



INFRASTRUCTURE SURVEY 2009



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BACKGROUND AND CONTEXT

In 2008 the Group of Eight (Go8) released a first report on the state of its buildings and infrastructure, based on a survey undertaken in 2007 (www.go8.edu.au/government-a-business/go8-policy-a-analysis/2008/181-group-of-eight-infrastructure-condition-survey-2007).

A further survey was undertaken in 2009, updating some information about the assessed quality, value and condition of buildings and use of space. It also collated data related to aspects of the estate not previously explored, including student accommodation, energy and other environmental issues and initiatives.

Some of these data are provisional: data sources are not yet well developed, and definitions and classifications are being reviewed for some of these topics. This is particularly so of the data related to space management and environmental issues including carbon measurement and reduction strategies, where further work is being done on both strategies and measurement/data issues.

Where appropriate, the survey has used Tertiary Education Facilities Management Association (TEFMA) definitions and methodology. There is a Glossary of terminology and definitions (**Appendix 1**). The survey form is **Appendix 3** of this Report.

As for the previous survey, two reports from the survey data are being prepared. This summary presents aggregates across the Go8. The second report contains data about each member university. It is confidential, and has limited availability.

The Go8 records its appreciation for the assistance of Directors of Facilities Management and their staff of member universities.



SUMMARY OF SURVEY RESULTS

1. Buildings and space

The eight member universities reported a total of 2,071 buildings with a total gross floor area (GFA) of 4,182,000 m², at the beginning of 2009. The calculated usable floor area (UFA), after allowing for common use and non-habitable areas, was 2,793,000 m².

The following table shows area/staff and area/student ratios for the Go8 universities in aggregate. TEFMA compiles comparable measures for a broader set of 38 Australian universities and higher education providers (including all of the Go8 members). The Go8 universities in aggregate represent just over 40% of the TEFMA totals, in terms of ARV, GFA, UFA and staff in FTE terms). The TEFMA averages are also shown in this table:

Table 1. Area/staff and area/student ratios

Ratio	Go8	TEFMA
GFA/FTE (m ² per staff member ¹)	99	107
UFA/FTE (m ² per staff member ²)	66	70
GFA/EFTSL (m ² per student)	18.9	14.6
UFA/EFTSL (m ² per student)	12.6	9.6

The Asset Replacement Value (ARV), or cost of rebuilding the existing buildings to their initial standard, totalled \$14,072.7 million. This is an average of \$6.8 million per building, and \$3,365 per m². The broader TEFMA data set had an estimated ARV/GFA of \$3,240 per m².

1.1 Types of space

The UFA is distributed across the following types of usage (in aggregate over the eight member universities).

Table 2. Usable floor area by space type

Type of space	% of UFA
Teaching and Learning	11.2%
Laboratory	15.6%
Office	24.3%
Information Services	6.9%
Ancillary	11.6%
General Use	20.1%
Other	10.3%

