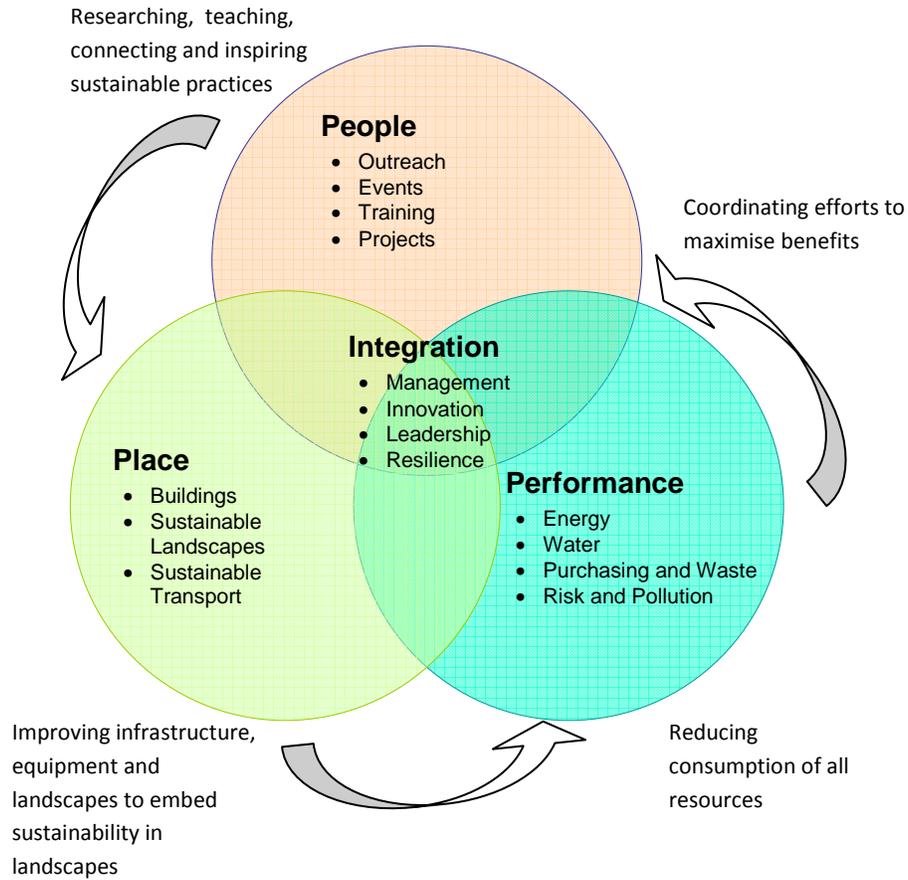
The above sections have explained the sustainability outcomes that ANU intends to achieve between 2008 and 2015. The remainder of the Plan explains how ANU will achieve these outcomes.

Implementation Strategies will be achieved through three core programs – People, Place and Performance. A fourth core program – Integration – focuses on the interactions between the other three, looking towards the Plan's vision of leadership in campus sustainability. Each Program focuses on a distinctive area of environmental management that has emerged over the last ten years. Sub-programs offer a more detailed focus for strategies within each main program.

Figure 1 shows the overall structure of the implementation program. This structure is being articulated to:

- formalise, strengthen and expand the natural groupings for sustainability strategies,
- provide an analytical framework to support new sub-programs and linkages, and
- clarify and support the instances and opportunities for integration across programs.

**Figure 1: Program Structure for
ANU Environmental Management Plan 2009-2015**



1. People

The campus community includes undergraduate and research students, general staff and academic staff. ANU is also well connected with its physical neighbours and with its peers in the higher education sector. Some of the strategies here target specific groups, but many are open to all interested communities.

Overall Goal of the People Program

Increase awareness, foster engagement and celebrate environmental management successes.

People Program Indicators and Targets

TBE = To Be Estimated

Sub-program	Indicator (methodologies are proposed below for novel metrics indicated with *)	2002 Results	2006 Results	2015 Target	
				Total	% change
People					
Outreach	Contact* = Total one-to-one points of community engagement with ANU sustainability information	2004	615,003	Continually increase	
	Commitments = Total commitments made to sustainability challenge programs	0	0	Continually increase	
	SLC = Membership of the Sustainability Learning Community	0	250	Continually increase	
Training	Professional Development = Total points earned in ANU sustainability training, based on Certified Environmental Professional Development scale	TBE	TBE	Continually increase	
	Green Champions = number of business units participating in campus sustainability initiatives	10	25	Continually increase	
	Products = number of cultural and academic artifacts produced that advance sustainability goals	TBE	TBE	Continually increase	
Events	Participation = Total number of person-hours invested by volunteers and participants in sustainability events and programs	TBE	TBE	Continually increase	
Projects	Project Time = Estimated hours of student projects addressing practical ANU sustainability issues	TBE	TBE	Continually increase	
	Audits = number of environmental audits undertaken	TBE	TBE	Continually increase	

TBE – To Be Estimated

1.1 Outreach

Outreach Goal

Strengthen the ANU community's awareness and understanding of sustainability through public education campaigns.

Outreach Strategies

#	Strategy	Indicators	Stakeholders (ANUgreen and...)	Timing
1	Develop coordinated information programs, initiatives and exhibits to heighten student, staff and faculty awareness of sustainability issues.	Contact, professional development	Marketing and Communications Division	Ongoing, with new initiatives
2	Continually improve the ANUgreen website and increase visitors.	Contact	Marketing and Communications Division, F&S information managers	Ongoing
3	Promote sustainability wins by featuring successful departments or programs in articles within ANUgreen newsletter, campus media or ANUgreen website.	Contact, participation	Marketing and Communications Division, other media outlets	As needed
4	<i>Establish a sustainability challenge program building on the 10% by 2010 commitment program encouraging community members to commit to sustainability actions on a daily basis.</i>	Contact, commitments	<i>Entire campus community</i>	<i>Ongoing, with new initiatives</i>
5	Keep alumni informed regarding sustainability initiatives at ANU and encourage their contributions.	Contact, participation, commitments, web hits	Alumni Office	As needed
6	Produce outreach materials about campus sustainability efforts, including fliers, brochures, posters and sustainability guides.	Contact	Marketing and Communications Division, other media outlets, Gardens and Grounds	Ongoing, with new initiatives
7	Develop a consistent ANUgreen branding and marketing strategy.	Contact	Marketing and Communications Division, F&S information managers	2009, 2012

8	Feature ANU sustainability leaders through the ANUgreen newsletter, campus media and the ANUgreen website.	Contact	F&S information managers	Quarterly
9	Host a Sustainability Learning Community that connects students and staff across degree programs to develop a practical understanding of sustainability	SLC, contact, participation, professional development, project time, commitments, student contributions	Pro Vice Chancellor –Students, Residential Students, Student Representative Council, Faculty with sustainability interests	Ongoing
10	<i>Establish an on-line database of quality student research projects which have contributed to sustainability at ANU.</i>	<i>Student contributions</i>	<i>Interns, volunteers, Green Champions etc</i>	<i>Establish in 2009, then update as needed</i>
11	Continue to liaise with University Accommodation Services on opportunities to enhance sustainable living opportunities at ANU.	Contact, participation, professional development, SLC, student contributions	Heads of Colleges, University Residents	Ongoing
12	Install signage and other information within rooms and throughout residential halls and colleges about energy and water conservation and related issues for campus residents.	Contact, commitments, SLC	Heads of Colleges, University Residents	Ongoing
13	Place sustainability posters with simple, clear, engaging messages and original artwork in public toilets, noticeboards and other key areas across ANU. Regularly exchange and refresh posters.	Contact.	University community and visitors	Update quarterly
14	<i>Conduct a triennial survey of community perceptions of sustainability including biodiversity, green buildings and transport infrastructure. Coordinate with transport survey.</i>	<i>Contact, commitments</i>	<i>Whole university community</i>	<i>2009, 2012, 2015</i>
15	<i>Support processes where Green Champions introduce environmental best practices in their operations.</i>	<i>Contact, participation</i>	<i>Green Champions</i>	<i>When called for</i>
16	<i>Establish a creative arts program centered around the theme of sustainability.</i>	<i>Contact, participation, ecological footprint</i>	<i>University community and their families.</i>	<i>When feasible</i>

17	<i>Monitor and support implementation of environmental best practice into workplace and halls of residence.</i>	<i>Contact, participation, professional development, projects</i>	<i>Green Champions, Green Representatives at Halls of Residence.</i>	<i>When feasible</i>
18	<i>As an Australian Green Precinct, establish high profile demonstration sites that showcase sustainable environmental management and promote these on the ANUgreen website.</i>	<i>Contact, participation, professional development, project time, innovation, leadership</i>	<i>External interest groups, Facilities and Services, Gardens and Grounds, Marketing and Communications, Faculty Staff, Students.</i>	<i>2009-2012,</i>

1.2 Events

Events Goal

The Events Sub-program aims for ANU to host high-quality sustainability events that encourage participation and learning about sustainability.

