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The University of Technology, Sydney (UTS) is committed to improving sustainability. UTS strives to sustain its local and global environment, organisational health and ability to create a positive, viable future. UTS endeavours to include environmental sustainability principles and targets in all aspects of its decision-making. Through its research, teaching and learning, operations and community engagement, UTS aims to:

- Minimise the environmental impact of its operations and move towards restoring environmental integrity
- Promote social justice, equity and diversity
- Contribute to human health and well-being
- Maintain its financial viability.

As part of its commitment to sustainability, UTS developed a Sustainability Policy and Sustainability Strategy 2012 – 2015. UTS is now developing a series of Sustainability Action Plans on energy and greenhouse, water, transport and waste to support implementation of the Policy and Strategy. This document is the UTS Sustainable Waste Management Plan 2013 – 2015.

A COLLABORATIVE APPROACH

The pathway towards sustainability demands a collaborative approach, in which organisations work together to share knowledge and learn from each other. UTS collaborates with many organisations on its journey towards sustainability. For example, UTS works closely with the City of Sydney, Frasers Property, the ABC, the TAFE Sydney Institute and the Powerhouse Museum on sustainable development of the Ultimo precinct. UTS also actively participates in several collaborations to improve building sustainability, including the Sydney Better Buildings Partnership (http://www.sydneybetterbuildings.com.au), the Green Building Council (http://www.gbca.org.au) and the Living Future Institute (http://living-future.org).
At UTS we strive to keep as much waste out of landfill as possible. We aim to avoid, reduce, re-use and recycle, before finally disposing of any remaining non-recyclable and hazardous wastes in a responsible way. Our greatest waste management success to date has come from implementing a diverse set of recycling strategies, targeting key waste streams and materials including co-mingled waste, office paper, e-waste, polystyrene, batteries and fluorescent tubes. By selecting appropriate waste handling systems, on campus technologies and behaviour change interventions, UTS has been able to achieve general waste recycling rates above 80% from 2007 onwards. This plan details the UTS waste management journey thus far before looking ahead to planned future actions.

It is now widely accepted that disposal, either through landfilling or incineration, is the least preferred waste management option from a sustainability perspective. Instead, there is now a preference for avoiding or reducing total waste volumes, re-using products and materials where possible, and recycling materials that cannot be directly reused. This contemporary approach (shown in Figure 1) recognises that the actions of individuals, businesses and institutions (including universities), are all critical to reducing total waste volumes and increasing resource recovery rates.

**WASTE MANAGEMENT AT UTS**

1.1

1. http://www.uel.ac.uk/greenthing/recycling/wasteinitiatives/
In recent decades waste management has undergone a dramatic shift. The 20th century focus on waste disposal has now been replaced with a more sophisticated approach geared towards resource recovery. Today governments, businesses and the community work collaboratively towards a future where materials are recovered and recycled through closed-loop manufacturing, take-back at end of life, and waste recycling. Despite this important philosophical shift, significant volumes of wasted materials still reach Australian landfill sites each year. An ongoing process of legislative, technological, and behavioural change is vital to ensure that Australia can continue to transition towards the target of a genuinely zero waste future.

As urban populations and patterns of disposable consumption continue to grow in Australia, the volume of waste being generated within our cities is increasing not decreasing. It is now a greater challenge for governments to sustain accessible landfill sites in close proximity to our cities.

The first serious environmental impact comes from greenhouse gases, which can leak into the atmosphere from the breakdown of organic waste in landfill sites. Another harmful impact is leachate, a liquid containing toxic chemicals that also forms in landfill sites. Litter in the environment can also have a devastating impact on wildlife and pollute waterways, rivers or the ocean.

As our society has grown more aware about what it really takes to produce the materials that we consume, ‘waste’ is now increasingly being recognised as a valuable resource, which should neither be buried nor incinerated when opportunities can exist for re-use and recycling.
This section briefly outlines national, state and local policy responses that align with the University’s own commitment to responsible waste management.

NATIONAL POLICY RESPONSES

In 1992 the Council of Australian Governments (COAG) released the National Strategy for Ecologically Sustainable Development. According to the 2010 National Waste Report, this document was: ‘the anchor for all subsequent State and Territory waste management policies to date’.

In more recent times the National Waste Policy (2009) was agreed upon by all Australian environment ministers, setting up Australia’s waste management direction to 2020 and enshrining a commitment to: ‘An efficient and environmentally responsible approach to waste management in Australia’.

STATE AND TERRITORY POLICY RESPONSES

State and national waste management policies have changed significantly since 1992, with new legislation, agencies, and strategies emerging to reduce environmental impacts and increase resource recovery rates. Most jurisdictions, including NSW now work towards the best practice Waste Hierarchy, which has been supported by legislation since 2001.