1. Staff members are measured as staff full-time equivalent numbers (FTE).

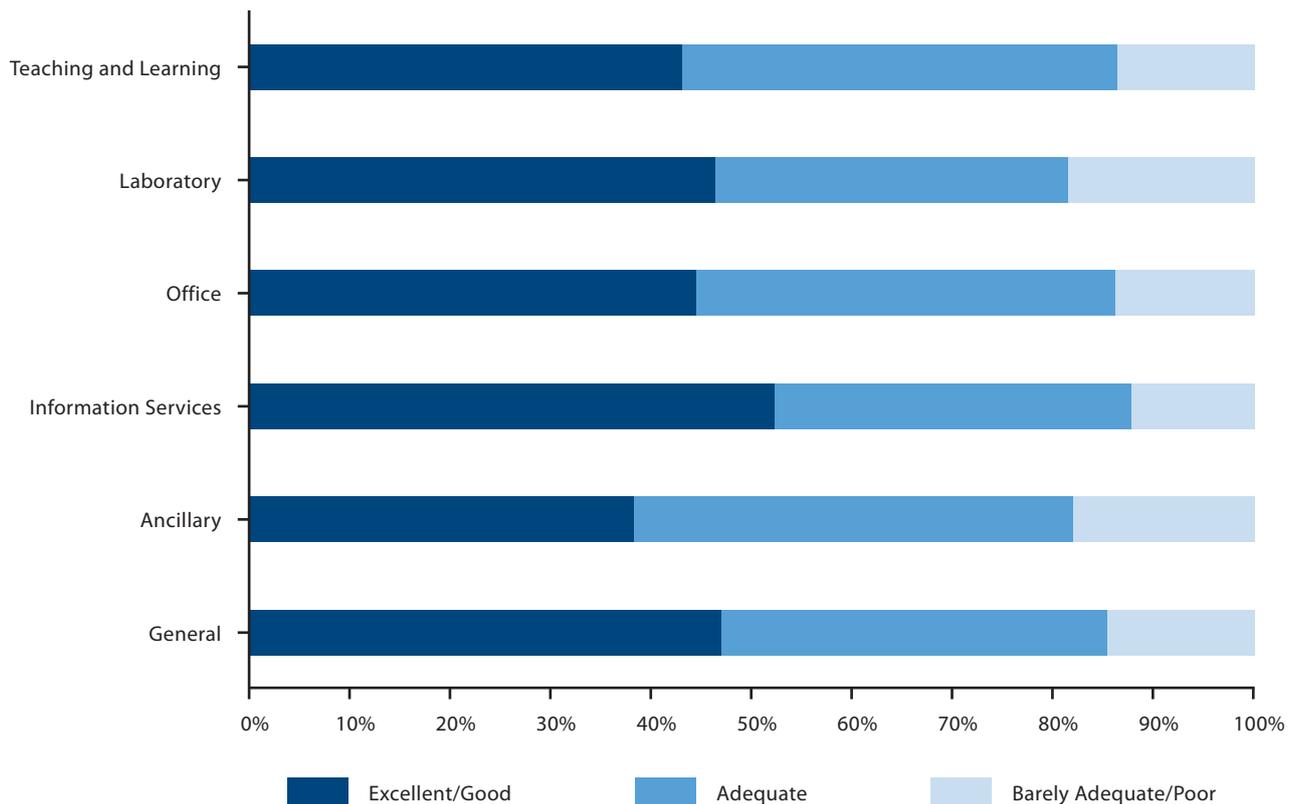
2. Student numbers are equivalent full-time student load (EFTSL).

These commonly used staff and student measures, and the ratios derived using them, have limitations. Part-time staff and students occupy space and use facilities. Also, space needs depend upon the composition of disciplines for which teaching/learning and research is provided and undertaken at a university. Nonetheless, these ratios are indicative and provide a useful basis for comparison, over time and across institutions.

1.2 Functionality of building stock

The TEFMA Facilities Functionality Index provides an objective methodology to qualitative ratings of the building stock. The index takes account of the requirements to bring a facility up to user requirements, statutory compliance and fitness for purpose. See **Appendix 2** for definitions of the categories, and details of the TEFMA Index. In interpreting these data, some caution is required, given the degree of subjectivity in the ratings. However, they provide a good indication of the extent to which there are various spaces requiring attention to bring them up to appropriate standard.

Figure 1. Functionality of building stock



Offices

Across Go8 universities, 17.2% of office space was rated Excellent, and 27.3% Good. Some 14% was rated Poor or Barely Adequate; the remaining 41.5% was Adequate.

Teaching and Learning

Overall, 16.4% of Teaching and Learning areas were rated Excellent, with a further 26.5% rated Good. 13.7% of Teaching and Learning space rated Poor or Barely Adequate. The remaining 43.4% was Adequate.

Laboratories

Of laboratory space, 20.7% was rated Excellent and 25.6% Good. Some 35.0% was Adequate, while 18.7% was Poor or Barely Adequate.

Ancillary

For the Ancillary areas, 13.0% were rated Excellent, and 25.2% rated Good. 18.3% of Ancillary space rated Poor or Barely Adequate. The remaining 43.6% was Adequate. Ancillary space includes laboratory preparation rooms, store rooms, workshops and locker rooms.

Information Services

In the Information Services areas, 16.2% was rated Excellent, 36.1% Good, 35.2% Adequate, and 12.5% Barely Adequate or Poor. Information Services include libraries, computer rooms and audio visual facilities.