Events Strategies

#	Strategy	Indicators	Stakeholders (ANUgreen and...)	Timing
1	Maintain a presence at ANU events to encourage participants to adopt sustainable practices. Provide information-rich fliers, posters, drink bottles and other practical, promotional items.	Contact, participation	ANU event managers	As opportunities present, including O-Week and other inductions
2	Hold major events related to sustainability to raise awareness and encourage participation.	Contact, participation, slc, commitments, student contributions	All ANU communities and neighbours within the region	Annual Celebrate Sustainability Day, Earth Hour etc
3	Host and contribute to workshops, presentations and other public information sessions on sustainable facilities management.	Contact, participation, professional development	Faculty staff, Peer Institutions	As opportunities present
4	<i>Actively coordinate the collection, redistribution and recycling of clothes, furniture, bedding and other goods left by residential students at the end of each year.</i>	<i>Contact, participation, student contributions</i>	<i>Heads of Colleges, University Residents</i>	<i>End and start of teaching each year</i>
5	As an Australian Green Precinct, showcase high sustainability demonstration sites at events.	Contact, participation, professional development, project time, innovation, leadership	External interest groups and the whole ANU community	2009-2012 and beyond

1.3 Training

Training Goal

Develop and support an effective network of environmental representatives active throughout all business units.

Training Strategies

#	Strategy	Indicators	Stakeholders (ANUgreen and...)	Timing
1	Continue to seek student representation on sustainability committees	Participation, student contributions, professional development	Student representative and support groups including halls of residence, students association and others	Continuous
2	Improve policies and run training programs to promote safe handling and storage of hazardous materials	Risk, professional development	Head Technical Officers, staff and students in laboratory sciences and fine arts	As needed, especially at induction
3	<i>Host workshops for key professionals across ANU to achieve targeted sustainability outcomes</i>	<i>Contact, participation, professional development, utilities value, comments, internal awards, waste reduction, electricity, gas, green energy</i>	<i>Business Managers, Procurement Officers, Computer Technicians.</i>	<i>2009, 2011, 2013</i>
4	<i>Establish an on-line sustainability induction program and processes to ensure access by all new ANU staff and students</i>	<i>Contact, professional development</i>	<i>Whole community</i>	<i>2009-2010, review annually</i>
5	Extend current programs that provide professional development pathways for staff and students to make practical contributions to sustainability in action This will include the current Green Champions under the SEE Sustainability @ Work program, and a new network of reliable and committed student volunteers	Professional development, contact, participation	Green Champions, Business Managers, reliable and committed students.	Ongoing according to demand and opportunity

6	Support Green Champions in promoting sustainability through face-to-face contact with colleagues	Contact, participation	Green Champions and Business Managers	Ongoing according to demand and opportunity
7	Continue to run GreenSteps or equivalent vocational training for future sustainability leaders	Contact, participation, professional development, project time	Students, host organizations, GreenSteps leaders at Monash University	Annually.
8	Develop and maintain environmental audit training for students to assist in identifying energy and water saving opportunities	Contact, participation, professional development, project time, electricity, gas, water, CO ₂ E	Students, Green Champions.	Ongoing according to demand and opportunity
9	<i>As an Australian Green Precinct, provide professional training opportunities showcasing high profile sustainability demonstration sites</i>	<i>Contact, participation, professional development, project time, innovation, leadership</i>	<i>External interest groups and the whole ANU community</i>	<i>2009-2012 and beyond</i>

1.3 Projects

Projects Goal

Maximise student projects that address practical ANU sustainability issues.

Project Strategies

#	Strategy	Indicators	Stakeholders (ANUgreen and...)	Timing
1	Continue student internship programs that provide opportunities for student research addressing practical ANU sustainability issues	Student contributions, project time	Student leaders, Facilities Managers	Biannual program and additionally as needed
2	Harness opportunities from the International Alliance of Research Universities (IARU) to expand the international internship program.	Project time, student contributions	IARU, student leaders	Annually
3	Liaise with lecturers and researchers to provide coursework assessment on relevant campus sustainability themes. Take up feasible solutions where feasible.	Project time, student contributions	Faculty staff	Biannually, particularly at the start of semesters
4	<i>Supervise student research projects with practical sustainability themes and apply results when feasible</i>	<i>Project time, student contributions, ecological footprint</i>	<i>Research students, Faculty Staff</i>	<i>Ongoing</i>
5	<i>As an Australian Green Precinct, supervise student projects that investigate options for high sustainability demonstration sites</i>	<i>Contact, participation, professional development, project time, innovation, leadership</i>	<i>External interest groups and the whole ANU community</i>	<i>2009-2012 and beyond</i>

2. Place

Overall Goal of the Place Program

Use physical features of the ANU to save energy and water, eliminate the use of potable water for landscape irrigation, reduce waste and achieve other sustainability goals.

Place Program Indicators and Targets

Programs	Indicator (methodologies are proposed below for novel metrics indicated with * and defined in the appendix of all indicators)	2002 Results	2006 Results	2015 Target	
				Total	% change
Place					
Buildings	Green Building Rating – estimated change to the sustainability rating of ANU buildings using relevant tools.	TBE	TBE	Continually increase	
	Green Loans – investments and returns to the Green Loan Fund	TBE	TBE	100%	Increase
Sustainable Landscapes	Landscape Watering = Total KL of potable water used in landscape irrigation	TBE	TBE	0%	TBE
	Sullivan’s Creek Water Quality* = per cent change in creek water quality.	TBE	TBE	Continually increase	
	Carbon Sequestration* = Estimated change in kilograms of carbon embodied in landscape features (qualitative report with a possible metric element)	TBE	TBE	Continually increase	
	Weeds – distribution and abundance of major weed species.	TBE	TBE	TBE	- 30%
	Temperature differentials* = change in the difference between internal and external temperatures attributable to landscape features.	TBE	TBE	Continually increase	
Sustainable Transport	Green Commuting = per cent of university commuting outside Single Occupant Cars (or Fleet Vehicle Emissions)	TBE	TBE	50%	TBE
	Bicycle Parking – number of secure bicycle parking spaces at ANU	TBE	TBE	TBE	Increase
	Air travel off-sets – offset CO ₂ E from air travel	TBE	TBE	100%	TBE
	Air travel kms – change in ANU total air kms	TBE	TBE	Continually reduce	
	Fleet vehicle emission offsets – tonnes of CO ₂ E from the university fleet – reported with off-sets	100%	100%	100%	Hold
	Fleet vehicle emission reductions – per cent reduction in CO ₂ E from the university fleet – reported without off-sets (also record total CO ₂ E)	1100	923	738	- 20%