NSW WASTE LEGISLATION
- Protection of the Environment Operations Act 1997 (amended in 2008);

NSW WASTE STRATEGY

RELEVANT NSW AGENCIES
- Environment Protection Authority;
- Office of Environment and Heritage

LOCAL GOVERNMENT POLICY RESPONSES

In Australia, councils commonly have planning responsibility for the infrastructure needs of municipal and industrial waste facilities and making provision for waste management within local communities. As part of Sustainable Sydney 2030, the City of Sydney has introduced specific aims to work with the community around:
- Producing less waste and maximising resource recovery rates

UTS currently works with the City of Sydney to achieve their 2030 sustainability goals as a member of the Better Building Partnership leadership panel, as well as being involved with other working groups for energy, water and waste management.

• Reducing greenhouse emissions from waste
• Providing solutions for problem waste (chemicals, e-waste, etc.)
HISTORY OF SUSTAINABILITY AT UTS

UTS has a long history of engaging with sustainability, stretching back to the establishment of the Institute for Sustainable Futures in 1997 and the signing of the Talloires Declaration in 1998. UTS committed to a Sustainability Policy in 1999 and a revised Environmental Sustainability Policy in 2008.

In 2008, UTS joined with other universities in the Australian Technology Network of Universities to declare its commitment to local, national and global sustainability. Sustainability has also been an important consideration in the UTS City Campus Masterplan, which is currently underway.

Today, the UTS Sustainability Strategy, established in 2012, guides sustainability at UTS across research, teaching and learning, community engagement and campus operations. A high-level Sustainability Steering Committee provides strategic guidance for a team of three full-time staff members. A timeline for sustainability at UTS is provided in Figure 2 below.

FIGURE 2 – UTS SUSTAINABILITY RESPONSES
3.1 KEY ACTIONS TO DATE

UTS has already made significant progress towards maintaining a responsible and sustainable waste management system. This section outlines the key waste handling procedures, partnerships, innovative technologies and recycling programs that have allowed UTS to make this transition.

**TABLE 1 – THE UTS WASTE MANAGEMENT JOURNEY**

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>5% of waste stream is recycled</td>
</tr>
<tr>
<td>2003</td>
<td>Introduction of print management system</td>
</tr>
<tr>
<td>2009</td>
<td>Waste Audits</td>
</tr>
<tr>
<td>2010</td>
<td>Purchase of Hungry Giant polystyrene compactor:</td>
</tr>
<tr>
<td>2012</td>
<td>Signatory to the Australian FluoroCycle program</td>
</tr>
<tr>
<td>2013</td>
<td>Mobile phone, battery and E-waste</td>
</tr>
</tbody>
</table>

**Details:**
- **2002:** Introduction of new paper recycling scheme and trial of desk-side paper recycling, Default double-sided printing and trial of sugar cane paper, Purchase of remanufactured print cartridges
- **2009:** Detailed chemical waste audit, Detailed clinical/biological waste audit
- **2010:** Reduction of polystyrene waste to 2-5% of its original volume, with a compaction ratio of 50:1
- **2012:** Recycling program rolled out across all Union eateries and bars which includes: garbage, glass, plastics, aluminium, steel, paper and cooking oil
- **2013:** Collection programs rolled out across all campuses
PARTNERING WITH A CO-MINGLED RECYCLING CONTRACTOR

Prior to 2007, contamination issues plagued source separation bins across the campus. Switching to co-mingled waste recycling from 2007 onwards immediately improved waste diversion rates. Now every weekday morning at 3.30am trucks collect UTS co-mingled waste and transport it to the Wastefree recycling facility at Seven Hills. Here the waste is liberated from plastic bags in a large rotating cylinder called a trommel, where much of the organic waste component is also separated out for bio-digestion. Next the mixed waste goes on to a conveyer for hand sorting to eliminate as much disposable rubbish as possible. After the paper sorted out, ferrous and non-ferrous metals are collected using a combination of electrical and magnetic fields, before a final round of hand sorting to remove the remaining glass and high density plastics. The recyclables are then baled and shipped to local and international recycling centres for further processing. The non-recyclable material (typically high in organics and low density plastics) is transported to the Clyde transfer station, from where it is sent by rail to the Woodlawn landfill facility in Goulburn.