General

For General areas of the building stock, which include meeting rooms, lounges, medical centres, exhibition space, recreation rooms and child care facilities, 11.1% were rated Excellent, 35.8% Good, 38.5% Adequate and 14.6% Barely Adequate or Poor.

1.3 Building condition

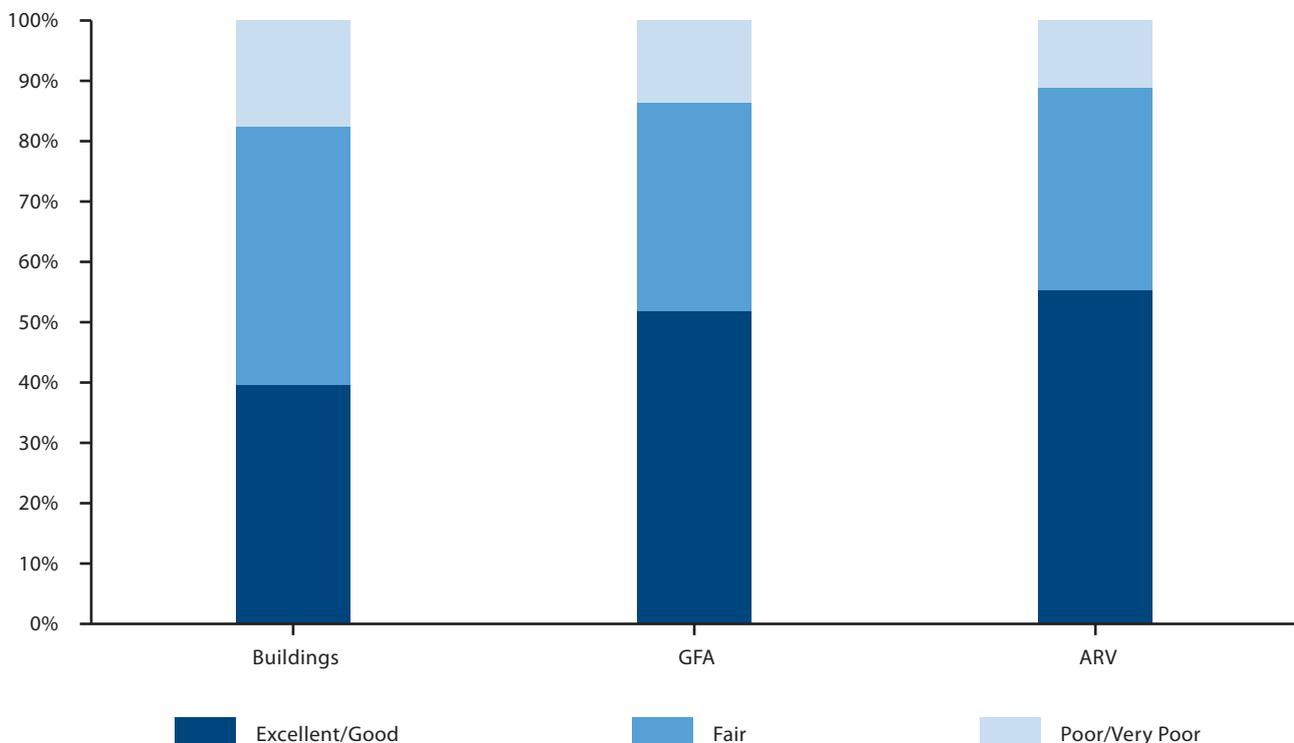
The condition of the university buildings was rated using the TEFMA Facilities Condition Index. (Details of this Index are in *Appendix 2*.)

Of the 2,071 buildings in the Go8 universities, 823 (40%) were rated as in Excellent or Good condition, while 871 (42%) were Fair. The remaining 377 buildings (18%) were rated as Poor or Very Poor.

In terms of total Gross Floor Area, 52% was rated Excellent/Good; 34% was Fair; while 14% of GFA was rated Poor or Very Poor.

Buildings in Excellent/Good condition were just over half of the total Asset Replacement Value. A further 33% of the ARV was considered Fair. Buildings rated in Poor or Very Poor condition represent 11.5% of the total Building ARV.

