ASU Roadmap to Zero Waste





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A message from the ASU Sustainability Operations Officer

Arizona State University is pleased to work with Waste Management, Inc. in our shared endeavor to achieve zero solid waste across our campus locations by 2015. Over the past decade, the university has made strides in the implementation of renewable energy and the reduction of greenhouse gas emissions. With our Waste Management relationship and the zero solid waste plan, we are taking our operational sustainability efforts to the next level. ASU defines zero solid waste as a 90-percent reduction in waste to area landfills from our current business-as-usual status. The following is a snapshot of how we plan to reach our goal:

- Aversion: Stop a quarter of our municipal solid waste from ending up at area landfills by preventing its appearance on our campuses in the first place.
- Diversion: Prevent the rest of university waste from reaching landfills through recycling, composting and re-purposing projects.

The goal for the ASU community – consisting of 85,000 students, employees and contractors – is to create less than 800 tons of waste per year. That's about 10 percent of the amount of waste that the average American produces.

To achieve zero solid waste quickly and efficiently, ASU community members have to do their part, day to day. Financial investments in infrastructure, good planning and competent management cannot be the only measures that university planners take to attain zero solid waste. It truly will take the collective actions of the entire ASU community to hit our target.

Zero solid waste also is smart business. The disposal of organic materials into compost or energy streams already is financially competitive with landfill disposal. Recycling of almost all commodity streams makes financial sense when the costs of land use and water pollution from mines and landfills are included.

Our zero solid waste goal goes beyond current financial plans and benefits that affect the existing campus community. ASU wants to avoid creating waste that would result in resource scarcity, supply limitations and pollution for our future students and surrounding neighborhoods.



Executive Summary

The *Roadmap to Zero Solid Waste* was carried out using a sequence of planning and analytical processes. First, we undertook a waste audit, an assessment of the composition of our waste stream. Second, we looked for potential new projects that could reduce our volume of waste, by aversion, diversion (both recycling and compost projects), and re-uses and repurposing. Third, we performed environmental, social, financial, and life-cycle analyses of proposed projects, using the Sustainability Projects Assessment Tool (SPAT). Fourth, we developed project descriptions of existing and proposed projects, assigning people, places, equipment, and logistics to each. The last of these processes comprises the *Roadmap to Zero Solid Waste*. ASU invites critiques, feedback and input on this Zero Waste Initiative from colleges and university recycling and waste managers, and from other expert sources.

Some of our solutions, including co-mingled single-stream recycling, are uniform across all of our facilities. The common infrastructure and methods allow us better efficiency, a consistent message to all campus users, and a consistent suite of policies that guide our work. Other aspects of our work, like management of yard trim and food scraps, beg for unique solutions, because the local nature of composting operations changes dramatically over even landscapes of moderate scale. Nearly 40% of the current stream (including food scraps and compostable paper) is compostable, making the Green Bins program, in its many forms and venues, the most important one.

Our work is organized into four areas: aversion, recycling, composting, and re-use. The approach is a re-statement of the aphorism '*reduce, re-use, recycle*.' We've divided recycling into Blue Bin, which consumer-campus users use for paper, metals, plastic and glass, and Green Bin, which they use for organic materials. In the coming months and years, this pairing will become more common on our campuses, and trash bins less common. We sometimes use the term *di-aversion* to signify the sum of our aversion and diversion efforts, which calculates the result of our waste avoidance more comprehensively than conventional measures of diversion.

To achieve our goal, we've developed over 50 programs and projects. A wide range of departments is responsible for the implementation of these projects, including University Sustainability Practices; ASU Recycling; Business Services; Grounds; Environmental Health and Safety; Mail Services; Memorial Union; Purchasing; Sun Devil Athletics; Surplus Property; our food service providers, Aramark, Atlasta and Sodexo; Canon, Inc.; and Waste Management, Inc. Through collaborations among these partners, the ASU Zero Waste Initiative provides a model for a successful waste minimization program.

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it all goes in the blue bin. recycle, it's what we do.

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Opportunities and Challenges

Commitment to zero waste by 2015 is an aggressive goal. While attainment of zero waste can be realized with mostly pedestrian business practices, it will require financial commitment, team work among internal and external partners at ASU, focus on details, and effective coordination among dozens of projects.

ASU has developed a comprehensive system for capturing several dozen streams of materials; the exact number of streams depends on how they are broken out. Continued operation of these projects is essential to success of the overall program. Projects that do not yet require 90% or higher diversion should develop policies and procedures that assure that 90% or higher is achieved.

About one-third of all waste generated from ASU is organic material from food services and restrooms, and recovering that material stream will double the diversion rate. Recognition that such recovery consists of a dozen projects shows the complexity of the issue. To recover those materials, food service workers, custodians, diners and office workers must all accept new responsibilities, some of them quite small and simple. While this is not every person on campus, it is most of us. Successful implementation of the Green Bin program will require good communications and public awareness, excellence in development of infrastructure and service delivery, and cooperation among tens of thousands of campus users.

Nearly a quarter of the current stream of MSW consists of materials that should be deposited into Blue Bins. USP and our many partners are charged with activating the engagement of all of the 85,000 users of our seven campuses to move material from trash bins to Blue Bins. Success in the Blue Bin program will require actions of our community members in ways that have not ever before been asked. It truly will 'take a community' to achieve this goal.

Finally, ASU leaders who are not engaged in day-to-day sustainability activities must provide leadership to assure success of this initiative. Business operations managers, building managers, contract administrators, and line supervisors must help facilitate the movement toward zero waste through on-the-ground awareness and encouragement for recycling. Through support from these key stakeholders, ASU can fulfill our commitment to zero waste.

Scope and Methods

Our work is spread over five academic campuses (Tempe, Polytechnic in Mesa, Downtown Phoenix, West campus in far west Phoenix, ASU-Havasu in Lake Havasu City) and two research parks (SkySong in Scottsdale and ASU Research Park in south Tempe). Six of the seven locations are in the Phoenix metro valley area, and our newest campus, ASU-Havasu, is on the western border of Arizona. Much of the space located in SkySong and the ASU Research Park is occupied by start-up companies that were fostered by ASU research. These organizations operate independently of the university and are therefore not included in our planning and operations. The campus in Lake Havasu City will be phased in when new zero waste projects are operating smoothly on our more established campuses.

The development of this roadmap was accomplished through four processes.

- A strategic partnership for zero waste was formed by ASU and Waste Management, Inc. in January 2012. The terms of the partnership provide for an extension of the existing waste hauling contract between ASU-Tempe and Waste Management in return for providing an assessment of the existing waste stream and development of a Roadmap to Zero Waste. WM hired a dedicated Project Manager specifically tasked with the implementation of the zero waste strategy and projects included within the Roadmap. The strategic partnership offers important synergies. In this effort both parties can be more successful together than they might be alone on the road to zero waste.
- 2. Waste Management conducted an assessment of the waste stream in February 2012. Details of that methodology and the results of that audit are described below.
- The ASU/WM zero waste team identified potential new projects and expansion of existing initiatives. These were evaluated for costs and benefits by use of the Sustainability Projects Assessment Tool (SPAT).
- 4. A summary of waste minimization projects has been developed that comprises the heart of this document. The project descriptions show sufficient detail to understand the most important operational, financial, environmental and social costs and benefits of each project. When these projects or similar initiatives with the projected impacts are implemented, ASU will achieve zero waste within our target time frame.

Definition of Institutional Boundaries

With 73,000 students on five teaching campuses and two research parks, ASU is one of the nation's largest universities. The facilities that our students, faculty and staff use are usually owned by ASU, but are occasionally rented or leased from private companies or partnerships. Because the ASU system is large and complex and the definition of what is and what is not ASU may not be obvious, it is necessary to develop a formal definition of our institutional boundaries to consistently and transparently describe what facilities are included in the ASU footprint for purposes of reporting the production of waste, recycling, and compost.

The methodologies to establish institutional boundaries for greenhouse gas emissions in the <u>Greenhouse Gas Protocol</u> are clear and useful. ASU has used the operational control methodology, which defines the institution as facilities over which ASU *has the full authority to introduce and implement its operating policies at the operation*. Under this definition, residence halls that are owned by private partners (for example, American Campus Communities, Inland American Real Estate Trust, and Colliers International) are part of ASU even though ASU does not own the residence hall facilities. Other examples of facilities that are controlled by ASU but not owned by the university include the Fulton Center on the Tempe campus, which is owned by the ASU Foundation; parts of SkySong, a research park owned by the City of Scottsdale that houses ASU's Office of Knowledge Enterprise Development; and parts of the ASU Research Park, which is managed and leased by Sunbelt Holdings. The ASU Research Park houses MacroTechnology Works, which includes researchers from the Flexible Display Center, Ira A. Fulton Schools of Engineering, the Department of Chemistry & Biochemistry and the Department of Physics. Including facilities at each of the seven locations described above, ASU's physical footprint is 17.72 million gross square feet (GSF) as of June 2012.

Alignment of ASU's waste and recycling reporting footprint with that of its greenhouse gas emissions inventory provides continuity and consistency between those reporting systems. It provides a single basis for reporting on our most critical sustainability activities.

Waste Characterization Report and Study

The Waste Characterization Report is a vital first step in establishing and developing a comprehensive zero waste strategy. Using this process, an institution can both calculate baseline data for waste generated by its population of users and also assess the current composition of waste materials generated throughout institutional facilities. Thoroughly understanding the waste stream and its components provides an opportunity to establish benchmarks and develop customized approaches that will formulate a comprehensive zero waste strategy.