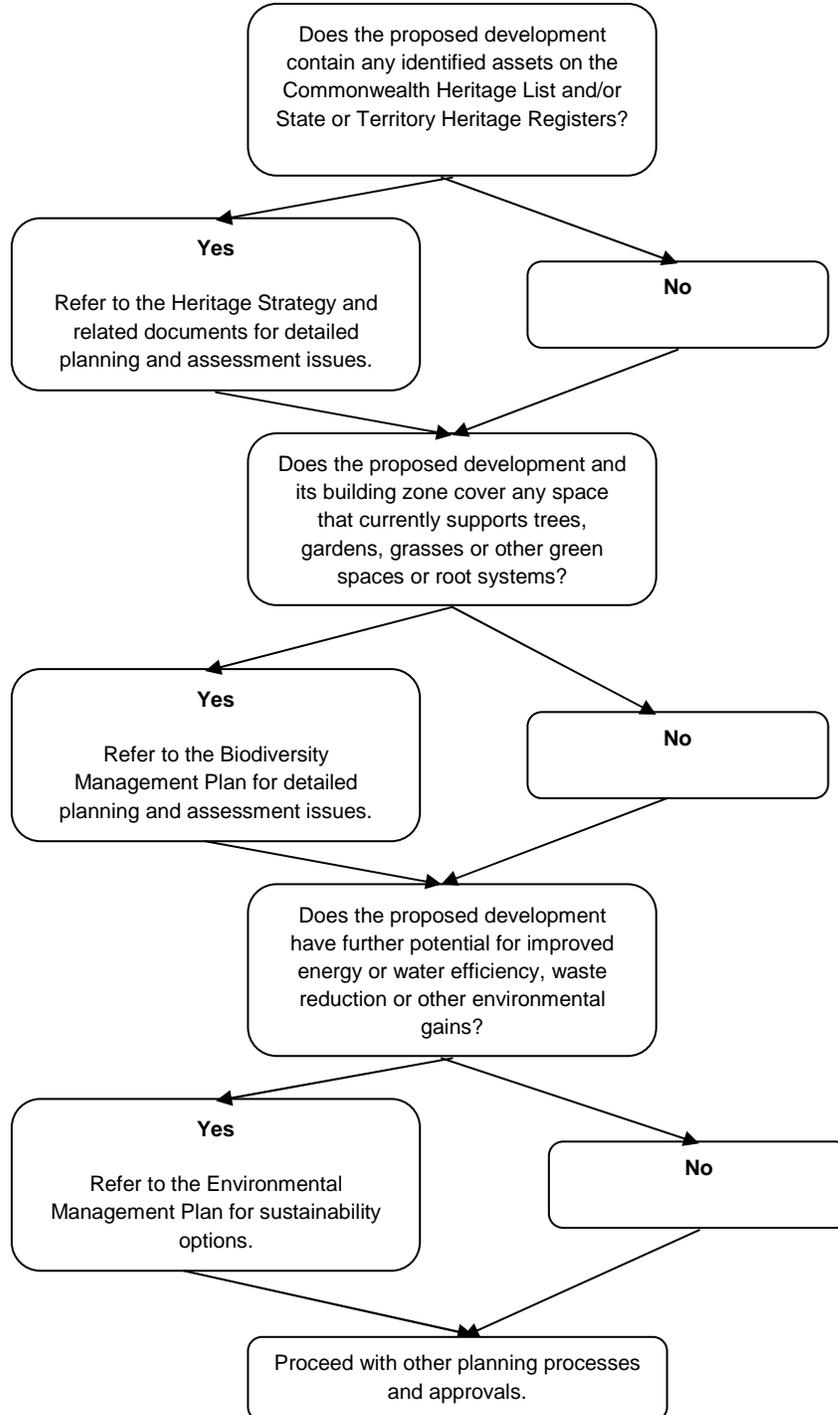
TBE = To Be Estimated

SLC – Sustainability Learning Community

Integrating planning decisions

The following diagram shows the relationship between the Environmental Management Plan, Heritage Strategy and Biodiversity Management Plan, in the context of campus development decisions.

Process for Integrating Heritage, Biodiversity and Environmental Planning



2.1 Buildings

ANU manages its buildings for many diverse outcomes, of which two are of concern in this Plan. First, the Plan provides strategies to guide energy and water savings and ensure that the ANU operates 'Green Buildings'. Second, the Plan recognizes the importance of preserving cultural heritage assets under the Australian *Environmental Protection and Biodiversity Conservation Act 1999*. It refers to the heritage planning documents to provide pathways for coordinating heritage and other environmental management initiatives at ANU.

Buildings Goal

Green Buildings Goal

Reduce greenhouse gas emissions, water use, environmental risk and waste by building greener buildings and retrofitting the current building stock to a higher sustainability standard.

Heritage Management Goal

ANU is committed to recording and where possible preserving its cultural heritage values.

The ANU Heritage program ensures that developments that occur on or near Commonwealth Heritage assets that are owned or controlled by the University do not have a detrimental effect to the values inherent at the site. Any new buildings or sites that are identified as having Commonwealth Heritage values are added to the ANU Heritage Register ([insert web link](#)) and protected and maintained by the University for future generations.

The ANU has developed a *Heritage Strategy*, which is the primary documents driving heritage management at the ANU. The *Heritage Strategy* will be referred to whenever developments, retrofits or renovations are proposed for heritage listed assets, or for those with other heritage values.

Heritage Objectives specified in the *Heritage Strategy* are included in the box below.

The principal objective of the ANU Heritage Strategy is to outline a strategic approach for the effective management of places that the University owns or controls. The ANU has both an obligation and a responsibility to ensure that locations that embody Commonwealth Heritage values are protected and conserved. Within this broad objective the University has specified the following objectives:

To identify and assess places and assets with Commonwealth Heritage values;

To protect and conserve places with identified Commonwealth Heritage value through the development of procedures that integrate internal ANU policies with Commonwealth, State or Territory legislation;

To identify, protect and conserve areas and sites that have cultural and ecological significance to the University community;

To identify, protect and conserve areas and sites that have cultural significance to Indigenous communities;

To present and transmit information about these values, where appropriate, to the students, staff and visitors of the ANU;

To prepare a Heritage Management Manual and a triennial Heritage Management Plan; these documents govern principles that relate to heritage management.

Green Buildings Strategies

#	Strategy	Indicators	Stakeholders (ANUgreen and...)	Timing
1	Energy savings through green buildings, optimal use of facilities and other measures	Green building rating, electricity, gas CO ₂ E emissions	Building Managers, University Planners	When feasible
2	Providing training and awareness campaigns on the use and benefits of Green Buildings	Contact, professional development, electricity, gas CO ₂ E emissions	Building Managers, University Planners	When feasible
3	Tracking the application of student project recommendations, applying cost-effective recommendations when feasible	Student contributions	Building Managers, University Planners	When feasible
4	<i>Implement strategies for switching electronic equipment off when not in use.</i>	<i>Contact, investment</i>	<i>Building Managers, University Planners and College IT managers</i>	<i>2009-10</i>
5	<i>Install signs, sensors and other systems to encourage laboratory users to 'lower the sash' of fume cupboards</i>	<i>Contact, electricity</i>	<i>Head Technical Officers</i>	<i>2009</i>
6	<i>Streamline the 'fleet' of electronic equipment such as printers and copiers to improve service using fewer, multifunction devices with good energy ratings and eco-friendly features including duplexing, recyclability and power down capacity</i>	<i>Contact, training, participation, project time, waste reduction</i>	<i>Division of Information, Procurement office, Business Managers</i>	<i>2010</i>
7	<i>Engage ICT staff and students in identifying opportunities and piloting projects to improve performance across purchase, use and disposal phases.</i>	<i>Engagement, energy, CO₂E emissions, waste reduction, green commuting</i>	<i>Division of Information, Procurement office, Business Managers, IT Managers, User community representatives</i>	<i>From 2009</i>

8	<i>Investigate feasibility of a position of ICT Sustainability Officer to coordinate ICT energy efficiency and sustainable activities</i>	<i>Professional development</i>	<i>ICT Sustainability Officer and all above campus stakeholders</i>	<i>2009 and ongoing if needed</i>
9	<i>As an Australian Green Precinct, showcase sustainable buildings to external interest groups</i>	<i>Contact, participation, professional development, project time, innovation, leadership</i>	<i>External interest groups and the whole ANU community</i>	<i>2009-2012 and beyond</i>

2.2 Sustainable Landscapes

Sustainable Landscapes Goals

Design and manage the university so that all physical spaces are utilised in the achievement of environmental outcomes. Enhance ecological function and maintain species diversity through sustainable resource use and innovative landscape management and design.

The Biodiversity Management Plan (BMP) is the driving document for managing landscape assets.

Through the BMP, ANU will enhance the ecological performance of campus landscapes and minimise the impact of campus development and operations on the ecosystem processes that are required to maintain healthy biological communities and landscape function.