PARTNERING WITH STAFF AND STUDENTS

Although co-mingled recycling has significantly improved UTS waste diversion rates, the actions of staff and students on campus remain crucial to keeping certain materials out of the co-mingled stream. For example, when office paper is kept separate from other waste it can stay clean, which results in a better quality recycled product. Yet almost the same volume of paper is currently thrown into UTS garbage bins as is put into paper-recycling bins. Unfortunately, this contaminated paper is destined to end up as a lower grade recycled product. Fluorescent tubes and batteries are also examples of products that need to be kept separate because they contain toxic substances. For these reasons, UTS remains committed to providing collection points on campus that support staff and students to directly recycle office paper, furniture, expanded polystyrene, batteries, mobile phones, fluorescent tubes and E-waste. Staff and students can also influence total waste volumes by reducing their material consumption on campus. For example, by limiting printing and always selecting double sided options, using reusable mugs instead of disposable coffee cups and saying no to plastic bags by bringing along a reusable one.
ACHIEVEMENTS SO FAR

PARTNERING WITH THE UTS UNION

A proactive recycling program has been rolled out across all Union bars and eateries, where material including glass, plastics, aluminium, paper and cooking oil is collected separately from co-mingled waste and taken away for recycling. The Union also runs a unique promotion offering customers a discounted price for reusable coffee mugs in an effort to reduce the total number of disposable coffee cups.

BLUEBIRD BREKKIE BAR

The UTS Students’ Association run the award winning Bluebird Brekkie Bar, a pop up café serving free sustainable breakfast to students on Wednesday mornings. Designed and run by students for students Bluebird has waste minimisation principles at its core. Furniture was made from found, recycled and recyclable materials, the bar uses cutlery and crockery (nothing disposable), and students are asked to scrape and clean their own dishes. There is also no packaging at the Bluebird Brekkie bar and BYO mugs and food containers are encouraged. Food suppliers are also asked to embrace zero waste principles for deliveries. The initiative not only practices waste minimisation but also plays an important role in educating the UTS community on how it’s done.

TRIALLING INNOVATIVE TECHNOLOGIES

UTS accumulates approximately 4-6 cubic metres of expanded polystyrene (EPS) each week. That equates to more than 300 cubic metres each year! In 2009, UTS purchased a Hungry Giant polystyrene compactor, which is currently located in the basement of building one. A second Hungry Giant unit will also be installed in the Dr Chau Chak Wing building. With a compaction ratio of 50:1 this machine reduces the volume of polystyrene to 2-5% of its original size. The compacted blocks are then sent to be recycled into plastics. This approach diverts waste away from landfill and decreases greenhouse gas emissions associated with collection and transportation.

JOINING INNOVATIVE RECYCLING PROGRAMS

UTS recycles fluorescent tubes and light bulbs and is a signatory to the national Fluorocycle program. Fluorescent lamps contain mercury, which can be toxic in landfill. At UTS the lamps are collected and sent to an accredited plant where they are crushed and the components recycled. The crushed material is sorted into individual materials such as glass, aluminium, other metals, plastics and the mercury containing phosphor powder. The mercury is recovered from the phosphor powder and each material recycled. The plant does not generate any waste for landfill.
3.2 PERFORMANCE TO DATE

GENERAL WASTE RECYCLING RATES

A NABERS accredited auditing process is now used to verify the amount of UTS general waste diverted from landfilling to recycling. The ten-day general waste audit covers both co-mingled collections and clean paper and cardboard. Co-mingled waste is handled at the Seven Hills Wastefree facility where normal recycling processes apply during the audit period plus additional steps to weigh each separated material stream. Clean paper and cardboard collections are normally processed at the Amcor facility at Botany, however during the audit period the collections are also diverted to the Wastefree facility at Seven Hills for measurement and review.

Figure 3 (below) shows the percentage of UTS general waste diverted to recycling in each reporting year since 2002. From 2007 onwards audits have confirmed that over 80% of the general waste stream went on to further recycling processes. To put this achievement in context, the NSW Government’s Reducing Waste: Implementation Strategy 2011–2015 set a 2014 state wide diversion target of: 66% for municipal waste; 63% for commercial & industrial waste; and 76% for construction & demolition waste (following recorded diversion rates in 2008-2009 of 44%, 52% and 73% respectively). To highlight the success of UTS’s waste management actions, our current diversion rate sits well above the recorded NSW average and exceeds the 2014 target.

Figure 4 (below) shows the mix of materials recovered during the most recent 2013 general waste audit. Notably, paper products made up 2/3 of the total waste handled, with almost half of this paper being contaminated within co-mingled bins. These figures stress the importance of paper separation and waste avoidance strategies for UTS.
GENERAL WASTE VOLUMES

Although the ten-day audit process only gives a snapshot, total waste volumes increased between the 2011 and 2013 audits. (see Figure 5 below). Given that avoiding and reducing waste is the highest priority of the best practice Waste Hierarchy to which UTS is committed, strategies designed to limit the growth of waste volumes will be crucial in the years ahead.