Waste Management Sustainability Consultants performed a Waste Characterization Study for ASU from February 14 through 17, 2012. The study examined municipal solid waste generated at the ASU main campus in Tempe, Arizona. The function of this exercise was to examine material generation and waste stream composition in order to reduce waste and improve operational efficiencies. A Waste Characterization Report was then developed to provide quantitative baseline data and observations about the material assessed.

The following is a summary of the Waste Characterization Study, which provides baseline data to identify opportunities for increased recycling rates and reducing the amount of waste that is currently being sent to landfill. The outcomes of this study help identify projects for the comprehensive zero waste strategy and provide a focus for the steps necessary to increase landfill diversion and operational efficiencies. This exercise was a collaborative approach between WM and ASU personnel, providing valuable information and clarification of system dynamics.

Waste Characterization Methodology

The study examined municipal solid waste generated at the ASU main campus in Tempe, Arizona. During the assessment, WM consultants sorted and analyzed 5,199 pounds of campus waste stream materials from twelve solid waste compactors and one solid waste open top rolloff container located on ASU's Tempe campus.

In order to implement an effective and efficient Waste Characterization Study, WM consultants engaged in the following activities:

- Participated in a comprehensive campus tour facilitated by the on-site WM Project Manager and ASU Sustainability Staff.
- Identified and examined waste collection sites, placement of waste and recycling containers, conveyance routes and methods.
- Interviewed key campus stakeholders in Facilities Development and Management and the University Sustainability Practices Office.
- Analyzed data to understand the annual tonnages for waste and recycling on campus.
- Conducted a comprehensive Waste Characterization Assessment of the waste stream.

ASU consists of multiple campus locations across the region. The Waste Characterization Assessment in this study focused on analyzing waste samples specifically from the ASU Tempe campus. The Tempe campus was chosen because it appears to be representative of other campus locations in the university system, and because as the largest campus (about 60,000 students), its impact is most important.

Representative samples from ASU's Tempe campus were selected from a variety of categories of generator demographics in order to gather waste data from a diverse and representative mix of both facility and user activities. Based on these categories, samples were obtained representing the overall waste generated at the ASU Tempe campus.

Each sample was intended to weigh between 200 and 300 pounds, and was taken from representative portions of compactors and front load containers in accordance with American Society for Testing and Materials (ASTM) Protocol D 5231: Determination of the Composition of Unprocessed MSW. The table below lists the five categories of generators and the campus buildings associated with each category, and shows the number of samples pulled for the assessment.

Generator	Description	Number of Samples
Athletics	Wells Fargo Athletic Facilities Complex	3
ACBLP	Physical Science, Life Sciences, Art Building, Biodesign, Engineering	11
Residence	Hassayampa, Sonora, Matthews Center, Center Complex	7
Dining/Retail	ASU Bookstore, Memorial Union	7
Mixed	Palo Verde Main (Residence Halls, Dining and Retail)	2
Total		30

Figure 1. Waste samples collected and ASU locations.

Compactors and open-top containers were hauled five miles north of the campus to the Sky Harbor Transfer Station to analyze the waste samples. The WM team that performed the assessment included Sustainability Consultants, a Regional Manager, and seven temporary workers. Samples were pulled from each container, sorted into thirty-nine categories, and each category was weighed. The goals of the waste assessment were to achieve the following:

- Identify the sample container and match it to the sampling plan.
- Physically sort 100 percent of each sample into one of the material categories identified by the structure of the assessment.
- Record the weight of each material sub-category at the completion of each sample.
- Remove the sorted and weighed sample from the sorting area.
- Clean the sorting area to prepare for the next sample.

Waste Characterization Results

Thirty-two percent of the waste stream consisted of recyclable material that can be diverted into existing recycling programs. The majority of the recyclable material consisted of mixed papers, packaging, and beverage containers. The team also observed that 34.8 percent of the waste stream consisted of liquid and solid food waste. An additional 22.0 percent consisted of material that is potentially recyclable or can be diverted, depending on market availability and commitment from the institution to capture and divert the material. These streams include such items as plastic film and compostable tissue paper.

The figure below summarizes the composition data for the MSW stream according to the seven primary material categories.





The Waste Characterization Study contributed significantly to the foundation on which this Roadmap was built as the comprehensive zero waste strategy for the institution. Existing material management practices at the university can use the study to focus resources on specific material categories and generators on campus. The data demonstrates opportunities to capture larger percentages of the recyclable and compostable waste streams currently being sent to landfill. Perhaps most importantly, the study provides reliable knowledge and leverage to support administrative decision-making that can lead to the funding and expansion of recycling and composting programs.

			Overall				Dining/	
	#	Material	Average	Athletics	ACBLP	Residence	Retail	Mixed
	1	Newspaper	0.5%	0.4%	0.7%	0.2%	0.7%	0.0%
	2	Uncoated Cardboard (OCC)	6.6%	5.4%	2.9%	7.1%	10.5%	13.7%
5	3	Office	7.2%	8.1%	8.2%	2.9%	11.3%	1.4%
ape	4	Paperboard / Chipboard	3.4%	3.1%	2.9%	4.7%	2.5%	4.6%
٩	5	Mixed Paper (Other Recyclable)	2.3%	2.2%	3.5%	1.5%	1.4%	0.8%
	6	Compostable Paper	13.7%	19.6%	19.4%	9.6%	9.4%	3.0%
	7	Non-recyclable/Other	7.3%	6.6%	5.8%	6.6%	8.6%	14.5%
		TOTAL PAPER	41.0%	45.4%	43.4%	32.7%	44.5%	38.0%
	8	#1 / #2 containers	5.4%	5.2%	5.0%	8.2%	4.4%	2.2%
tics	9	#3-#7 containers	2.7%	2.0%	2.5%	3.7%	2.4%	2.4%
las	10	EPS - packaging and food containers	1.5%	1.6%	2.5%	0.9%	0.7%	0.1%
	11	FIIII	8.3% 2.1%	9.4%	8.0% 2.0%	2.9%	8.2% 2.5%	8.0% 2.2%
	12		5.470	2.0%	3.970	5.870	2.570	5.570
		TOTAL PLASTICS	21.2%	20.8%	22.5%	24.0%	18.1%	16.6%
-	13	Aluminum / Non-ferrous Cans	0.6%	0.5%	0.7%	0.9%	0.3%	0.5%
leta	14	Tin / Steel / Ferrous Cans	0.5%	0.2%	0.3%	0.7%	0.3%	1.6%
Σ	15	Other Non-Ferrous Metals	0.3%	0.2%	0.4%	0.1%	0.5%	0.6%
	16	Other Ferrous Metals	0.1%	0.1%	0.1%	0.1%	0.3%	0.0%
		TOTAL METAL	1.6%	0.9%	1.4%	1.8%	1.5%	2.8%
	17	Containers	2.4%	1.0%	1.8%	5.4%	0.9%	2.1%
ass	18	Regulated Glass	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
ษ	19	Lab Glass	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	20	Other Glass	0.1%	0.2%	0.0%	0.1%	0.0%	0.0%
		TOTAL GLASS	2.4%	1.2%	1.9%	5.5%	0.9%	2.1%
S	21	Food Waste	18.9%	19.1%	12.0%	19.7%	25.3%	32.1%
nic	22	Liquid Waste	5.1%	6.0%	4.4%	7.4%	4.1%	2.7%
Drgc	23	Yard Waste	0.1%	0.6%	0.1%	0.0%	0.0%	0.0%
9	24	Other Organics	2.4%	0.3%	4.5%	1.2%	1.9%	0.8%
		TOTAL ORGANICS	26.6%	25.9%	21.0%	28.3%	31.3%	35.6%
	25	Paints / solvents	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%
Ň	26	CFL	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%
ŧ	27	Sharps	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	28	Other Hazardous	0.1%	0.0%	0.2%	0.0%	0.0%	0.0%
		TOTAL HHW	0.2%	0.0%	0.2%	0.4%	0.0%	0.0%
	29	Appliances	0.7%	0.0%	0.2%	2.7%	0.0%	0.0%
	30	Ceramics	0.5%	0.2%	1.2%	0.1%	0.1%	0.0%
	31	clothing/shoes/textiles	1.4%	0.7%	1.7%	2.1%	0.4%	1.3%
و	32	E-waste	0.1%	0.1%	0.2%	0.1%	0.0%	0.0%
'ast	33	Toner cartridges	0.2%	0.2%	0.3%	0.0%	0.2%	0.0%
N N	34	Batteries	0.1%	0.0%	0.1%	0.1%	0.0%	0.0%
the	35	HVAC/Other Filters	0.5%	0.0%	1.4%	0.0%	0.0%	0.0%
Ö	36	C&D	0.3%	0.4%	0.5%	0.3%	0.0%	0.0%
	37	Bulky Wastes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	38	Fines / dirt	1.5%	1.0%	1.4%	1.2%	1.8%	3.2%
	39	Other Inorganics	1.7%	3.2%	2.6%	0.5%	1.2%	0.5%
		TOTAL OTHER WASTE	7.0%	5.8%	9.6%	7.3%	3.8%	4.9%
		TOTAL SAMPLE	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Figure 3. Results of the ASU Tempe campus waste assessment, February 2012.