Biodiversity Principles

- 1. Conserve areas of best ecological condition and areas of key ecosystem function;**
- 2. Actively manage threats within areas of best condition** including inappropriate landuse, weed and pest incursion.
- 3. Enhance connectivity** between areas of best condition, source habitats (such as the ANBG), and other habitats within and extending from the Acton site through rehabilitation of areas in strategic locations.
- 4. Enhance ecological condition of Biodiversity Management Zones (BMZ) through targeted ecological enhancement and restoration of ecosystem function.**
- 5. Control and manage weed and pest populations** on the Acton site, particularly Invasive Alien Species (IAS).
- 6. Increase opportunities for human interaction** with, and appreciation of urban landscapes, for example, through the development of Learnsapes such as outdoors demonstration sites, theatrettes and hands on opportunities.
- 7. Integrate native flora into aesthetic landscape architecture** to promote the potential of native species as aesthetic elements of landscape design.
- 8. Reduce resource inputs (water, nutrients and labour) by integrating ecosystem function into landscape design and landscape maintenance protocols.**
- 9. Demonstrate the potential for green infrastructure to contribute to the sustainability of the built form**, including the capacity of green infrastructure to provide energy efficiency gains in buildings, provide alternative outdoor educational facilities and compliment engineered stormwater and drainage solutions.
- 10. Monitor and document process and outcomes** to allow adaptive management based on the review of management actions and as more information becomes available.

Sustainable Landscapes Strategies

#	Strategy	Indicators	Stakeholders (ANUgreen and...)	Timing
1	Irrigate landscapes with a non-potable mix including rainwater, stormwater and grey water.	Landscape Watering, Potable Water, Grant Funding, Contact	Gardens and Grounds, University Maintenance, ACTEWAGL and health department for some approvals	When Practical
2	<i>Develop principles for design and management of low water use landscapes (including Water Sensitive Urban Design) and distribute these with training to relevant work units</i>	<i>Landscape Watering, Potable Watering, Training, Contact</i>	<i>University Maintenance, Gardens and Grounds, University Planners</i>	<i>Principles articulated in 2009</i>
3	<i>Trial alternative surface treatments such as synthetic lawn or conversion of an oval to parkland or outdoor teaching common.</i>	<i>Landscape Watering, Potable Water, Grant Funding, Contact, Participation, Project Time</i>	<i>University Maintenance, Gardens and Grounds, University Planners</i>	<i>When Practical</i>
4	<i>Trial and review landscape water meters to monitor real reductions in landscape water use.</i>	<i>Landscape Watering, Potable Water, Contact, Training</i>	<i>University Maintenance, ACTEWAGL, Gardens and Grounds</i>	<i>When Practical</i>
5	<i>Contribute to the sequestration of atmospheric carbon through plantings, mulching and composting.</i>	<i>Contact, Participation, Professional Development, Project time, Carbon Sequestration</i>	<i>University Planners, Gardens and Grounds, Waste Managers</i>	<i>Ongoing</i>
6	<i>Establish protection zones that maintain key biodiversity values and provide scope for improved ecosystem function.</i>	Contact	Gardens and Grounds, University Planners	<i>Zones proposed by 2010 and endorsed by 2011</i>
7	<i>Adopt policies for the management protection of zones</i>	<i>Contact, Project Time</i>	<i>Gardens and Grounds, University Planners</i>	

8	<i>Maintain species diversity within protection zones. Continue assessment of bird (4 seasonal surveys every 5 years) and frog (annual spring survey) species. Investigate options for assessment of other biota including mammals, reptiles and aquatic invertebrates</i>	<i>Participation</i>	<i>Gardens and Grounds, University Planners</i>	<i>Periodic survey as identified</i>
9	<i>Reduce the extent, intensity and ecological impact of weed of regional and national significance</i>	<i>Contact, Participation, Project Time</i>	<i>Gardens and Grounds, internal and external weed management stakeholders</i>	<i>Ongoing</i>
10	<i>Reduce the extent, intensity and ecological impacts of pest animal species</i>	<i>Contact, Participation, Project Time</i>	<i>Gardens and Grounds, internal and external pest management stakeholders</i>	<i>Ongoing</i>
11	<i>Establish community interaction opportunities and education activities (including Earth Sciences Reserves) in primary corridors, links and patches</i>	<i>Contact, Participation, Professional Development, Project time</i>	<i>Whole community</i>	<i>When feasible</i>
12	<i>Develop sustainable landscape strategies that promote reduced dependence on potable water and minimise the use of imported nutrients.</i>	<i>Carbon Sequestration, Landscape Watering</i>	<i>Gardens and Grounds, Waste managers,</i>	<i>Ongoing,</i>
13	<i>Conduct Landscape Function Analysis (LFA) across protection zones to determine infiltration and nutrient assimilation baseline.</i>	<i>Landscape Watering,</i>	<i>Facilities Managers, Grounds and Gardens, Fenner School of Environment and Society</i>	<i>Ongoing</i>
14	<i>Develop guidance for sustainable landscapes in the contractors induction training package</i>	<i>Professional Development, Contact</i>	<i>Facilities and Services, Contractors</i>	<i>When contractos start</i>

15	<i>Restore ecosystems, especially at Old Canberra House Grasslands, the Sullivans Creek Riparian Corridor and the Lake Burley Griffin Corridor</i>	<i>Contact, Project Time</i>	<i>Grounds and Gardens, internal and external heritage interest groups</i>	<i>2009-2012</i>
16	<i>Optimise the relationship between landscapes and energy conservation within buildings</i>	<i>Temperature differential</i>	<i>Facilities and Services, Gardens and Grounds, building occupants</i>	<i>With each proposed landscape change</i>
17	<i>Ensure that biodiversity values are protected through the development process, especially through planning proposals, reviews of preliminary and final site plans and the construction phase.</i>	<i>Carbon Sequestration, Landscape Watering</i>	<i>Facilities and Services, Gardens and Grounds</i>	<i>With each proposed landscape change</i>
18	<i>As an Australian Green Precinct, establish high profile demonstration sites that showcase the sustainable management of sustainable landscape assets</i>	<i>Contact, Participation, Professional Development, Project Time, Innovation</i>	<i>External interest groups, Facilities and Services, Gardens and Grounds, Marketing and Communications, Faculty Staff, Students.</i>	<i>2009-2012 and beyond</i>

2.3 Transport

Transport Goal

Minimise the environmental impact of university-related travel.

Transport Strategies

#	Strategy	Indicators	Stakeholders (ANUgreen and...)	Timing
1	<i>Establish the position of Environment Officer (Alternative Transport) to coordinate sustainable transport activities</i>	<i>Professional development</i>	<i>Transport Officer and all campus commuters</i>	<i>2009 and ongoing if needed</i>
2	Establish additional bike storage facilities and shower/locker facilities on campus	Green commuting	Cyclists	2009
3	Continue to run 'ride to uni breakfasts, and cyclist mentor programs to encourage and support cycle-commuting	Green commuting, events, participation	Cyclists	Biannually
4	<i>Run Go-Green-Get-Lean and other sustainability and wellbeing programs to increase the use of active transport, carpooling, busing to increase acceptability and accessibility of active transport</i>	<i>Green commuting, air travel kms, fleet vehicle emissions, participation, contact</i>	<i>All campus commuters</i>	<i>When feasible</i>
5	Improve student access to affordable second hand bicycles, including providing additional storage for The Recyclery	Green commuting	All campus commuters	2009-2010
6	<i>Review tax arrangements for staff, including options for salary sacrificing bus fares and bicycle purchase</i>	<i>Green commuting</i>	<i>University Finance, Commuters</i>	<i>2009</i>

7	Continue the Timely Treadlies program providing bicycles as alternatives to engine-driven vehicles	Fleet Vehicle Emissions	Staff and Postgraduate Students	Ongoing
8	<i>Review options for University subsidization of public transport costs and/or purchase of vehicles</i>	<i>Green commuting</i>	<i>University Finance, Commuters</i>	<i>2009</i>
9	<i>Redevelop car pooling scheme – including dedicated car pooling car park on campus</i>	<i>Green commuting</i>	<i>Single Occupancy Vehicle users and car poolers</i>	<i>2009-2010</i>
10	Negotiate with ACTION Buses to establish dedicated express/direct services to campus from major interchanges (The University Bus); synchronise bus schedule to teaching schedule; develop online access/download of campus bus schedules and real time arrival information	Green commuting	All campus commuters	2009-2010
11	Review the suitability of locations of major bus stops on campus	Green commuting	All campus commuters	2009, 2012
12	<i>Benchmark parking fees to public transport costs, preferably making parking more expensive than the alternative transport option</i>	<i>Green commuting</i>	<i>All campus commuters</i>	<i>2009-2014</i>
13	<i>Coordinate promotion and support of active transport options with the closure of parking spaces</i>	<i>Green Commuting</i>	<i>All campus commuters</i>	<i>When carparks close</i>
14	<i>Assess the viability of establishing an after-hours emergency shuttle bus service, primarily as a back up service for staff/students working late and not able to access their normal means of transport (public transport, car pool etc)</i>	<i>Green commuting</i>	<i>All campus commuters</i>	<i>2009-2010</i>