Figure 2. Building condition level



2. Backlog maintenance

Maintenance costs are a major budgetary issue for all Go8 universities. The total estimated cost of backlog maintenance in 2009 was \$1,509 million across the Go8 universities. This is 10.9% of the total building ARV. In terms of the condition of the buildings, this backlog maintenance was distributed as follows:

Table 3. Backlog Maintenance

Building Condition	Backlog Maintenance (\$m)	%
Excellent	36	2.4
Good	304	20.2
Fair	716	47.4
Poor	322	21.4
Very poor	131	8.7
Total	1509	100.0

While the estimate of total backlog maintenance required has risen by 1.3% from the \$1,490 million estimated in the previous survey (2007), it has fallen by 0.8 percentage points in terms of its proportion of the total building ARV, from 11.7%.

The eight universities planned to spend \$41 million in 2009 to address backlog maintenance. This represents 2.7% of the estimated \$1509 million total costs of present backlog maintenance.

3. Student accommodation

Go8 universities reported a total of 20,418 residential beds at the beginning of 2009. This number was 9.2% of the Equivalent Full Time Student Load.

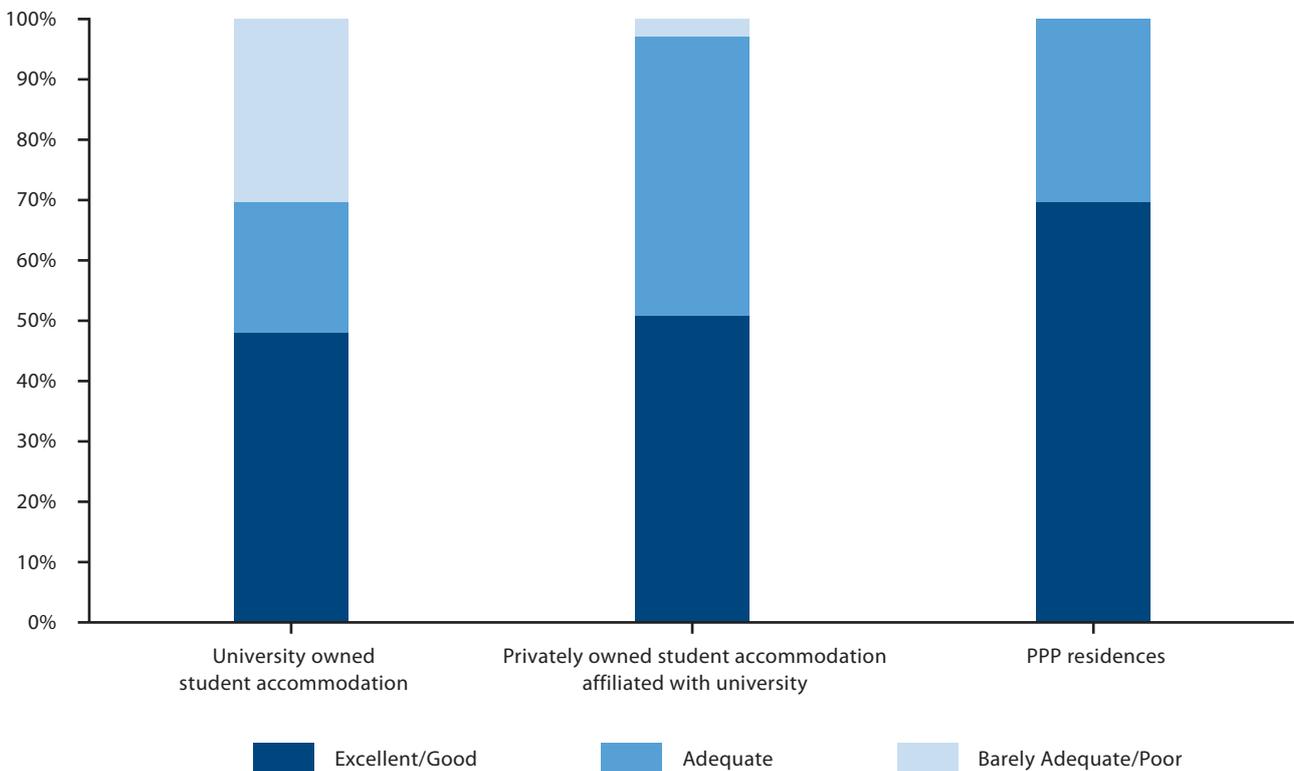
There were 7,451 university owned student beds (36.5%), while 49.8% of residential beds were privately owned student accommodation affiliated with the university, and 13.8% were in Public/Private partnership (PPP) facilities.