Sustainability Projects Assessment Tool (SPAT)

The Sustainability Projects Assessment Tool (SPAT) was developed by Nick Brown in 2009, and has been applied to greenhouse gas reduction and waste minimization projects for municipalities and institutions. In 2012, Brown and Richard Rushforth, a PhD candidate at ASU, refined the tool by enhancing its flexibility and its capacity for application towards ASU's Roadmap to Zero Waste.

The program is a decision support tool that assesses four areas: environmental, social, financial and life cycle impacts of proposed projects. The tool is interactive, allowing what-if type changes in assumptions and it provides outputs that reflect changes in those assumptions. SPAT seeks to identify total cost of ownership of projects and their components. The program scores external impacts of pollution and environmental degradation (health costs, costs of reduced land production capacity or water depletion, etc.).

SPAT allows global assumptions of inputs, such as the costs of energy, water, compost, waste management services, and financial factors (including projections of discount rate, Consumer Price Index and energy price escalation), to be applied consistently across all proposed projects. Its outputs include financial factors such as capital costs, annual operations and maintenance costs, and net present value; environmental outputs such as \$ per metric ton of GHG emissions and landfill avoided; and social factors such as impacts on local economy, social justice, and impacts on workers. A summary report of proposed projects generated by SPAT 2.0 for this Roadmap is shown below.

SPAT 2.0	Financial			Environmental Assessment				Life Cycle Assessment			
Zero Waste Initiative	Project Number	Project Length (yrs)	Initial cost	Net present value	Annual cost <avoided> (additional)</avoided>	MT CO ₂ e emissions yr ⁻¹ <avoided> (additional)</avoided>	\$/MT CO ₂ e avoided	Annual ST landfill <avoided> (additional)</avoided>	NPV /ST landfill	Life cycle GHG <avoided> (additional) (MT CO₂e)</avoided>	Life cycle water <avoided> (additional) (ac-ft)</avoided>
Blue Bins	project 09	5	\$594,000	(\$6,651,034)	(\$460,835)	1362	\$977	1,486	(\$895)	5,836	4,229
Green Bins - plate to dock	1	1		1	1				1		
(Tempe)	project 13	5	\$75,000	(\$896,117)	(\$62,703)	0	\$83	0	(\$76)	6,066	3,745
HVAC filters	Project 05	5	\$73,300	\$29,612	\$7,030	18	(\$333)	20	\$296	108	(20)
Dyson Hand Driers	Project 04	7	\$83,333	(\$102,912)	(\$18,435)	7	\$2,143	21	(\$704)	177	1,270
Personal Towels	Project 02	3	\$36,000	(\$6,607)	(\$2,472)	8	\$286	9	(\$258)	72	1,262
Green Bins dock to compos	Project 08	10	\$30,000	(\$1,393,495)	(\$189,331)	1973	\$71	2,135	(\$65)	18,658	0
Zero Waste Kit	Project 06	3	\$50,000	\$0	\$0	(61)	-	0	-	0	0
Totals			\$941,633	(\$9,020,552)	(\$726,746)	3,306		3,670	1	30918	10486
				Social							
Zero Waste Initiative	Project Number	Project Length (yrs)	Uses land sustainably	Creates community connections	Creates sustainability ethos	Supports local efforts	Supports indigenous people	Supports public health	Creates social justice	Creates right work	Social score (0-10)
Blue Bins	project 09	5	5	8	8	0	5	5	5	5	5.8
Green Bins - plate to dock		[1	[1	1	[1	[
(Tempe)	project 13	5	7	7	7	5	5	5	5	5	5.8
HVAC filters	Project 05	5	7	5	5	5	5	5	5	5	5.3
Dyson Hand Driers	Project 04	7	7	6	7	6	6	9	7	8	7.0
Personal Towels	Project 02	3	8	6	8	6	6	8	6	7	6.8
Green Bins dock to		(
compost	Project 03	5	8	6	8	6	6	7	6	7	6.8
Zero Waste Kit	Project 06	3	5	8	9	9	5	6	5	6	6.6
				Envi	ronmental Assess	iment					
						_					
Zero Waste Initiative	Project Number	Project Length (yrs)	Biodiversity Impact	Land Degradation	Aquatic/marine degradation	Restoration	Mitigation	Local NGO input	Environmental Score (0-10)		
Blue Bins	project 09	5	5	7	6	6	6	6	5.4		
Green Bins - plate to dock	project 13	5	5	7	6	6	5	5	5.4		
HVAC filters	Project 05	5	5	6	5	5	5	5	5.1		
Dyson Hand Driers	Project 04	7	6	7	7	7	6	6	6.3		
Personal Towels	Project 02	3	6	6	6	6	6	8	6.3	1	
Green Bins dock to	Project 03	5	6	6	6	6	6	8	63		
compose	110,60103	ر _ا	0		5 0	; 0	5 0		2 0.0		

Figure 4. Output of SPAT for proposed zero waste projects.

Zero Waste Policy at ASU

Purpose: To establish effective, consistent practices for recycling, composting, and waste management across all ASU campuses, and to facilitate the achievement of Zero Waste by 2015.

Source: University Sustainability Practices

Applicability: Implementation is the responsibility of building managers, building office managers (BOMs), grounds managers, custodians, and events coordinators on all ASU campuses.

Policy: Appendix 1 at the end of this document provides draft language for ASU's Zero Waste Policy as of January 2014.

Twelve Steps to Zero Waste

From the experience that we've acquired and from observing the successes of other institutions, we've learned that there are important steps that, when aggressively pursued, will accelerate progress toward zero waste.

- Set a date to achieve zero waste. Zero waste is a big deal. It's an important mindset. Working toward it will instill pride in everybody who contributes to the success. A commitment to zero waste reminds everybody that no waste can be ignored or moved off of the agenda.
- 2. Purchasing. Stop landfill before it gets to campus. Develop and enforce purchasing policies that call for minimum packaging, package take back, recyclable content of expendable and durable goods, and other actions known as *extended producer responsibility*. Substitute multiple use items for single-use items. Use only BPI certified food service items (<u>http://www.bpiworld.org/</u>). Eschew evil hybrid packaging and products (e.g., plastic and metal composite packaging, so-called recyclable food cups with non-recyclable tear-off lids and tops). ASU has institutionalized green purchasing into its policies in several ways (<u>http://sustainability.asu.edu/practice/what-asu-is-doing/purchasing-policy.php</u>), through published Sustainable Design Guidelines (<u>http://www.asu.edu/purchasing/forms/Sustainable_Design_Guidelines.pdf</u>) and a Sustainable Design Policy

(http://www.asu.edu/purchasing/forms/Sustainable Design Policy.pdf), which require LEED certification, and a minimum of 75% recycling of construction and demolition debris on LEED projects. The ASU Purchasing and Business Services Manual (http://www.asu.edu/aad/manuals/pur/pur210.html) further calls for minimizing packaging, packaging take back, recyclable materials, and the efficiency of electronic equipment.

- 3. *Establish teamwork*. The recycling program, sustainability program, food service vendors, athletics department, university housing, the student union, contract waste haulers, grounds team, custodial services, media and communications teams, and student organizations should all have a stake in the success of the program. Reps from all of these teams should meet to define roles and responsibilities, and divide communications, training, and operational duties.
- 4. *Training*. Everybody who's been managing the waste and recycling streams—and everyone who uses bins—needs to know the new rules of managing food scraps, yard trim and special collections to achieve zero waste. Develop interesting presentations,

and get on the agenda of meetings for events coordinators, office managers, custodial teams and student clubs. At ASU, Human Resources requires employees to consider sustainability in the course of carrying out their jobs

(<u>http://www.asu.edu/hr/documents/sustainabilityexpectations.pdf</u>), and provides a point for sustainability actions on annual performance evaluation, including how well the employee carries out waste minimization (<u>www.asu.edu/hr/forms/PerformanceEvaluation_staff.doc</u>).

- 5. *Effective signs*. Simple, clear, well-placed signs help customers make good decisions.
- Maintain excellence in customer service and convenience. In this sense, a zero waste initiative isn't any different from standard recycling and waste management. Conveniently placed bins that are well serviced are an essential aspect of successful operations.
- 7. Post-event sorting. Every successful program does it. Rome wasn't built in a day, and your customers will contaminate recycling and compost streams. Assume that your community will take a few years to train adequately, and don't be disappointed when you see contamination after large events. Build the cost of post-event sorting into your budget and your standard operating procedure the first few years of program expansion.
- 8. *Metrics*. We manage effectively things that we measure well. It's important to have a good baseline of performance to understand the impact of zero waste projects. Using scales, waste audits and other tools of good recordkeeping verifies to program managers, campus administrators, and students that your successes are real.
- 9. *Sound economics*. Work to develop projects that budget managers can adopt because they are budget neutral or better. Zero waste will probably cost more than mindless landfilling in early years, but it will also be a positive aspect of institutional branding.
- 10. *Celebrating successes*. Reward your best performers, especially in operations, and publicize their good work. Publish your di-aversion numbers as they improve. Develop media that publicly supports your corporate partners. Share information like this page with as many institutions and organizations as possible.
- 11. *Regional synergies*. Develop signs, bin colors and arrangements, routes, and sorting strategies that integrate with and compliment host and adjacent communities. When things look (and work) similarly on campus and off, campus users get positive reinforcement in town and vice versa.

12. Foster local capacity development. Healthy competition is good, and to have a successful organics diversion program you'll need one or more facilities in the area that accept proteins, dairy, post-consumer scraps, cardboard and paper. Support local companies that make energy or compost from a wide variety of materials. If a local company can make energy from your organic materials, it will support your GHG reduction strategy as well as your zero waste strategy.