15	<i>Reduce transport carbon footprint by expanding use of videoconferencing services. through ICT Capital Development projects</i>	<i>Green commuting</i>	<i>All campus commuters</i>	<i>2009-2010</i>
15	<i>Assess the viability of establishing a stored value parking permit card to be used in specified car parks. Holders would run the card through a machine which generates a voucher for the day and debits the value off the card to encourage mixed mode commuting.</i>	<i>Green commuting</i>	<i>All campus commuters</i>	<i>2009-2010</i>
16	<i>Investigate options for a centrally managed car fleet for transport around and off campus for official business or to be "rented" by the hour for staff/residents who wish to go off campus</i>	<i>Green commuting</i>	<i>All campus commuters, Contact, Participation</i>	<i>2009-2010</i>
17	Maximise the proportion of fleet vehicles specified for low emissions, and optimally tuned for best performance.	Fleet Vehicle Emissions	Deans and Directors Univesity Procurement Office	Ongoing
18	<i>As an Australian Green Precinct, establish high profile demonstration sites that showcase sustainable transport in action</i>	<i>Contact, Participation, Professional Development, Project Time, Innovation, Green Commuting</i>	<i>External interest groups, Facilities and Services, Marketing and Communications, Faculty Staff, Students.</i>	<i>2009-2012 and beyond</i>

3. Performance

Overall Goal of the Performance Program

Achieve world best practice in resource efficiency, conversion to low-carbon energy use and waste minimisation.

Performance Program Indicators and Targets

Programs	Indicator (methodologies are proposed below for novel metrics indicated with * and defined in the appendix of all indicators)	2002 Results	2006 Results	2015 Target	
				Total	% change
Performance					
Energy	CO₂E emissions = tonnes of CO₂E emissions according to National Greenhouse and Energy Reporting Guidelines, itemized by electricity, gas, waste reduction, transport etc	74,944	100,362	80,289	- 20%
	Electricity = total GJ of energy used from electricity	243,320	308,005	246,404	- 20%
	Gas = Total GJ of energy used from reticulated gas	129,255	159,082	127,265	- 20%
	Green Energy = Reduced demand for 'black energy' due to green energy purchased and produced	-	-	Decrease	<20%
Water	Potable Water = total KL of potable water used	746,901	781,564	547,095	- 30%
Procurement and Waste	Waste reduction* = estimated tonnage reduction of waste to landfill (or Waste to Landfill)	TBE	TBE	TBE	- 40%
	Savings from re-use* = estimated savings due to the re-use of furniture and other equipment	TBE	TBE	TBE	- 40%
	Waste to Landfill = tonnes of waste to landfill	1,664	1,208	724 8	- 40%
	Ecological footprint* = the ANU demand for resources compared with the Earth's capacity to regenerate and provide services.	TBE	TBE	Continually decrease	
Risk and Pollution	Risk = percent residual environmental risk assessed using the Comparative Environmental Risk Assessment Method (CERAM™)	48%	36%	<20%	- 16%
	Emergency services = instances requiring attention of relevant emergency services	TBE	TBE	TBE	0%
	Incidents = observed statutory environmental incidents, and responses	9	1	0	-
	Hazardous Materials = stocks and flows of hazardous materials on campus	TBE	TBE	Continually decrease	

TBE – To Be Estimated

CO₂E – carbon dioxide equivalent

GJ – GigaJoules

SLC – Sustainability Learning Community

km – kilometers

GL – GigaLitres

3.1 Energy

Energy Goal

Significantly reduce energy use and greenhouse gas emissions consistent with world's best practice with a firm target of reducing energy use by 10% by 2010 and by 20% by 2015.

Energy Strategies

#	Strategy	Indicators	Stakeholders (ANUgreen and...)	Timing
1	Minimise energy use, while providing world-class research and teaching facilities	Green building rating, CO ₂ E emissions, electricity, gas, ecological footprint	Building Managers, all ANU facility users	Constant
2	Install renewable and energy efficient equipment, automate switch off equipment and measure energy use by IT software/hardware where possible	Green Building rating, CO ₂ E emissions, electricity, gas, ecological footprint	Building and IT Managers, all ANU facility users	Constant
3	Improve energy monitoring and reporting through online reporting GreenGauge and other Building Management Systems and meters	CO ₂ E emissions, electricity, gas	Building Management System, GreenGauge, Building Managers	Constant
4	Raise the level of green energy purchased	CO ₂ E emissions, electricity, gas, ecological footprint	ACTEWAGL, Finance, Building Managers	When feasible
5	<i>Develop a practical internal carbon neutralization program which aligns with international best practice.</i>	<i>CO₂E emissions, electricity, gas, student contributions</i>	<i>Business managers, individual purchasers</i>	<i>Starting in 2009 and improving annually</i>
6	Promote investment in energy-saving infrastructure	Green building rating, CO ₂ E emissions, electricity, gas, ecological footprint	Vice Chancellor's Green Loan Fund, Business and Building Managers	Ongoing
7	<i>Achieve or exceed all relevant standards for new energy infrastructure</i>	<i>Green building rating, CO₂E emissions, electricity, gas, ecological footprint</i>	<i>Vice Chancellor's Green Loan Fund, Business and Building Managers</i>	<i>Ongoing</i>

8	<i>Initiate a change to internal temperatures, of 1° for 7% energy reduction through the Building Management System incorporating timers for split-systems</i>	<i>Contact, training, CO₂E emissions, electricity, gas, ecological footprint</i>	<i>Building Managers, Occupational Health and Safety Unit, Campus Community</i>	<i>Ongoing</i>
9	<i>As an Australian Green Precinct, showcase sustainable energy strategies in action</i>	<i>Contact, participation, professional development, project time, innovation, leadership</i>	<i>External interest groups and the whole ANU community</i>	<i>2009-2012 and beyond</i>

3.2 Water

Water Goal

Achieve national leadership in sustainable water use. This includes removing all potable water from landscape irrigation and maximizing the value of potable water through water savings and re-use.

Water Strategies

#	Strategy	Indicators	Stakeholders (ANUgreen and...)	Timing
1	<i>Apply water-saving design and management principles in landscapes</i>	<i>Water, potable water</i>	<i>Grounds and Gardens, University Maintenance</i>	<i>When feasible</i>
2	<i>Water plants with a non-potable mix including rainwater, stormwater and grey water</i>	<i>Water, potable water</i>	<i>Grounds and Gardens, University Maintenance</i>	<i>Ongoing</i>
3	Improve water monitoring and reporting through GreenGauge and other Building Management Systems and meters	Green building rating, water, potable water	Grounds and Gardens, University Maintenance	Ongoing
4	Install renewable and efficient water equipment	Green building rating, water, potable water	Grounds and Gardens, University Maintenance	When feasible
5	<i>Integrate ecological function and water capture into building and landscape design</i>	<i>Green building rating, water, potable water</i>	<i>Grounds and Gardens, University Maintenance</i>	<i>When feasible</i>
6	Student internships and coursework on water efficient projects	Green building rating, water, potable water, student contributions, project time	Grounds and Gardens, University Maintenance	When feasible
7	Achieve or exceed all relevant standards for new water infrastructure	Green building rating, water, potable water	Grounds and Gardens, University Maintenance	When feasible
8	<i>As an Australian Green Precinct, showcase sustainable water strategies in action</i>	<i>Contact, participation, professional development, project time, innovation, leadership</i>	<i>External interest groups and the whole ANU community</i>	<i>2009-2012 and beyond</i>

3.3 Procurement and Waste

Procurement and waste Goal

Achieve national leadership in waste minimization, by maximizing resource values and applying the waste hierarchy across all resource streams. That is placing an emphasis on waste avoidance, reduction, re-use, recycling and disposal, in that order.