In terms of functionality rating, for the university owned accommodation, 7.6% was rated excellent, 40.5% good, 21.7% Adequate and 29.7% Barely Adequate.

Of the privately owned student accommodation, 16.2% rated Excellent, 34.3% Good, 46.3% Adequate and 2.8% Barely Adequate.

The PPP residences are relatively newer, and 55.6% were rated Excellent, a further 14.3% Good, and the remaining 30.1% Adequate.

Figure 3. Functionality of residential accommodation



4. Non-building infrastructure

Universities have substantial non-building infrastructure—above ground assets (lights, roads, footpaths, signage etc.) and in-ground services (electrical, water, gas, sewerage, stormwater etc.).

The eight universities reported that replacing or completely upgrading non-building infrastructure requiring this level of attention would cost \$82 million. A further \$111 million of major works required was reported, representing a total of \$194 million. This estimate used the TEFMA methodology, and related only to level 4 or 5 requirements.

5. Planned infrastructure and building works 2009

Across the eight universities, the total planned expenditure on new assets, renewal and backlog maintenance totalled \$1,070 million in 2009.

5.1 New assets

The Go8 universities estimated a total of \$627.9 million in building works on new assets in 2009. Of this, 80.0% was to be financed internally by the universities, with 17.8% to be financed by the Commonwealth Government, and 2.1% by state government contributions received by three institutions.

5.2 Renewal work

A further \$374.6 million was estimated to be spent on renewal work (defined as work that is necessary to bring a room, building or facility up to a new standard); 91.8% was financed internally, while Commonwealth Government funding was for 8.2%.

5.3 Non-building infrastructure renewal

In 2009, \$26 million was planned to be spent on work necessary to bring non-building infrastructure up to new standards or capacity. All of this was to be funded internally.

6. Environmental issues

For the first time the Go8 has collated some environment-related data. While these issues need further examination, this information provides a useful perspective on present and planned activities. The survey used National Greenhouse and Energy Reporting (NGER) system definitions.

6.1 Carbon footprint

Emissions

The eight member universities, in aggregate, reported that they generated 61,735 Tonnes Scope 1 CO₂ emissions and a further 614,391 Tonnes Scope 2 CO₂ emissions in 2008-09. Scope 3 emissions were not collected in this survey.

Scope 1 emissions are the release of greenhouse gases into the atmosphere as a direct result of an activity, or series of activities (including ancillary activities) that constitute the facility.

Scope 2 emissions are the release of greenhouse gases into the atmosphere as a direct result of one or more activities that generate electricity, heating, cooling or steam that is consumed by the facility but do not form part of the facility.

Scope 3 emissions are a third category of greenhouse gas emissions that are not reported under the *National Greenhouse and Energy Reporting (NGER)* scheme. These include greenhouse gas emissions (other than scope 2 emissions) that are generated in the wider economy as a result of activities at a facility but are physically produced by another facility (e.g. employees of a facility flying on a commercial airline for business).

Source: Understanding the NGER data, www.climatechange.gov.au/government/initiatives/national-greenhouse-energy-reporting/publication-of-data/understanding-nger-data.aspx.

Gross Total CO₂ emissions were 715,191 Tonnes. This is equivalent to approximately 17 Tonnes per Full Time Equivalent staff member, or 3.2 Tonnes per students (EFTSL).

Offsets

Four of the eight member universities reported purchase of Third Party renewable 'green' energy, accounting for 41,791 Tonnes CO₂ emissions. This is 5.8% of Gross Total CO₂ emissions.

Three member universities have reported other certified offsets, such as Greenfleet, Breathe Easy or Air Mile offsets totalling 10,206 Tonnes CO₂ emissions in 2008-09.