Municipal Solid Waste and Recycling Streams

Arizona State University has made a commitment to achieving zero waste by 2015, which has been defined as producing 10% or less of 2008 solid waste. Table 1 below shows quantities of solid waste generated from all ASU facilities from 2007 through 2012.

To achieve this zero waste goal, the university will implement over fifty projects and programs. Some of these projects and programs are already in place while others will become newly adopted initiatives in the upcoming years. The remainder of this report describes these projects including the methods, equipment, responsible parties and other resources needed for implementation, the locations of operation, and the status of their implementation at our institution.

2007 – 2011 Solid Waste Data

Arizona	a State	Univer	sity								
	waste	GHG			GHG	GHG	waste	waste			
	(tons)	(MT CO ₂ e)	enrollment (FTE)	space (GSF)	(MT CO ₂ e/FTE)	(MT CO ₂ e/1000 GSF)	(tons/FTE)	(tons/1000 GSF)			
2007	9,518	367,516	59,068	14,033,632	6.2	26.2	0.16	0.68			
2008	7,900	360,508	60,543	14,406,808	6.0	25.0	0.13	0.55			
2009	5,894	349,117	64,011	16,314,559	5.5	21.4	0.09	0.36			
2010	6,241	321,624	66,988	17,063,275	4.8	18.8	0.09	0.37			
2011	6,778	330,901	69,459	17,354,404	4.8	19.1	0.10	0.39			
2012	6,550	313,466	73,073	17,718,904	4.3	17.7	0.09	0.37			
10% r	10% reduction in net GHG emissions from 2007 through 2012										
23% reduction in GHG emissions per FTE from 2007 through 2012											
27% reduction in GHG emissions per GSF from 2007 through 2012											
Our GHG emissions are down					15% from 2007 to 2012, despite adding			in space, and			
							24%	in enrollment.			
29% r	reduction i	n waste to l	andfill from 2007 throug	gh 2012							
39% reduction in waste to landfill per FTE from 2007 through 2012											
42% reduction in waste to landfill per GSF from 2007 through 2012											
Our waste to landfill is down			31%	from 2007 to 2	2012, despite adding	26%	in space, and				
							24%	in enrollment.			

Figure 5. Municipal solid waste at ASU, 2007 - 2012.

Summary of Existing Recycling and Waste Infrastructure

The Arizona State University Recycling Program began in the early 1990's as a source separated collection system for paper and aluminum. Originally, the Surplus Property Program of the Business Services Division operated the recycling program. Through the years, other recycling streams were developed as the Phoenix market area became more established, eventually converting to a single stream (co-mingled) collection system in 2008 and transferring responsibility to Grounds Services in the Facilities Development and Management (FDM) division. In 2010 the program was dubbed *Blue Bin* comingle as part of a move to color-code recycling.

The current recycling system includes a robust Blue Bin collection system as well as over a dozen back-of-the-house source separated streams. Rigid plastics, food-grade glass, mid-to high-grade papers, and food-grade metals are all allowable in Blue Bins. Separated material collection programs are also available at ASU to capture streams specific to certain areas (like lab glass collection in labs, cardboard bins on docks, etc.) and to take advantage of the natural source-separation that occurs from certain university activities (like office paper collection for file clean-outs). Other source-separated streams (described in this document below) include inert materials like concrete and drywall, sports equipment, scrap metal, and pallets and scrap wood.

The Phoenix market area has seen a marked growth of recycling processors in recent years. State-of-the-art materials recovery facilities (MRFs) tooled toward highly co-mingled recycling, local niche remanufacturers, and development of large-scale facilities for processing organic materials have created a business environment that facilitates rapid expansion of recycling programs for large producers of municipal solid waste (MSW) like ASU.

To take advantage of regional synergies, the ASU Recycling Program has evolved in parallel with the major recycling infrastructure and market developments in the greater Phoenix area. With the opening of the Waste Management MRF in Surprise, Arizona (about 30 miles northwest of the ASU Tempe campus) in January 2010, ASU codified the list of Blue Bin co-mingled "acceptable" and "unacceptable" materials to its current configuration (<u>https://cfo.asu.edu/files/BlueBin_recycle_list.pdf</u>). ASU has taken advantage of unique local remanufacturers to recycle materials, such as expanded polystyrene (EPS) and lab glass, which are generally unmarketable to national and international markets. Recent developments in recycling of organic materials have allowed ASU to expand into recycling food scraps and compostable paper and wood fibers. Even with these developments, the Phoenix area's recycling market is less robust than other large population centers across the nation.

Maps of Existing Infrastructure

In 2009 the ASU Recycling Program initiated detailed mapping of solid waste collection locations and flow at all four campuses, as part of the university's facility CAD mapping system. This included layered maps reflecting centralized collection points, public waste and recycling receptacles, seasonal programs for special collections, and recycling routes. The maps have been used to refine both landfill and recycling routes, to phase in new outdoor receptacles, and to inform landfill and recycling infrastructure in new construction projects. ASU Facilities Management Grounds Services maintains the maps. An example can be seen below:



Figure 6: Layered MSW and Recycling Map of the ASU Tempe Campus.

User Bin Styles and Selections

One of the most important factors in getting users to participate in a recycling program is availability of bins. The primary bins ASU utilizes for comingle collection are 5-gallon deskside blue bins for personal office and in-room residential recycling, 23-gallon slim profile blue bins for indoor public and office recycling, and custom-made dual bins for outdoor public recycling. Other bins utilized are 45-gallon rolling blue bins for events, 95-gallon blue bins for clean-outs and large producers of materials, and blue mail hampers for collection of cardboard and other bulky items. Full pairing of these bins across all campuses is ongoing. Five gallon and 23-gallon bins can be damaged or removed over time for a variety of reasons, causing trash and recycle bins to become unpaired.

Concrete bins with pebble surfaces are sometimes selected for areas of high vandalism and in outdoor areas, where they weather with a natural appearance. Since 2011, ASU has been in the process of replacing concrete outdoor containers with customized outdoor landfill receptacles. The new receptacles are pre-paired, metal, and color-coded (silver for landfill and blue for recycling). Phase three of the project is underway at the Tempe Campus, with about one more year of replacement scheduled before replacement is complete. Polytechnic and Downtown Campuses have complete sets of outdoor paired bins, and West Campus is in the process of pairing outdoor containers.

In the summer of 2012, ASU began the transition to the Blue Bin Comingle system on the West and Downtown Campuses. Many gaps remain in achieving the proper location and pairing of inside bins. The most marked is at West Campus, where approximately 600 desk-side bins are needed to pair with waste cans. In addition, bins are regularly broken or get moved from their original location, so a constant supply of bins is needed to keep all locations paired.

In the spring of 2012, ASU Recycling added bin pairing to the responsibilities listed in custodial contracts. This means that after bins are emptied indoors, custodians have responsibility for re-pairing any sets that have been moved or un-paired.

Back of the House Operations

The concept of pairing bins is extended from indoor bins to outdoor collection locations; where possible, ASU places beige and blue containers side by side. The primary bins used for off-dock centralized collection are compactors, open-top roll-offs, and front-load bins.

Large (thirty cubic yard) outdoor compactors are used for both trash and Blue Bin centralized collection, and are often solar powered. Centralizing these materials into compactors keeps costs down, minimizes the use of large trucks on walking malls and sidewalks, keeps the landscape cleaner and safer, and allows ASU to get actual weights to measure diversion. Since 2009, all new buildings that produce a large amount of trash and comingled recycling waste have included paired compactors into their design and construction plans. New compactors have been placed at the Memorial Union and the Physical Sciences Lab Stores on the Tempe campus to collect cardboard.

Outdoor compactors and other large collection bins can be perceived as unattractive. These aesthetic concerns coupled with the large footprint of such units, makes the designation of permanent locations on campus difficult. Areas are designated where aesthetics are least compromised while functional support for building services is maintained.

Maintenance of compactors and open top containers is labor-intensive. Each area is monitored several times a day for safety issues, cleanliness, and correct usage, and they are regularly power-washed. Because they include motorized and hydraulic components, preventive maintenance and repairs must be regularly performed on compactors.



Aversion

Material aversion is the primary and most cost-effective step in implementing a comprehensive zero waste strategy. Material aversion is the process by which an institution or organization minimizes and ultimately eliminates the procurement of landfill-destined material. For example: if an institution has been procuring Styrofoam cups and there are no local facilities that can recycle Styrofoam cups (diversion), then that material will be destined for the landfill. In order to ensure that this material does not end up in a landfill, the institution must ensure that the product is not procured in the first place.

Advances in manufacturing technologies and product development have formed a competitive market for more sustainable products and services. The projects described below represent only the beginning of what will be possible in the future. In order to most successfully utilize aversion strategies, an institution must be up to date with marketplace advancements and get creative in replacing older and often more wasteful products and services with newer and more efficient ones.

Sustainable Procurement

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: All waste items produced from university procurement of goods

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus, Lake Havasu City Campus

Implementers: Purchasing & Business Services and Central Receiving (Contract Managers).