Procurement and waste Strategies

#	Strategy	Indicators	Stakeholders (ANUgreen and...)	Timing
1	Maintain a permanent and efficient network of recycling stations in the landscape, and throughout buildings	Contact, waste reduction, waste to landfill, ecological footprint	Cleaning contract, University Maintenance	Ongoing, with additions and maintenance as needed
2	<i>Apply the waste hierarchy and sustainability standards across all procurement policies, resource streams and materials contracts, where feasible and cost-effective.</i>	<i>Waste reduction, waste to landfill, ecological footprint</i>	<i>Procurement Office, Business Managers, National Packaging Stewardship Council, Good Environmental Choice Australia</i>	<i>Ongoing</i>
3	<i>Develop consistent measurements for resource purchase and use across major material streams</i>	<i>Waste reduction, project time, ecological footprint,</i>	<i>Procurement Office, Business Managers</i>	<i>2009-2010</i>
4	<i>Improve waste monitoring and reporting through community and contract arrangements</i>	<i>Waste reduction, waste to landfill, participation, project time, ecological footprint</i>	<i>Business Managers, Waste Contractors, student interns</i>	<i>Ongoing</i>
5	Student internships and coursework on resource efficiency and waste reduction projects	Ecological footprint, waste reduction, waste to landfill, student contributions, project time	Students, Faculty	When feasible
6	Establish a permanent organic waste recycling facility Manage waste to reduce greenhouse gas emissions	CO ₂ E emissions, waste reduction	Grounds and Gardens, Waste Contractors, infrastructure partners	Ongoing
7	Further investigate opportunities for green procurement, and integrate into preferred suppliers lists	Waste reduction, participation	Procurement Office, Business Managers, industry experts, preferred procurement contracts	Ongoing

8	<i>Foster a culture of conscious consumption where energy efficiency and sustainability are primary influences procurement decisions</i>	<i>Contact, participation, professional development, waste reduction, waste to landfill</i>	<i>ANU staff and postgraduate students, Heads of Halls, Business Managers, Procurement Office</i>	<i>Ongoing, and as a focus at events</i>
9	Provide information on the limits to re-use and recycling, and a service for the retrieval, storage and redistribution of excess, re-usable equipment	Waste reduction, waste to landfill, ecological footprint	Whole ANU community and external recycling suppliers	Service to be responsive within a reasonable time
10	<i>Maintain a database of hard-to-solve redistribution or waste problems and review regularly to identify system gaps and opportunities</i>	<i>Contact, comments</i>	<i>Faculty and General Staff</i>	<i>Ongoing</i>
11	<i>Harness opportunities for public art, displays, actions and other positive messages for waste minimisation and resource conservation and wellbeing</i>	<i>Contact, participation, project time, waste reduction</i>	<i>Arts community and other interested parties</i>	<i>When feasible</i>
12	Promote the removal of large waste-to-landfill skips, and their replacement with smaller bins when feasible to prevent unnecessary waste pickups and encourage recycling	Waste reduction, contact	Business Managers	Ongoing
13	<i>As an Australian Green Precinct, showcase any waste management systems that lead to water or energy savings</i>	<i>Contact, participation, professional development, project time, innovation, leadership</i>	<i>External interest groups and the whole ANU community</i>	<i>2009-2012 and beyond</i>

3.4 Risk and Pollution

Risk and Pollution Goal

Minimise the likelihood and consequences of all potential emissions from ANU.

Risk and Pollution Strategies

#	Strategy	Indicators	Stakeholders (ANUgreen and...)	Timing
1	Continue annual environmental risk assessments and reporting using Comparative Environmental Risk Assessment Method, aiming to maintain a residual risk below 20%. <i>Enhance existing systems through self-assessments.</i>	Risk, incidents	Head Technical Officers and Building Managers especially in higher-risk buildings	Annually
2	Continue to ensure that suitable spill kits are available to clean any foreseeable spill at ANU	Risk, incidents, emergency Services	Occupational health and Safety Unit, Security Division, Head Technical officers, University Maintenance	Ongoing
3	Continue to oversee the planning and installation of pollution prevention equipment as needed for specific, identified sites. Train relevant staff and students in their use	Risk, participation, professional development	Occupational health and Safety Unit, Security Division, Head Technical officers, University Maintenance	As needed
4	Continue to investigate, manage or remove possible point sources of pollution from the ANU	Risk, incidents, emergency services	Occupational health and Safety Unit, Security Division, Head Technical officers, University Maintenance	As needed
5	<i>Implement chemical barcode system to track hazardous substances</i>	<i>Risk, hazardous materials, emergency services, incidents</i>	<i>Occupational Health and Safety Unit, Head Technical Officers, Hazardous Waste Planning Committee</i>	<i>Achieve 90% coverage by 2012 and 100% by 2015</i>
6	Incorporate environmental risk management into standard procedures and practices	Risk, contact, professional development, incidents, emergency services	Occupational Health and Safety Unit, Head Technical Officers	Ongoing

7	<i>Establish and maintain a register of environmental events, incidents and ticketable offences and review these to improve protection</i>	<i>Incidents, emergency services</i>	<i>Occupational Health and Safety Unit, Head Technical Officers, University Maintenance, Risk Management and Audit Office</i>	<i>Ongoing</i>
8	Continue monthly monitoring and public reporting of Sullivans Creek water quality	Contact, participation, risk, resilience, incidents	Volunteers	Monthly
9	<i>Investigate any suspected cases of water quality reductions through extra sampling and analysis when needed</i>	<i>Contact, participation, risk, resilience, project time, incidents, emergency services</i>	<i>Volunteers, student interns</i>	<i>As needed – possibly once a year</i>
10	<i>Continue public information campaigns to prevent stormwater pollution, applying high quality signs to all drains</i>	<i>Contact, risk</i>	<i>University Maintenance</i>	<i>Install in 2009</i>
11	Continue to install and monitor sediment traps where needed	Risk, incidents, emergency services	University Maintenance, Technical Staff	As needed
12	Continue stormwater management and spill prevention training, and add other pollution prevention courses as needed, including for cleaners and science areas	Professional development, participation, risk.	Technical staff and students.	As needed.

4. Integration

Overall Goal of the Integration Program

Develop a world-class sustainability program built upon innovation, leadership and collaboration between university departments.

Integration Program Indicators and Targets

Programs	Indicator (methods are proposed below for indicators marked with *)	2002 Results	2006 Results	2015 Target	
				Total	% change
Integration					
Management	Utilities Value* – Benefit-Cost analysis of the university sustainability program (qualitative report with a possible metric element).	TBE	TBE	Continually increase	
	Comments* = A register of comments received about the sustainability program.	Not known		Continually increase positive and reduce unresolved.	
Innovation	Publications – points accrued for publications on ANU sustainable facilities management, based on the relevant Department of Education scale	TBE	TBE	Continually increase	
Leadership	Awards received – number of external awards received for sustainable facilities management at ANU	TBE	TBE	Cement leadership in sustainability	
	Awards made – total value of prizes issued through internal award and reward programs	TBE	TBE	Support novel initiatives	
	Grant Funding – total grant funding received for sustainability projects	TBE	TBE	Support novel initiatives	
Resilience	Resilience – degree of exposure to risks from the environment to ANU (qualitative report with a possible metric element)	TBE	TBE	Continually increase	
All	Population = Full-time equivalent staff plus students	12,399	14,712	-	-
	Floor Area = Total floor of buildings in m ²	378734	487672	-	-

TBE – To Be Estimated

4.1 Management

Management Goal

Enhance the efficiency of the ANU sustainability program to achieve more gains where practical.

Management Strategies

#	Strategy	Indicators	Stakeholders (ANUgreen and...)	Timing
1	<i>Review and harness opportunities for cost savings due to sustainability outcomes</i>	<i>Utilities value</i>	<i>All of ANU, especially Building Managers</i>	<i>Ongoing</i>
2	<i>Develop and implement cost-effective strategies for collecting, analyzing and presenting sustainability results using indicators associated with this plan</i>	<i>All, especially new indicators defined in indicators table.</i>	<i>Course convenors, student groups, staff groups, Division of Information.</i>	<i>Ongoing.</i>
3	<i>Develop and maintain a register of comments on improvements on sustainable facilities management.</i>	<i>Comments</i>	<i>All ANU communities</i>	<i>Ongoing</i>
4	<i>Increase the professionalism of the ANUgreen office by association with the Certified Environmental Practitioner program and relevant professional bodies</i>	<i>Professional development</i>	<i>ANUgreen staff</i>	<i>When feasible</i>

4.2 Innovation

Innovation Goal

Make creative, original contributions to facilities management. Register the innovations being achieved through the publication of results in relevant journals and popular media.