Net carbon footprint

The net carbon footprint, taking account of offsets, totalled 663,193 Tonnes CO₂ emissions. This represents 15.7 Tonnes CO₂ per Full Time Equivalent staff member, or almost 3 Tonnes per student (EFTSL).

Sustainable buildings

Across the eight member universities, there are 3 buildings rated as 4+ Greenstar, and an additional 22 buildings designed with high sustainability (but not externally accredited).

On campus renewable energy

Five of the eight member universities report on-campus renewable energy systems. In the main, these are photovoltaic (PV) cells—some are minor systems. Some universities report solar hot water systems. One university reported a co-generation plant being commissioned.

6.3 Future plans

Universities reported a range of on-campus renewable energy initiatives to be installed or investigated including:

- Trigeneration
- Solar PV
- Wind Turbines
- Solar/Gas Hot water systems
- Geothermal heat exchange
- Deep earth geothermal energy

Other environmental initiatives reported by member universities include:

- Cultural change programs, including training for environmental officers, sustainability promotion programs
- Waste audits
- Recycling, including organic recycling, and waste management
- E-recycling
- Clean out campaigns and furniture re-use
- Water harvesting
- Extended use of recycled water for irrigation of landscapes and sports grounds
- Installing synthetic turf on playing fields
- Installing more efficient heaters
- Default duplex printing
- Automatic power down of unattended computers
- Motion detectors and lighting control
- Facilitating water bottle refilling fountains
- Bike fleet for campus transport
- Extending electric vehicle fleets used by maintenance staff
- Car pooling
- Subsidising public transport to/from university

In the longer term, other environmental initiatives being planned for the future include (as well as those listed above):

- Green master plans
- Sustainability assessments for each university building
- Space conditioning to manage temperature and save energy and emissions
- Research into geothermal sources
- Green walls and roof gardens
- Energy saving competitions
- Green loan fund
- Reduction of car fleet size

Appendix 1

Glossary of terminology and definitions

ARV	Asset Replacement Value (The cost of rebuilding an existing capital asset to its initial standard)
Backlog maintenance	Maintenance that is necessary to prevent the deterioration of an asset or its function but which has not been carried out
EFTSL	Equivalent Full-time Student Load
FTE	Full-time Equivalent Staff
GFA	Gross Floor Area (The sum of the 'Fully enclosed covered area' and 'Unenclosed covered area')
NGERS	National Greenhouse and Energy Reporting System
TEFMA	Tertiary Education Facilities Management Association
UFA	Usable Floor Area (The sum of the floor areas measured at floor level from the general inside face of walls of all interior spaces related to the primary function of the building)

Appendix 2

Survey definitions

Table A2.1 Monash space definitions

Predominant purpose of use	Monash space category	Areas included
Teaching and Learning	General Teaching	Lecture theatres, lecture rooms, tutorial rooms, case study space, examination rooms and other general teaching space
	General Studio	Arts studios (painting, pottery, sculpture), design studios, drama studios, music studios and multimedia studios
Laboratory	General Laboratory	Teaching laboratories, teaching instrument laboratories, teaching ancillary laboratories (storage), laboratory teaching preparation rooms, laboratory teaching circulation, research laboratories, research instrument laboratories, research ancillary laboratories (storage), laboratory research preparation rooms and laboratory research circulation
Office	General Office	Academic offices, academic flexible offices, post graduate offices (course work), honorary offices, sessional offices, research offices, research flexible offices, higher degree by research offices, higher degree by research flexible offices, administrative offices, administrative flexible offices, reception space and hot desks
Information Services	General Information Services	General collection libraries, rare book collection libraries, library photocopy areas, library research areas, reading/study areas, compactus/archive areas, library services space and library circulation space
	General Computer Laboratory	Teaching computer laboratories, training computer laboratories, research computer laboratories, specialist computer laboratories and library computer laboratories
Ancillary	General Ancillary	Workshops, stores, display areas, glass houses, animal services, mail rooms, chemical storage space, freezer/cold rooms, dark rooms, projection/control rooms, special purpose space and server rooms
General Use	General Use	Conference/meeting rooms, photocopying/printing/duplicating space, staffrooms, student common rooms, academic common rooms, general staff common rooms, canteen/dining rooms, kitchen/servery/tearooms, tea preparation rooms, recreation rooms/lounges, undergraduate lounges, postgraduate lounges, higher degree by research lounges, indoor sporting facilities, commercial/business facilities, theatres, assembly halls, special/religious space, medical centres, careers/employment centres, child minding centres, student association space and waiting space
Other		Any other usable space