Methods and Procedures: One of the best ways to avoid waste generation is to develop operating procedures that don't generate waste in the first place. The most significant focus areas include paper reduction, package reduction, and improvement of packaging material quality. ASU Purchasing operates under policy *PUR 210*, which is a *Green Purchasing Policy* (<u>http://www.asu.edu/aad/manuals/pur/pur210.html</u>). This policy assures that vendors provide low impact products and services to the university. ASU also operates under *PUR 211*, which is the *Values-Based Standard for Business Relationships*

(<u>http://www.asu.edu/aad/manuals/pur/pur211.html</u>). This policy provides the ethical and social based principles for sustainability purchasing transactions.

Purchasing policy PUR 210 requires suppliers to both minimize packaging and also take back packaging for reuse or recycling. Formal solicitations include the following requirements:

In order to reduce the adverse environmental impact of our purchasing decisions we are committed to buy goods and services from manufacturers and suppliers who share our environmental concern and commitment.

Proposer shall minimize packaging and any packaging/packing materials that are provided must meet at least one of, and preferably all, of the following criteria:

Made from 100% post-consumer recycled materials Be recyclable Reusable Non-toxic Biodegradable *Further, proposer is expected to pick up packaging and either reuse it or recycle it. For major projects, this will be a requirement of the contract or purchase order.*

This information will be used as part of the evaluation criteria for Proposer Sustainability efforts for the RFP process.

Central Receiving staff monitors compliance with Purchasing Services requirement for packaging take-back. Student teams perform audits to support Central Supply's efforts.

In addition to the sale of durable goods and equipment, vendors of expendable supplies must comply with package take-back policies. For example, suppliers to snack vending machines are required to take back packaging when restocking their sites. These policies are found online at https://cfo.asu.edu/purchasing-green.

Materials, equipment and schedules of operation: None Required.

Costs: Business-as-usual expenditures.

Impact/benefits: ASU does not track specific quantities of materials that are averted from the landfill by this program. However, Central Receiving staff estimate that packaging is reduced by 50% below previous levels, and this is estimated to be 45 – 50 tons per year of packaging.

Actions needed for full implementation: No further actions required at this time.

Canon Sustainable Digital University[™]

Status: Proposed \rightarrow Piloting \rightarrow Adopted \rightarrow Fully in Place at Location \rightarrow Fully in Place Enterprise-Wide

Target Waste Stream: Print, scan, fax, and copy equipment. Paper and ink.

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus, Lake Havasu City Campus

Implementers: The ASU Canon Sustainable Digital UniversityTM is sponsored by the Auxiliary Business Services group. Canon Business Solutions, Inc. has won the contract to manage the department formerly known as Digital Document Services. As part of the contract, Canon follows the university's *Performance Based Risk Management Program* and works directly with the director of the Facility Management Research Institute (FMRI) and deputy-director of the Performance Based Studies Research Group (PBSRG).

Solutions provided by Canon are supported by networking actions by the University Technology Office (UTO). Canon also works with UTO's Auxiliary Marketing team to communicate with the ASU community via Lyris, the ASU Canon website, and through signage on campus that inform campus users of new programs and special events.

Methods and procedures: All departments requesting equipment are offered a free assessment of their existing print, scan, fax and copy environment. They are given a recommendation from Canon on the most cost effective and sustainable solution for their area. Long-term goals of the program include 1) reduction in the number of single function output devices on campus, 2) streamlining print requests to shared workgroup devices, to result in a lower cost per impression and a lower environmental footprint, and 3) development of a wider range of printing and data management functionality to the university environment.

Materials, equipment and schedules of operation: In 2010 Canon established a baseline of 6,020 single function devices and 584 multi-functional devices on campus. The goal by 2015 is to reduce the number of single function devices to 600 and increase the number of multi-functional devices to 1000.

Costs: As a strategic partner in digital data management, Canon underwrites the costs of *ASU* Canon Sustainable Digital UniversityTM. No direct financial cost for this program to ASU.

Impacts/benefits: The partnership provides a range of benefits to ASU, including:

- Canon has achieved a 99% average uptime on printing and multi-function equipment on campus.

- All equipment is supported by a service and supply inclusive contract, eliminating the risk of a department needing to find funds in their budget to pay for repairs.

- The program eliminates the need to dedicate a space and personnel to manage supply inventories for the various device models that may be within a department.

- Because supplies are part of the contract, departments rarely need to stockpile supplies that in many cases, expire in storage closets before they are used.

- Canon multi-function device supplies are locally recyclable and Canon has worked with the ASU Stores operation to establish a toner recycling program for the University.

- Devices are standardized for copy, print and scan capability, allowing departments to continue the process of digitizing their records and distributing/storing records electronically. The program also offers services to archive large databases of information for researchers and departments.

- All devices are duplex capable and departments are encouraged to set equipment to duplex as a default setting to reduce paper consumption. A key performance indicator, related to this service and to the increased availability of scanning, is the decrease of paper purchased by 48% over the past 6 years.

- Less material waste and energy is used to support document production and distribution needs on campus.

Actions needed for full implementation: Additional education is needed on the negative impact that overuse of personal printers, scanners and fax machines can have on the University Sustainability goals. There is a need for incentives and encouragement for sustainable printing practices and digital document distribution in place of printing.

Ownership of printing equipment by a department could be eliminated, with the ultimate goal of providing remote access to printing technologies by any user anywhere on campus. This model would limit the overall device count to the number needed to support the overall campus environment instead of the duplication of capacity that results from departments procuring their own equipment.

Mail Address Clean-up

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide

Target Waste Stream: Misdirected and dead-end incoming mail for University departments

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus, Lake Havasu City Campus

Implementers: Mail Services and IntraMail Network (IMN) (<u>https://www.intra-mail.com/</u>). IMN works with major mailers to correct or delete ASU addresses in their databases.

Methods and procedures: ASU Mail Services contacts IMN about mail that is misaddressed and/or undeliverable. IMN contacts the major mailing company in order to correct or delete their address lists. The address list from the major mailer is sent to ASU for correction or deletion.

Materials, equipment and schedules of operation: There is no additional equipment needed other than basic computer and internet access for updating address lists. The majority of the time spent is staff time needed to contact IMN and to correct address files.

Costs: Business-as-usual expenditures.

Impacts/benefits: Mail (standard mail or what is considered junk mail) delivered to ASU without the correct address is recycled. ASU Mail Services recycles over 250 pounds per week of undeliverable mail. By working with mailers to correct or delete addresses in their databases, we can reduce the amount of dead-end mail coming into ASU, which in turn reduces the amount of mail to be created and recycled.

Actions needed for full implementation: At this time, ASU Mail Services works with major mailers and IMN. To achieve full implementation, Mail Services will need to contact the companies using incorrect addresses directly. This would effectively reduce the quantity of mail sent to ASU, while retaining the assurance that mail continues to be delivered correctly to current mail slot holders.

Departmental Copying and Paper-use Restrictions

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Paper products.

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus, Lake Havasu City Campus

Implementers: The Division of Facilities Development and Management and the Purchasing & Business Services Office have department level print reduction programs. Departments maintain electronic catalogs and schedules across the university, which reduces paper use by thousands of reams each year. (https://catalog.asu.edu/catalog_contacts)

Methods and procedures: ASU implemented a *Print Publications Cost Reduction Initiative* in March 2009. Departments reduce consumption by reducing the physical size and number of documents increasing both shelf life and also usage of electronic documents.

The Division of Facilities Development and Management maintains construction documents, blueprints, and contracts digitally, and disseminates contract-related documents among bidders, contractors, construction managers and purchasing officials through SharePoint sites.

The Purchasing and Business Services Office sends solicitations electronically, and all responses are required to be digital. Rather than distributing lengthy proposal document to the Evaluation Committee, these items are now maintained electronically on a SharePoint site.

As part of our effort to digitize the university, all course catalogs and course schedules are available only via the <u>ASU online Academic Catalog</u> website. Registration is paperless and all orientation materials are sent electronically. Orientation materials are given to students on a zip drive.

Materials, equipment and schedules of operation: None Required.

Costs: Business-as-usual expenditures.

Impacts/benefits: Paper sales by ASU Stores have been reduced by 32% from 2009 (170,481 reams) through 2012 (115,139 reams). At 5.125 pounds per ream, this has also amounted to a waste reduction of 283,628 pounds of paper on campus. The success of this program is shared with *ASU Canon Sustainable Digital University*TM, the Electronic Commencement Materials, and other paper conservation projects.

Digital Commencement Programs

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Graduation ceremony programs

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus

Implementers: University Ceremonies Program, the Office of the Sr. Vice President and Secretary of the University, University Sustainability Practices, University Registrar's Office and the Alumni Association.

Methods and procedures: Beginning with December 2012 commencement programs, the Office of University Ceremonies will provide graduates with digital commencement and convocation programs on USB flash drives.

Graduating students and their families will receive a traditional ceremony program at the commencement and convocation events but it will not contain a list of graduating students. A full commencement program will be produced after all degrees are certified and mailed to students approximately eight weeks after the semester ends. The digital program will contain information about candidates for graduation who applied on or before the fall 2012 graduation application deadline.

Undergraduate, Masters and Juris Doctor degree candidates will receive an external drive with the digital program at the college convocation event. Doctoral candidates will receive an external drive with the digital program at the University Graduate Commencement.

After all degrees are certified, a commencement program with the listing of graduate names will be mailed to the graduate's mailing address of choice. Additional programs will be available for delivery on demand only through the print house that produces commencement programs.

An announcement has been made to college convocation coordinators, as well as been posted on the University Ceremonies web site. (<u>http://graduation.asu.edu/announcements/3-1</u>) Information has also been distributed at the Graduate Fair.