Innovation Strategies

#	Strategy	Indicators	Stakeholders (ANUgreen and...)	Timing
1	Publish results of sustainable facilities management programs, through newspapers, newsletters, industry magazines, conferences, workshops and other academic publications	Publications, student contributions, project time, outreach	Fenner School of Environment and Society and other academic areas	When opportunities present
2	Contribute sustainability reports to annual conferences of higher education facilities management groups, including Australasian Campuses Towards Sustainability, Tertiary Education Facilities Managers and International Association of Research Universities	Contact, publications, student contributions, projects	External peers and associations	Annually
3	<i>As an Australian Green Precinct, take up available options to promote innovative sustainability gains achieved by ANU</i>	<i>Contact, participation, professional development, project time, innovation, leadership</i>	<i>External interest groups and the whole ANU community</i>	<i>2009-2012 and beyond</i>

4.3 Leadership

Leadership Goal

Encourage, reward and celebrate environmental leadership and civic responsibility through case studies and showcases of world-class environmental initiatives.

Leadership Strategies

#	Strategy	Indicators	Stakeholders (ANUgreen and...)	Timing
1	Participate in, and operate systems of grants and awards which facilitate better environmental performance	Awards received, awards made	All ANU communities	Annually, and when opportunities present
2	Run an internal program to acknowledge, reward and foster excellence in environmental facilities management	Awards made	All ANU communities	Annually, and when opportunities present
3	<i>Take steps to support personal and community wellbeing to ensure sustainability of environmental initiatives</i>	<i>Green commuting, participation, projects, contact</i>	<i>Green Champions, other sustainability leaders across all ANU communities</i>	<i>As needed</i>
4	<i>As an Australian Green Precinct, encourage peers and other interest groups to take on innovative sustainability solutions that save energy and water</i>	<i>Contact, participation, professional development, project time, innovation, leadership</i>	<i>External interest groups and the whole ANU community</i>	<i>2009-2012 and beyond</i>

4.4 Resilience

Resilience Goal

A resilient campus that protects its surroundings.

Resilience Strategies

#	Strategy	Indicators	Stakeholders (ANUgreen and...)	Timing
1	<i>Apply risk management framework to risks from the environment to the ANU, and into other areas, such as biodiversity and extreme weather events</i>	<i>Resilience</i>	<i>Building Managers, Facilities and Services Division, Risk Management and Audit Office</i>	<i>Apply and review new framework annually</i>
2	<i>Develop an Energy Descent Action Plan for implementation over a 15-20 year timeframe.</i>	<i>Resilience</i>	<i>The entire ANU community and external interest groups</i>	<i>Draft in 2009-2010</i>
3	Incorporate environmental risk management into standard procedures and practices to prevent major disruption from extreme weather events	Resilience	Building Managers, University Facilities Managers, Security Division, Risk Management and Audit Office	When practical
4	<i>As an Australian Green Precinct, promote and support the building of resilience to climate change to peers and other interest groups</i>	<i>Contact, participation, professional development, project time, innovation, leadership</i>	<i>External interest groups and the whole ANU community</i>	<i>2009-2012 and beyond</i>

Appendix: Performance Indicators for ANU Environmental Management Plan 2009-2015

Sub-program	Indicator (methodologies are proposed below for novel metrics indicated with *)	2002 Results	2006 Results	2015 Target	
				Total	% change
People					
Outreach	Contact* = Total one-to-one points of community engagement with ANU sustainability information	2004	615,003	Continually increase	
	Commitments = Total commitments made to sustainability challenge programs	0	0	Continually increase	
	SLC = Membership of the Sustainability Learning Community	0	250	Continually increase	
Training	Professional Development = Total points earned in ANU sustainability training, based on Certified Environmental Professional Development scale	TBE	TBE	Continually increase	
	Green Champions = number of business units participating in campus sustainability initiatives	10	25	Continually increase	
	Products = number of cultural and academic artifacts produced that advance sustainability goals	TBE	TBE	Continually increase	
Events	Participation = Total number of person-hours invested by volunteers and participants in sustainability events and programs	TBE	TBE	Continually increase	
Projects	Project Time = Estimated hours of student projects addressing practical ANU sustainability issues	TBE	TBE	Continually increase	
	Audits = number of environmental audits undertaken	TBE	TBE	Continually increase	
Place					
Buildings	Green Building Rating – estimated change to the sustainability rating of ANU buildings using relevant tools.	TBE	TBE	Continually increase	
	Green Loans – investments and returns to the Green Loan Fund	TBE	TBE	100%	Increase
Sustainable Landscapes	Landscape Watering = Total KL of potable water used in landscape irrigation	TBE	TBE	0%	TBE
	Sullivan's Creek Water Quality* = per cent change in creek water quality.	TBE	TBE	Continually increase	
	Carbon Sequestration* = Estimated change in kilograms of carbon embodied in landscape features (qualitative report with a possible metric element)	TBE	TBE	Continually increase	
	Weeds – distribution and abundance of major weed species.	TBE	TBE	TBE	- 30%
	Temperature differentials* = change in the difference between internal and external temperatures attributable to landscape features.	TBE	TBE	Continually increase	
Sustainable Transport	Green Commuting = per cent of university commuting outside Single Occupant Cars (or Fleet Vehicle Emissions)	TBE	TBE	50%	TBE
	Bicycle Parking – number of secure bicycle parking spaces at ANU	TBE	TBE	TBE	Increase
	Air travel off-sets – offset CO ₂ E from air travel	TBE	TBE	100%	TBE
	Air travel kms – change in ANU total air kms	TBE	TBE	Continually reduce	
	Fleet vehicle emission offsets – tonnes of CO ₂ E from the university fleet – reported with off-sets	100%	100%	100%	Hold
	Fleet vehicle emission reductions – per cent reduction in CO ₂ E from the university fleet – reported without off-sets (also record total CO ₂ E)	1100	923	738	- 20%

Performance					
Energy	CO₂E emissions = tonnes of CO₂E emissions according to National Greenhouse and Energy Reporting Guidelines, itemized by electricity, gas, waste reduction, transport etc	74,944	100,362	80,289	- 20%
	Electricity = total GJ of energy used from electricity	243,320	308,005	246,404	- 20%
	Gas = Total GJ of energy used from reticulated gas	129,255	159,082	127,265	- 20%
	Green Energy = Reduced demand for 'black energy' due to green energy purchased and produced	-	-	Decrease	<20%
Water	Potable Water = total KL of potable water used	746,901	781,564	547,095	- 30%
Procurement and Waste	Waste reduction* = estimated tonnage reduction of waste to landfill (or Waste to Landfill)	TBE	TBE	TBE	- 40%
	Savings from re-use* = estimated savings due to the re-use of furniture and other equipment	TBE	TBE	TBE	- 40%
	Waste to Landfill = tonnes of waste to landfill	1,664	1,208	724 8	- 40%
	Ecological footprint* = the ANU demand for resources compared with the Earth's capacity to regenerate and provide services.	TBE	TBE	Continually decrease	
Risk and Pollution	Risk = percent residual environmental risk assessed using the Comparative Environmental Risk Assessment Method (CERAM™)	48%	36%	<20%	- 16%
	Emergency services = instances requiring attention of relevant emergency services	TBE	TBE	TBE	0%
	Incidents = observed statutory environmental incidents, and responses	9	1	0	-
	Hazardous Materials = stocks and flows of hazardous materials on campus	TBE	TBE	Continually decrease	
Integration					
Management	Utilities Value* – Benefit-Cost analysis of the university sustainability program (qualitative report with a possible metric element).	TBE	TBE	Continually increase	
	Comments* = A register of comments received about the sustainability program.	Not known		Continually increase positive and reduce unresolved.	
Innovation	Publications – points accrued for publications on ANU sustainable facilities management, based on the relevant Department of Education scale	TBE	TBE	Continually increase	
Leadership	Awards received – number of external awards received for sustainable facilities management at ANU	TBE	TBE	Cement leadership in sustainability	
	Awards made – total value of prizes issued through internal award and reward programs	TBE	TBE	Support novel initiatives	
	Grant Funding – total grant funding received for sustainability projects	TBE	TBE	Support novel initiatives	
Resilience	Resilience – degree of exposure to risks from the environment to ANU (qualitative report with a possible metric element)	TBE	TBE	Continually increase	
All	Population = Full-time equivalent staff plus students	12,399	14,712	-	-
	Floor Area = Total floor of buildings in m ²	378734	487672	-	-

Headline indicators are in blue, bold.