Table A2.2 TEFMA definition for Facility Functionality Index (FFI)

Functionality code	TEFMA FFI code	Description
Excellent	Very functional	Building efficiency is over 75%, building layout is very flexible and can be adapted with minimal effort, less than 5% ARV
Good	Functional	Building efficiency is between 65% and 75%, services are reasonably up to date and has spare capacity, requires less than 25% of ARV to refurbish
Adequate	Fair functionality	Facility has area efficiency between 50% and 65%, has accessible service paths although services are out of date, and requires between 25% and 50% of ARV to refurbish
Barely Adequate	Low functionality	Facility has area efficiency between 40% and 50% and requires between 50% and 80% of ARV to refurbish
Poor	Not functional	Facility is very inefficient in the use of utilities, has an area efficiency of less than 40%, or requires more than 80% of ARV to refurbish

Table A2.3 TEFMA definition for Facility Condition Index (FCI)

Building condition level code	TEFMA FCI code	Description
Excellent	Very Good	Asset has no defect; appearance is as new
Good	Good	Asset exhibits superficial wear and tear, minor defects, minor signs of deterioration to surface finishes; but does not require major maintenance; no major defects exist
Fair	Fair	Asset is in average condition; deteriorated surfaces require attention; services are functional, but require attention; backlog maintenance work exists
Poor	Poor	Asset is in poor condition; deteriorated surfaces require significant attention; services are functional but failing often; significant backlog maintenance work exists
Very Poor	Demolish	Asset has deteriorated badly; serious structural problems; general appearance is poor with eroded protective coatings; elements are broken, services are not performing; significant number of major defects exist

Table A2.4 Levels of Refurbishment for Non-building Infrastructure Works

		Infrastructure Needs			
		Excellent	Good	Poor	Critical
Infrastructure Performance	Excellent	Maintain	Level 1	Level 2	Level 3
	Good	Level 1	Level 2	Level 3	Level 3
	Poor	Level 2	Level 3	Level 3	Level 4
	Critical	Level 3	Level 3	Level 4	Level 5

Level of refurbishment	Description
Level 1	Very little or no works required
Level 2	Tune up and minor works
Level 3	Intermediate works required
Level 4	Major works required
Level 5	Complete asset replacement/upgrade required

Appendix 3

Go8 survey form 2009

Please fill in the cells shaded blue:

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Q1. What are your contact details?

Institution	
Contact person name	
Title	
Telephone	
Email	

Q2. What is the size of your institution/portfolio as at 31 December 2008? Use TEFMA definitions. Include all campuses (including properties that are leased out to 3rd parties, but do not include residential properties or properties leased for university use; i.e. include all buildings you are required to maintain).

Number of buildings	
ARV	
GFA	
UFA	
FTE	
EFTSL	

Explanatory notes/comments

Q3. What is the floor area of your space types? Refer to Monash University Space Utilisation Definitions as a guide. Use TEFMA definitions. Include all campuses (including properties that are leased out to 3rd parties, but do not include residential properties or properties leased for university use; i.e. include all buildings you are required to maintain).

Predominant purpose of use	UFA	% Portfolio
Office		
Teaching & Learning		
Laboratory		
Ancillary		
Information Services		
General		
Other		
Total		

Explanatory notes/comments

Q4. What is the functionality of your building stock? Functionality means the level of capital required to bring a facility up to user requirements, statutory compliance and fit for purpose etc. Refer to TEFMA definition for Facilities Functionality Index (p19, How to Undertake a Facilities Audit; available at www.tefma.com/infoservices/publications/fac_audit.jsp).

Predominant purpose of use	% of building stock within predominant use category				
	Excellent	Good	Adequate	Barely Adequate	Poor
Office					
Teaching & Learning					
Laboratory					
Ancillary					
Information Services					
General					
Explanatory notes/comments					

Q5. Information on the condition of your buildings. Condition is the level of backlog maintenance funds required to bring an asset back to its original condition. Refer to TEFMA definition for Facilities Condition Index (p8, How to Undertake a Facilities Audit).