One of the key challenges for managing waste volumes (whether at the national, state, city or institutional level) is the correlation between population growth and increasing waste volumes. Put simply, adding more people to an organisation generally results in more waste being produced. Accordingly, increased staff numbers and equivalent full-time student loads on campus (2010: 24,523; 2011: 25,779; 2012: 25,782) are likely to influence total waste volumes. Increasing waste volumes can also be the result of changed consumption patterns. Stabilising, and ultimately reducing overall waste volumes requires targeted strategies to reduce per capita consumption for key materials such as office paper, plastic bags and disposable food and drink containers.

CONSTRUCTION WASTE

Building contractors working at UTS are now contractually required to recycle a minimum of 80% of their construction waste. Skip bins are used for the collection of waste material generated during construction projects on campus and also for large items such as broken furniture. The skip bins are supplied and collected by a contractor that recycles soil, building rubble, concrete, bricks, tiles, timber, assorted metals, paper and cardboard. In 2009-10 approximately 1200 m3 of waste was collected each quarter from skip bins around the campus. Auditing processes also confirmed that more than 90% of the waste material collected within these bins goes through a resource recovery and recycling process.
ACHIEVEMENTS SO FAR

CLINICAL/BIOLOGICAL AND CHEMICAL WASTE

The following figures come from the most recent clinical/biological and chemical waste audits conducted in 2009:

To dispose of hazardous wastes responsibly and in accordance with existing environmental legislation:

- 21% (2.6 tonnes) of the clinical/biological waste produced at UTS was incinerated and the remaining 79% (10.1 tonnes) was shredded, treated, compacted and sent to landfill.

To handle chemical wastes responsibly and in accordance with existing environmental legislation:

- 53% (2.1 tonnes) was recycled, for example by reclaiming glass, aluminium and phosphor from fluorescent lamps.
- Energy was recovered from 25% (1 tonne), by reclaiming certain chemicals such as acetone and other solvents to fuel brick and cement kilns.
- 22% (892.5 Kg) was disposed of to landfill following chemical treatment.
- 0.7% (30 Kg) was disposed via the sewerage system following chemical treatment.
- 1.1% (5.05 Kg) was incinerated.
COMMITTED ACTIONS

The period from 2013 to 2015 will continue to see the delivery of initiatives designed to improve waste performance at UTS. Committed actions will primarily come through the UTS Sustainability Strategy 2012-2015:

1. A Green Information Technology Action Plan to reduce the environmental impact of the technologies we use. This includes strategies for the appropriate management of electronic waste - all electronic equipment returns to the supplier at end-of-life for reuse or recycling. (Sustainability Strategy 2012-2015).

2. A Sustainable Procurement and Asset Re-Use Action Plan to guide the ongoing process of incorporating sustainability considerations into procurement across the University. This includes the re-use, recycling and disposal of assets at end-of-life. The Action Plan would specifically consider support for Fair Trade products (Sustainability Strategy 2012-2015).

3. All new and refurbished buildings to have ‘Building User Guides’, which aim to minimise waste generation and maximise opportunities for reuse and recycling (Sustainability Strategy 2012-2015).

4. Updated sustainability requirements in the UTS Design Guidelines that promote the principles of long life, energy efficiency and low maintenance (Sustainability Strategy 2012-2015).

5. Further work with UTS housing residents to improve recycling rates through educational programs. (UTS:Green)
This Waste Management Action Plan runs through to 2015. Alongside the existing committed actions for this period, a number of additional potential actions have come from consultations with key stakeholders and external research partners. These actions will receive further investigation and review during the 2013-2015 period. Subsequent Waste Management Action Plans will report back on which of these actions have been realised:

- Set management targets for waste volumes and diversion rates: covering general waste, construction/demolition waste and chemical waste.
- Install digital signage on campus to display sustainability information: which could include waste statistics, existing strategies, and prompts for staff and students on how to further improve waste management on campus.
- Office 'mini-bin' pilot project to be rolled out across the whole campus.
- UTS Union food court organic waste collection trial: may be undertaken in conjunction with Better Buildings Partnership members.
- Further education measures to inform staff and students of the benefits of separating clean paper and cardboard into the correct bins.
- Empty all kitchen waste into a food waste stream separate from the general waste/recycling stream.
- Stricter controls could be placed on UTS bins to reduce the incidence of external parties dumping contaminants and inappropriate waste in the general waste/recycling stream.
- An onsite composting system (similar to the Hungry Giant food waste machines) could be installed to reduce the quantity of food waste sent offsite.
- Further innovative strategies for greening the campus landscape: to build capacity for greater closed loop organic waste management.
- Reusable takeaway food container trial: approximately 6 tons of polypropylene waste is created daily through the use of disposable food containers within the City of Sydney. A Reusable food container program could help reduce this. UTS is an ideal testing ground for a pilot project, which could be a collaboration between partners including UTS Design students, Institute for Sustainable Futures, UTS Union and the City of Sydney.