Materials, equipment and schedules of operation: Programs are provided by Ironwood Litho, and external drives are provided by US Digital Media.

Costs: The Office of the Sr. Vice President is currently determining capital costs.

Impacts/benefits: Full commencement programs for all ASU graduates—58,000 programs printed each spring and 29,000 programs in December, an average of 250 pages each—total over 21 million pages (42,000 reams, or 125 tons of paper) of printed material per year. The short-term goal is to reduce the quantity of conventional printing by 50% in the 2012 – 2013 academic year with this program.

Actions needed for full implementation: Once the Sr. Vice President's Office has determined total capital costs, this initiative will be rolled out to all commencement programs at all university locations.
Compostable Food Service Items

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Napkins, plates, flatware, clam-shells, cups, boats, straws, lids, bowls, and other food and snack related paper items

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus, Lake Havasu City Campus

Implementers: Contract food service providers (Aramark, Atlasta, Sodexo and their subcontractors), caterers, department events coordinators who sponsor their own food events

Methods and procedures: All food service providers will purchase and distribute food service items that are compostable; items manufactured from paper and/or corn fiber sources.

Materials, equipment and schedules of operation: Providing compostable food service items will complement the Green Bins program, which will afford convenient disposal of all food-related items into a single bin that will go to off-campus compost programs.

Costs: There will be a small incremental cost to diners, which our food service providers have indicated will not raise prices of on-campus meals noticeably. The material is currently being managed as a cost-neutral pilot. Costs are being tracked and service price will be determined.

Impacts/benefits: About 14% of ASU's waste stream is comprised of compostable paper, and about half of that is from food-related sources (the rest is from cleaning and restroom activities). This means that about 475 tons of food-related material could be diverted from all campuses. To achieve 90% diversion, we need to compost 430 tons of compostable food service items per year, which will also avoid 390 Metric Tons of Carbon Dioxide equivalent or (MT CO₂e) of GHG emissions per year.

Actions needed to bring the project to full implementation: Food service providers indicate that they have nearly completed the process of sourcing and purchasing compostable items. Communications between ASU senior administration and senior corporate officials from franchised food vendors (e.g. Taco Bell) on campus will be necessary. Vendors should have the process of switching to compostable-only items by Summer 2013.

Food Waste Aversion: Food Donation

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Pre-Consumer Food Surplus

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus

Implementers: ARAMARK (Sun Devil Dining), ATLASTA (University Club)

Methods and procedures: Based on the the U.S. Environmental Protection Agency (EPA) Food Hierarchy, food donations are the primary strategy for diverting food waste from the landfill. Food donations can occur in two main streams: donation for human consumption or donation for animal consumption. Industry and legal standards may vary for each stream based on location.

ATLASTA captures all University Club food from kitchens, events, and consumers' plates. All food destined for donation is kept in a refrigerated environment and transferred to the appropriate end user in an edible, non-spoiled condition. Food for human consumption is donated by ATLASTA through two homeless shelters in town and a service that picks up perishable food daily and delivers to food pantries throughout the Phoenix metro valley. ATLASTA's food scraps for animal consumption are donated to area farms that raise animals that are not confined and not slaughtered for food, and only to farms that employ sustainable farming practices.

ARAMARK chefs are trained to manage food production based on expected traffic. However, in situations where there is food waste, ARAMARK works through the *Food Donation Connection* (<u>http://www.foodtodonate.org/</u>) and *Waste Not* (<u>http://www.wastenotaz.org/</u>) local food donation efforts that support organizations in need across the Phoenix metro valley. Food donations are collected from all ARAMARK kitchens and consolidated in the Memorial Union kitchen for weekly pick-ups. All ARAMARK employees are trained on food safety issues to ensure compliance with health department requirements.

ARAMARK's food donation includes:

- 1) Identify food items for donation
- 2) Safely pack and label food
- 3) Carefully weigh the donated food
- 4) Properly chill and freeze/refrigerate food to be donated, and
- 5) Document quantity of product on logs and hold food for pickup.

Materials, equipment and schedules of operation: No special equipment or materials are needed. Recovery of compostable materials occurs after each meal prepared at University Club and after each catered event.

Costs: Atlasta and ARAMARK underwrite the costs of their respective programs, and expend incrementally more labor cost to avert waste generation through food donation. Those costs are incorporated into the cost of meals and food services.

Impacts/benefits: Since the inception of ARAMARK's food donation program in Spring 2011, the first year of operations allowed Sun Devil Dining to donate over 4,251 pounds of food and Atlasta to donate 10 tons of food scraps from the University Club at ASU.

Food Waste Aversion: Food Management Process

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Organics

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus

Implementers: ARAMARK (Sun Devil Dining)

Methods and procedures: One of the most important steps to minimize food waste is to efficiently forecast how much food to purchase and produce. ARAMARK utilizes a computerized menu management system to accurately calculate the amount of food required for a particular menu. Batch cooking is an essential step to minimize food waste by cooking smaller amounts of food throughout the meal period instead of cooking everything in the beginning. This allows us to provide a continuous supply of fresh cooked food and minimize the amount of over production. The Food Management Process is supported by training, technology, improved supply chain management practices, and enhanced safety practices.

Materials, equipment and schedules of operation: ARAMARK has a proprietary software system that is used enterprise wide to ensure proper purchasing, inventory, and food management practices. Each food service location keeps a daily waste log in order to best manage production and reduce food waste. This process is supported by training, technology, improved supply chain management practices, and enhanced safety practices. A complete waste audit is also conducted annually at one location to get an understanding of the breakdown of our waste stream.

Costs: Aramark underwrites the costs of this program. That cost is incorporated into the cost of meals and food services.

Impacts/benefits: Through careful tracking and monitoring, ARAMARK's Food Management Process enables us to reduce food waste from the source. This process helps lessen our impact on the environment and improves food safety, quality and consistency.

Trayless Dining

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Organics

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus

Implementers: ARAMARK (Sun Devil Dining)

Methods and procedures: Removal of trays from residential dining locations.

Materials, equipment and schedules of operation: None required

Costs: There are no costs associated with this initiative.

Impacts/benefits: Trayless dining creates waste reduction, conserves energy and water, reduces the amount of detergents that enter the wastewater stream, and provides education and awareness on healthy eating habits. Among the seven all-you-care to eat dining facilities across the four campuses, trayless dining was estimated to reduced food waste by 76 tons, and water use by 652,948 gallons in one 2011 – 2012. In addition, trayless dining helps to reduce chemicals, detergents and drying agents used to wash trays, decreases discharge into landfills, incinerators and wastewater treatment facilities, and lessen the overall ecological footprint. These estimates are based on an ARAMARK study of 186,000 meals served at over 25 higher education institutions during an academic year.

Reusable To-Go Containers

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Single- use disposable products: paper, plastic, Styrofoam.

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus

Implementers: ARAMARK (Sun Devil Dining)

Methods and procedures: Customers pay a \$3 deposit for the use of NSF-approved plastic reusable containers. After using the containers, customers have three options: 1) Return the container and receive an exchange-tag to redeem for a clean container at their next visit; 2) Return the container and receive a clean container on the spot; or 3) Return the container and redeem the \$3 deposit. Reusable to-go containers are the only option to take food to go from these locations. Dining locations currently participating include: Taylor Place (Downtown), Devil's Greens (Downtown) and Catering (Tempe, Polytechnic, West and Downtown).

Materials, equipment and schedules of operation: Reusable to-go containers, extra drying rack capabilities, plastic key-tag exchange cards, and education/awareness marketing signage.

Costs: Aramark underwrites the costs of this program. That cost is incorporated into the cost of meals and food services. Costs would include items such as containers, key-tags, and marketing.

Impacts/benefits: The use of reusable to-go containers at Taylor Place Residential Restaurant and Devils Greens at Taylor Place save approximately 1500 single-use/disposable containers from the landfill each week.

Actions needed for full implementation: Information feedback from the initial implementation will be reviewed and considered for rollout of the project across all campus dining locations.

Reusable Bag & Mug Discount

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Single-use bags and single-use beverage containers.

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus

Implementers: ARAMARK (Sun Devil Dining)

Methods and procedures: For purchases over \$10 that use a Sun Devil Dining reusable bag, campus markets offer a \$1 discount. Sun Devil Dining also offers at least a 50-cent discount on beverages with the use of a reusable cup or mug. Free reusable hot and cold mugs are distributed at various Sun Devil Dining events to promote the use of reusable drink containers. Reusable mugs and bags are also sold at markets across campus locations.

Materials, equipment and schedules of operation: Reusable bags and reusable mugs sold across campus locations and distributed at special events. Marketing material posted at all locations to raise awareness with campus community.

Costs: Sun Devil Dining distributes 7,500 free reusable bottles during move-in across ASU campus locations. Reusable bottles and mugs are typically distributed during at least one other event throughout the academic year. For Earth Day 2012, ARAMARK partnered with the Center for Student Sustainability Initiatives for our Go Local Green Captain Expo where 250 stainless steel water bottles were distributed.

Impacts/benefits: Diners are offered discounts as an incentive to participate. This avoids the use of single-use disposable bags and hot beverage cups.

Bottled Water Reduction

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Single-use water bottles

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus, Lake Havasu City Campus

Implementers: USP, Office of the University Architect, Facilities Development and Management, student groups.