Building Condition Level	Number of Buildings	GFA	% Total GFA	ARV	% Total ARV	\$ Backlog Maintenance	% Total Backlog Maintenance
Excellent							
Good							
Fair							
Poor							
Very Poor							
Total							
Explanatory notes/comments							

Q6. Information on your student residential accommodation.

Type of residential accommodation	# beds	% of EFTSL
University owned student accommodation		
Privately owned student accommodation affiliated with university		
PPP residences		
Total		
Explanatory notes/comments		

Q7. What is the functionality of your student residential accommodation?

Type of residential accommodation	% of building stock within residential type				
	Excellent	Good	Adequate	Barely Adequate	Poor
University owned student accommodation					
Privately owned student accommodation affiliated with university					
PPP residences					
Explanatory notes/comments					

Q8. What is the \$ value of your deferred non-building infrastructure works to address Level 4 + 5? Refer to TEFMA definition for non-building infrastructure (p9, How to Undertake a Facilities Audit).

Infrastructure Performance		Infrastructure Needs			
		Excellent	Good	Poor	Critical
Infrastructure Performance	Excellent	Maintain	Level 1	Level 2	Level 3
	Good	Level 1	Level 2	Level 3	Level 3
	Poor	Level 2	Level 3	Level 3	Level 4
	Critical	Level 3	Level 3	Level 4	Level 5

Level of refurbishment

Level 1: Very little or no works required

Level 4: Major works required

Level 2: Tune up and minor works

Level 5: Complete asset replacement/upgrade required

Level 3: Intermediate works required

Level 4 \$	
Level 5 \$	

Explanatory notes/comments

Q9. What is your projected Building Works expenditure for 2009 (Calendar Year)?

	\$	Source		
		Commonwealth Govt	State Govt	Internal
New assets				
Renewal work				
Non-building Infrastructure Renewal				
Backlog Maintenance				
Total Infrastructure Budget				

Explanatory notes/comments

Q10. What is your carbon footprint? Use NGER definitions and report for 1 July 2008 to 30 June 2009.

Carbon Emissions	Tonnes CO ₂ e	Tonnes CO ₂ e/m ² GFA	Tonnes CO ₂ e/FTE	Tonnes CO ₂ e/EFTSL	% Total
Scope 1: As per NGER definitions					
Scope 2: As per NGER definitions					
Gross Total: Gross CO ₂ e Emissions					
Less: Green Energy Offset					
Less: Other Certified Offsets (e.g. Greenfleet, Breath Easy, Air Mile offsets)					
Net Total: CARBON FOOTPRINT Baseline emissions for 2008–2009 (Gross emissions less offsets)					

Explanatory notes/comments

Q11. How much do you plan to reduce your carbon footprint in 5 and 10 years?

Go8 Carbon Reduction Targets	% Reduction	Reduction in CO ₂ e emissions	Target CO ₂ e emissions
5 years: % overall reduction in total CO ₂ e emissions by end of 2013-2014 financial year			
5 years: % overall reduction in CO ₂ e emissions per m ² GFA by end of 2013-2014 financial year			
10 years: % overall reduction in total CO ₂ e emissions by end of 2018-2019 financial year			
10 years: % overall reduction in CO ₂ e emissions per m ² GFA by end of 2018-2019 financial year			
Estimated Financial Year end Carbon Neutral			
Tonnes CO ₂ e Reduction From On-campus Renewable Energy Sources			
Number of 4+ Greenstar rated buildings			
Number of buildings designed with high sustainability but not externally accredited			

Explanatory notes/comments

Q12. What are your current carbon footprint reduction targets?

Institution's Current Carbon Reduction Targets			
Base Year	Description	Target Year	%

Explanatory notes/comments

Q13. How do you plan to achieve these carbon footprint reduction targets?

Q14. What on-campus renewable energy do you currently have?

Q15. What plans do you have for future on-campus renewable energy?

Q16. What other environmental initiatives do you currently have (e.g. water harvesting, waste management etc.)?

Q17. What other environmental initiatives are planned for the future?

Q18. What is your degree of confidence in the overall accuracy of the survey data?