TBE – To Be Estimated

SLC – Sustainability Learning Community

GJ – GigaJoules

CO₂E – carbon dioxide equivalent

km – kilometers

GL – GigaLitres

Proposed methodologies for original metrics (marked above with * in the table above)

Contact

The *Contact* metric will count the individual points of contact made with ANU sustainable facilities management information. This is the total number of individual:

- Hits on the ANUgreen website,
- Face-to-face interactions at events,
- Participants at events, training programs, workshops and other sustainability gatherings,
- Unsolicited emails to ANUgreen addresses (such as recycle@anu.edu.au),
- Visits to the ANUgreen office,
- Other equivalent points of contact.

Carbon Sequestration

The *Carbon Sequestration* metric will describe the change in CO₂E held within the ANU landscape. It will not attempt to estimate total carbon sequestration, but only to monitor change. Annual growth of existing plantings will be included in the calculation of *New Carbon Sequestered*, together with the changes due to new plantings, composting and other additions. In most cases, mulching of dead wood is considered carbon-neutral. *Sequestration Loss* will quantify CO₂E lost through landscape change, including burning of dry material, and decomposition and aquatic plant matter.

Taking 2006 as a base year, sum for each landscape change:

$$\text{Carbon Sequestration} = \text{New Carbon Sequestered} - \text{Sequestration Loss}$$

Where

New Carbon Sequestered

=

Estimate of atmospheric CO₂E taken up through vegetation gains and other landscape sources at ANU, including annual growth of new plantings and composting.

and

Sequestration Loss

=

Estimate of CO₂E emitted through vegetation losses and other landscape sources, such as burning and decomposition of plant material.

Sullivan's Creek Water Quality

Sullivan's Creek water quality is already measured at three ANU sites each month in partnership with the Molonglo Catchment Health Indicators Project. Indicators include dissolved oxygen, turbidity, salinity (electrical conductivity), pH, nitrate, phosphate, temperature. The key indicator for ANU at present is dissolved oxygen, and initially this measure will be used alone for this consolidated report. Other measures may be brought forward for wider reporting if historical trends are changing.

Temperature differentials

Over time, develop a methodology for comparing the internal temperatures within similar characteristic buildings (re management, infrastructure etc) within different contexts, ie. one with a carpark on the west wall as compared to one with a greenspace or other green infrastructure.

Waste reduction

The *Waste Reduction* metric will estimate the change in waste removed from the landfill stream between years and across waste streams, based on the 2006 base year.

Waste reductions may be achieved for any waste stream, including: paper, cardboard, batteries, polystyrene, furniture, electronic equipment (monitors, central processing units, keyboards, televisions, other).

Waste Avoidance is calculated using university purchasing data. It reflects changes in purchasing patterns per person compared with the base year. Waste refusal could be calculated for any material stream for which central data are captured, but should include at least: paper, furniture, electronic and IT equipment, print cartridges and mobile phones.

Waste Recycling is also using reports from waste contractors. Each waste stream will be measured with one standard unit, which might be volume, weight or unit, depending on the nature of the stream. For example, paper is measured in units of reams, while organic waste is measured in tonnes.

Where

Waste Reduction

=

Average (Total Waste Avoidance and Recycling)

And

*% Waste
Avoidance or
Recycling*

=

$$\frac{(2006 \text{ result} - \text{reporting year result})}{2006 \text{ result}}$$

x

$$\frac{100}{1}$$

This methodology could be enhanced using expert input to determine different weightings for each waste stream. In this way, the small, but relatively hazardous materials such as batteries are accurately weighted against large, benign waste-streams such as paper. Baseline data for recycling are provided in the table below.

Base data for recycling

Waste Stream	Unit	2006 per person	2006 per m ²
Waste to landfill	Tonnes	82.14	2.478
Paper recycling	Reams	10.07	0.304
Cardboard recycling	Tonnes	6.50	0.196
Co-mingled recycling	Tonnes	8.30	0.251
Metal recycling	Tonnes	1.91	0.057
IT waste recycling (Monitors, CPUs, Keyboards, Televisions)	Units	1.72	0.052
Electronic equipment (other)	Tonnes		
Furniture recycling	Units	0.62	0.019
Pallet recycling	Tonnes	0.24	0.007
Fluorescent tube recycling		0.09	0.003
Phenomics waste bedding	Tonnes	8.27	0.250
Expanded Polystyrene	Tonnes	0.06	0.002
Cooking Oil	Litres	0.64	0.019
Print Cartridges/Mobile Phones.	Tonnes	0.04	0.001

Savings from re-use

The savings from re-use metric measures the dollar savings achieved by avoiding procurement of new furniture and equipment. It is calculated by summing the purchase cost of any equipment which is shifted for re-use anywhere within ANU.

- Standard rates for second-hand furniture are to be applied.
- The value of compost produced through the organic recycling is also included.

Ecological footprint

The Ecological Footprint metric compares the ANU demand for resources with the earth’s capacity to regenerate or provide services. The measurement and communication of the ANU ecological footprint will be informed by existing ecological footprint standards. Measuring ecological footprint will enable comparisons with the rest of the ACT, Australia and other countries. The intent is to establish an academic partnership where the annual ANU footprint is calculated within student projects in courses that already teach the methods.

Green Commuting

The *Green Commuting* metric estimates the per cent of campus commuters avoiding Single Occupancy Cars (SOCs). It could be based on an biannual survey (Autumn and Spring) taken at university entry points during peak arrival times (8am-10am) and an estimation of the university population working from home.

A team of people working simultaneously at each entry point would count the number of people using various transport choices, including:

- Single Occupant Car,
- Car-pool or car-share,
- Walk,
- Bus or walk from Civic (assume bus),
- Cycle,
- Work from home, and
- Other less-polluting transport options.

% Green Commuting	=	Per cent Arriving in SOCs	-	Per cent working off campus	x	100
		Total arriving on campus		1		

Green Building Rating

The *Green Building Rating* metric will describe the change in sustainable building ratings applicable to ANU buildings. This will be based on relevant published ratings tools, which may change during the life of the Plan. It will not attempt to estimate the total sustainable building rating for all buildings, but only to monitor change. Changes to ratings will be estimated the for new buildings, and those whose sustainability ratings have changed through retrofits.

$$\text{New Stars} = \text{Annual change in sustainable building ratings for ANU buildings.}$$

Utilities Value

The Value metric will aim for a benefit-cost analysis of ANU Sustainability initiatives with regards utilities including electricity, gas, water and waste. It is noted up front that the many intangible benefits from sustainability initiatives makes them worth doing even if they are costly. These intangible values are not included in the calculation of Value and so a qualitative report is to accompany any metric presented.

2006 is taken as the base year.

$$\text{Value} = \text{Savings} - \text{Costs}$$

Where

Savings are calculated by summing for electricity, gas, potable water and waste to landfill:

$$\text{Savings} = \left(\text{Base year (2006) result per person or m}^2 \text{ floor area} \times \text{unit cost of resource in reporting year} \times \text{population or floor area in reporting year} \right) - \text{actual resource cost in reporting year}$$

And

Costs = Salaries, on-costs and purchases for ANUgreen program minus the additional amount spent on green energy.

The following table contains base-line data to use in future calculations. In 2006, the full-time ANU population was 14,712 and there was 487,672m² of floor area.

Indicator	2006 Total	2006 results per person	2006 result per m ² floor area
Electricity (GJ)	308,005	20.94	0.63
Gas (GJ)	159,082	10.81	0.33
Potable Water (kl)	781, 564	53.12	1.60
Waste to Landfill (kg)	1208,000	82.11	2.48

Comments

Record the detail of requests, and also record whether the comment is:

- Positive or negative, and
- If negative, how long it took to resolve, or whether it remains unresolved.

Resilience

The Resilience metric will aim to give a comparative measure representing ANU exposure to risks from the environment. This will be an extension of the Comparative Environmental Risk Assessment Method. Each building will be assessed using CERAM for risk to business-as-usual from:

- Fire,
- Flood,
- Drought,
- Windstorm,
- Hail,
- And other extreme weather events.