Methods and procedures: A committee of stakeholders will be formed to assess water fountain technologies and equipment, campus policy, logistical issues and potential barriers, and other processes needed to install outdoor water fountains on ASU campuses. The group will develop specifications for water fountains in outdoor locations. Initial candidate sites include the Old Main Lawn, Palo Verde Beach, and the intersection of Orange Mall and Cady Mall. Availability of filtered water at outdoor fountain locations will reduce demand for bottled water by providing free, easily accessible, high quality water at convenient places.

Materials, equipment and schedules of operation: TBD by the drinking water committee described above.

Costs: Initial costs will depend on material/equipment selection. Operational costs will depend on the proximity and availability of water and electrical services.

Impacts/benefits: About 5% of ASU's waste stream, an estimated 350 tons per year, is polyethylene (PET) plastic #1 and high density polyethylene (HDPE) plastic #2 material, and perhaps half of that quantity is plastic water bottles (plastic #1). It is difficult to estimate the amount of material that would be diverted from the landfill, because the impact of the availability of fountains on bottled water sales is unknown.

Actions needed for full implementation: A committee must assure that proposed fountains:

1) Meet public health and safety requirements,

2) Are sited, funded, and installed in locations that result in significant use, and3) Are supported by effective public awareness and education efforts, and thereby reduce the use of single-use bottles.

ARIZONA STATE UNIVERSITY

water fountain map | Tempe Campus



SRC: Main entrance, turn left, on left side PE West: Main north entrance, turn right (not upstairs), on right 23 Old Main: Past the first floor information desk on the right side SRC:Man enables (and explored to the deal of the second to the seco Dixle Gammage (Secret Garden): Single fountain in front of room 143 and 154, 154 has a refill fauoet as wall 13 PE West: Main north entrance, up right staircase, right, on right PE West: Southeast entrance, on left 23 Hayden Library: Near the bathroom inside on the left (West) Computing Commons: Near the restrooms behind the store on the East side of the building (same on all levels) 26 Interdisciplinary A: Near the North entrance, inclusive of a refill faucet Computing Commons: Outside, southwest corner entrance, on left 27 Interdisciplinary B: Near the Southeast entrance, inclusive of a refil faucet 6 Memorial Union: Southeast lower level, downstairs, turn on left next to serenity Barrett: Sage South A: Through double doors, first left. On either side 2 Wrigley Hall: Breezeway level by the elevator Memorial Union: Main floor- in south east entrance, turn left down hall on right Barrett: Honors hall building H: Through main doors on west side, continue straight towards dining hall, on left 0 29 Language and Literature: First floor West entrance 8 Memorial Union: North main entrance, left up short staircase right, on left Barrett: Honors hall building H 2nd floor: Through main doors on west s straight, go up spiral staircase to right, turn right, continue down hallway. 30 Social Sciences: Base level by East entrance Memorial Union: Upstairs- in north main entrance, up left short staircase, up right stairs, turn right, on left
Memorial Union: Southeast entrance, up right staircase down hall, on left 20 Barrett: Cereus hall building C: Outside, to the right of elevators in enclave Social Sciences: Base level by West entrance Moeur: To the right (West) of the entrance Barrett: Cottonwood building D: Outside, east towards juniper, first right. 1 PE West: Northeast double entrance, on left 22 Barrett: Juniper building E: East toward main entrance, turn right, then left

Figure 7. Indoor water fountain locations on the Tempe campus.

Personal Towels

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Paper towels from rest rooms

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus, Lake Havasu City Campus

Implementers: University Sustainability Practices will specify and purchase personal towels. Residence Hall Community Advisors will distribute them and provide educational and public awareness activities to maximize their use. The Zero Waste communications team will provide messaging and communications products to Community Advisors.

Methods and procedures: Remove paper towels from rest rooms in residence halls and issue personal towels to residents. The project expects that with educational efforts, students will be willing to assume personal responsibility for hygiene by using handkerchief-type personal hand towels. One personal towel will be issued to each student at the beginning of the fall semester, and residents of ASU residence halls will be allowed one additional free towel that year. The adoption rate is likely to be small initially, perhaps 10% the first year. The project is assessed over a five year of implementation.

Materials, equipment and schedules of operation: There are 9,000 beds on ASU's campus locations in the Phoenix Metro Valley. 18,000 towels will be purchased each fall and given to residence hall students. Personal towels will be available for sale for about \$2 at the Campus Bookstore. One example of a possible product can be found at People Towels: https://www.peopletowels.com/

Costs: Initial costs will include a \$36,000 investment in product procurement to distribute to residential students on campus.

Impacts/benefits: About 6% of ASU's waste stream consists of paper towels from restrooms. This project will reduce paper waste by more than 10 tons per year (2% of restroom paper towels). The most important result will be improved awareness of waste paper issues and the beginning of behavioral change among the 9,000 students who live in residence halls.

Actions needed for full implementation: Effective public awareness and education, and a shift in behavioral pattern will be needed to achieve full compliance and implementation.

Hand Dryers

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Paper towels from restrooms on all campuses

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus, Lake Havasu City Campus

Implementers: Facilities Development and Maintenance Managers

Methods and procedures: Electric hand dryers can displace the need for paper towels in high traffic restrooms. There are over one thousand restrooms at ASU campus locations. A detailed assessment of the volume of waste paper generated in each restroom has not been completed, and it is therefore not known how many generate sufficient waste to pay for installation of a hand dryer within a reasonable time period. This proposal assumes that 100 hand dryers can be installed in high volume restrooms that do not yet have one.

Materials, equipment and schedules of operation: Dryers cost about \$1000 each, and the cost of installation will vary, but average about \$1,500 per unit. Thirty to forty units to be installed each year over a three-year period.

Costs: Initial costs will include the \$75,000 investment in product procurement per year for the first three years of the project. There will be significant savings throughout the life of this project as a result of not having to purchase paper towels. These figures are currently being calculated.

Impacts/benefits: About 6% of the solid waste stream consists of paper towels from restrooms. If 90% is averted through this project, 200 tons of waste will be removed from the landfill each year.

Actions needed for full implementation: A detailed assessment of the amount of waste generated in higher volume restrooms is needed. Public acceptance of hand dryers is moderate, and information regarding the benefits of waste reduction through hand dryers is needed. Finally, Facilities Maintenance will need to monitor the effectiveness of reducing waste through the use of hand dryers.

HVAC Filters

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: About 50,000 disposable filters are used in HVAC equipment every year in ASU facilities. This project would avert the need to purchase the most common sizes, which will reduce waste by half.

Locations: Tempe Campus

Implementers: Facilities Development and Maintenance Managers

Methods and procedures: Disposable HVAC filters of the most common sizes (e.g., 20" x 24", 20" x 30", 24" x 24") will be replaced with washable filters.

Materials, equipment and schedules of operation: Twelve thousand HVAC filters are replaced four times annually on the Tempe campus. The half dozen most common sizes will be replaced with washable filters. Re-usable filters will have a five-year service life and will be washed quarterly. A location will be found in the FDM shop area to wash filters. A procedure that results in efficient swapping of washable filters will be established to remove, transport, wash and store filters.

Costs: Initial costs will include \$36,000 per year for product procurement.

Impacts/benefits: About 35 tons of material will be averted from the landfill each year with this program. A substantial amount of water is used to manufacture paper filters. Less water will be used in washing reusable filters than is used to manufacture disposable filters.

Actions needed for full implementation: FDM will budget for a phase-in of these filters over a five-year period. This will level first costs to 20% of the overall total each year.

Personal Zero Waste (ZW) kit

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: A Personal ZW Kit will contribute to aversion of daily waste, potentially including:

- Packaging from groceries
- Single-use wrappers and disposable food service items at purchased meals and snacks
- Single-use drink containers
- Single-use shopping bags
- Single-use paper towels for kitchen and other household cleaning
- Tissues for personal hygiene
- Hand towels in the restroom
- Non-rechargeable batteries
- Personal hygiene items such as dental floss, bandages, cotton balls and swabs, and tape

Locations: Tempe Campus

Implementers: The concept will be presented to teams in the Herberger Institute's Innovation Space, the College of Technology and Innovation, and to other student groups. A group will be selected to develop designs and business plans to implement production and distribution.

Methods and procedures: Rollout will begin on the Tempe campus, and will expand to all campuses when partnerships provide adequate support. Depending on a business plan (not yet written), the kit could be developed by ASU students in collaboration with one or more corporate partnerships, and could be co-branded with local or national companies.

A successful kit might:

- Be branded by ASU marks and images
- Be easy to carry in a backpack
- Be marketable to area merchants who could either make money or co-brand with ASU

- Be leak proof, to allow secure food storage (perhaps leak proof in a vertical position)
- Be built around a lunch kit as the core unit, and
- Contain reusable items to take the place of single-use items

Challenges to the design and production include:

- It must meet a minimum coolness standard for the typical ASU student.
- It must meet significant waste reduction needs without being too large or cumbersome.
- It must have qualities that draw students to continue to use it after newness has worn off.
- It must be reasonable in price, so that thousands can be provided to ASU students and employees.
- It must have marketability to potential partners and sponsors who will share in the costs and benefits of its production and use.

Costs: Currently being determined by project team.

Impacts/benefits: The kit will enhance public awareness and campus engagement for the zero waste efforts fostering a waste-free lifestyle among users. The project aims to contribute to ASU's aversion efforts impacted by individuals' behavior on campus.

Actions needed to bring the project to full implementation: Interdisciplinary student teams that can engineer consumer products and develop business and marketing plans will be found to develop the project. A corporate partnership may be developed to share benefits of co-branding.



Recycling

Recycling efforts across ASU's campus locations have two main goals: to increase recycling participation and to reduce contamination that can relegate an entire bin of recyclables to the landfill. The implementation of the Blue Bin program is accomplishing both of these goals. From the Waste Characterization Study, we estimate that the university can divert approximately 31.6 percent of its waste stream from landfill utilizing the Blue Bin program.

An effective recycling program should not only be consistent across the institution, accessible to the entire community, and educational to its users; it should also positively influence users to contribute to increasing diversion rates and decreasing contamination rates. A great recycling program will be simple and straightforward on the front-end for user interface, and efficient and effective on the back-end for hauler operations.

As part of the ASU Facilities Development and Management department, the institution funds the ASU Recycling Program. This program employs a campus Recycling Program Manager hired to run recycling efforts. A team of recycling technicians and student interns supports the Recycling Program Manager. The projects described below fall primarily under the responsibility of this team in collaboration with University Sustainability Practices.

Blue Bin Program (Co-mingle Recycling)

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: All recyclable materials

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus

Implementers:

- ASU FDM Recycling is responsible for operations and improvements, coordinating and advising stakeholders, participating in planning, training operational staff, and providing some engagement. Recycling Manager, Recycling Program Technicians, Recycling Materials Handlers.
- ASU USP is responsible for communication, engagement, and marketing, and Zero Waste planning. Director, Program Coordinators.
- Campus custodians empty indoor recycling receptacles and pair bins. Managers, Supervisors, Leads, and Custodians.
- ASU FM Grounds Services empties outdoor containers, picks up materials, maintains compactors, and coordinates operations with Recycling Program. Grounds Assistant Supervisors, Grounds Employees.
- Waste Management empties compactors, roll-offs, and other centralized containers, and processes/markets materials. Education Sector Specialist.
- ASU Facilities Managements at West, Downtown, and Polytechnic manage the daily operations. Directors, Supervisors.
- Other implementers: ARAMARK Sustainability Coordinators and Kitchen Staff, ASU Building Managers.

Methods and procedures:

- Blue bins are located inside and outside all buildings on the Tempe, Polytechnic, and Downtown Campus. Bins are being phased in for West Campus.
- At Tempe Campus, custodians empty indoor bins into push carts and transport them to sidewalks and walking malls, where they are picked up nightly and taken by Grounds Employees and taken by 15' stake bed trucks to compactors and open top bins. High-use buildings and buildings located directly adjacent to compactors and open-top bins are emptied throughout the day. Grounds Employees empty outdoor bins into compactors and open top bins. Each compactor and open top bin services several surrounding buildings.

- Waste Management empties materials compactors and open top bins according to agreed schedules and transports Blue Bin materials to the Sky Harbor Transfer Station.
- Materials are weighed, combined with co-mingled recycling from other sources, and taken to the Materials Recovery Facility in Surprise, AZ where it is sorted and baled.

Materials, equipment and schedules of operation:

Equipment:

- Outdoor Blue Bins are paired with silver trash bins for general use
- Indoors, Blue Bins (Slim profile in non-office rooms and halls, 5-gallon desk side bins in offices) are paired with black or silver trash bins for general use. Break rooms and kitchenettes will have Blue Bins paired with Green Bins.
- 95-gallon barrels and wheeling hampers are used for office and lab clean-outs.
- 45-gallon wheeling barrels are used for events.
- Twenty-nine roll-off and compactor locations are used on the Tempe campus for centralizing materials. Polytechnic Campus centralizes into three locations, with two fullsized compactors. Downtown Campus centralizes into four locations, with one full-sized compactor. West Campus centralizes into two locations, with four full-sized compactors.
- A forklift is used as needed to move pallets of materials when large amounts are recycled.
- Two 15' stake-bed trucks are used to haul materials at night and during the day to compactors and open-tops.

Schedules of Operation

- Indoor Bins are serviced every other day; exact schedules vary by campus.
- Outdoor Bins are serviced daily or as needed
- Materials are transported from buildings to compactors nightly
- Compactors and other containers are serviced according to agreed pull schedule between Recycling and the hauler everything is on call

Costs: Initial cost will include \$594,000 primarily for the procurement of bins.

Impacts/benefits: Thirty-seven percent of ASU's Tempe campus waste stream is composed of materials acceptable in the current Blue Bin Program including paper, rigid plastic, glass, and metal. This represents a significant tonnage of potentially divertible waste per year among all four ASU Campuses, given a fully implemented and adopted program. In addition to waste-to-landfill reduction the program will also encourage behavior change towards other key recycling and sustainability programs.

Actions needed for full implementation: Achieving full implementation across all four ASU Campuses will require long-term investment in the first costs and operational resources necessary to establish and maintain the program. Full adoption of the program by ASU populations will be dependent on a fully-funded and on-going campus engagement and social marketing program.



What goes in the blue bin:



@asurecycles recycle-q@asu.edu

paper you can rip it, recycle it!

if you can rip it, recycle it! any color, any finish clips, staples and bindings: okay no paper towels, tissues, napkins, liquids or food waste examples: aseptic containers (e.g., juice box) brochures calendars cardstock chipboard (e.g., cereal box) copy/computer paper corrugate boxes (flattened) file folders greasy pizza boxes (no pizza) hard/soft-cover books junk mail magazines manila envelopes mik cartons newspapers paper bags paper cups (wary okay)

paper pads/notebooks paper plates paperboard (e.g., frozen food box) posters phonebooks/catalogues

sticky notes

plastic

hard (rigid) plastics only any number, any color lids and caps are okay

IIds and caps are okay / / no soft plastics (e.g., plastic bags) / no Styrofoam (including cups) / no liquids or food waste // examples: a any plastic utensils // clear bottles (e.g., water and soda // bottles) // clear cups (e.g., caudy tub) // microwave food trays (no food waste) // natural jugs (e.g., milk jug) // opaque bottles (e.g., shampoo bottle) // opaque bottles (e.g., shampoo bottle) // opaque out (e.g., caudy tub) // opaque bottles (e.g., shampoo bottle) // opaque out (e.g., caudy tub) // opaque cups (e.g., caudy tub) // opaque cups (e.g., caudy tub) // opaque obttles (e.g., shampoo bottle) // opaque cups (e.g., caudy tub) // opaque (e.g., caudy t

opaque contes (e.g., snampoo botte) opaque cups (e.g., yogurt cup) opaque jugs (e.g., detergent bottle) opaque tubs (e.g., cottage cheese tub)

plates (e.g., disposable event plates) serving platters and lids

metal

any metal labels are okay no large scrap metal no electronics no liquids or food waste examples: aluminum cans aluminum foil (no food waste)

aluminum foil (no food waste) energy beverage can steel cans (e.g., soup/tuna cans) serving trays and lids soda can storage tins

glass

any glass food container of any color lids and labels are okay no lab glass no light bubbs no mirrors no ceramics examples: bottles (e.g., soda bottle) jars (e.g., pickle jar)

Recycle@ASU. It's what we do. the contaminants liquids - food - paper towels - napkins

liquids

solutions:

- scrape food off into the trash or wipe clean with your used napkin, then recycle
- dump liquids into a sink, then recycle



Figure 6. Do's and don'ts of the Blue Bin.

Soft Plastics

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Soft Plastics

Locations: Tempe Campus

Implementers: ASU Recycling Program Manager, ASU Recycling Program Technicians

Methods and procedures: Drop-off locations for this program will be designated in centralized locations on the Tempe campus in Summer 2013. Other campuses will be phased in during the 2013-14 academic year. Collection bins will be placed inside and near locations that sell items that are taken in plastic bags. The campus Recycling Program will empty the bins and deliver contents to a roll-off bin at the Boneyard.

Materials, equipment and schedules of operation: Bins will be sized and located in accordance with space availability at commercial locations (i.e., locations where plastic bags are provided with purchases). Service of those bins will be added to the Recycling team weekly route.

Costs: Initial cost will include \$15,000 for the procurement of bins.

Impacts/benefits: From the Waste Composition Report, 8.3% of ASU's Tempe Campus waste stream is composed of film and soft plastics. Although most of this was in the form of trash liners, collection of consumer soft plastics has the potential of diverting up to 100 tons of waste per year among all campus locations. In addition the program would fill a highly visible recycling niche and will meet a need of campus users.

Actions needed for full implementation: The locations of bin placement and a market for plastic films have been tentatively identified. Funding must be allocated; bins need to be purchased; and labels must be designed and made. A strategy for marketing and public awareness of the program needs to be developed.

Battery Recycling

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Batteries generated by ASU departments.

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus

Implementers: Collection boxes are created by business office managers and building managers. EH&S picks up the collection boxes.

Methods and procedures: As part of this program, front desk staff participate in collection and drop-off procedures. Printable labels are provided online for collection purposes (<u>http://asu.edu/fm/documents/recycling/batteryrecycle_flyer.pdf</u>); business office managers and building manager place boxes at front desks and entryways and call EH&S for pick up when the boxes are full. Staff at the Student Recreation Center also participates in collection of materials. Batteries collected in the residence halls are sent to EH&S. Batteries collected from ASU operations are picked up by ASU recycling program and EH&S.

Materials, equipment and schedules of operation: Boxes are serviced when they are full.

Costs: Business-as-usual expenditures.

Impacts/benefits: The impacts and benefits are currently being calculated for this initiative.

Styrofoam/Expanded Polystyrene (EPS)

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Styrofoam/Expanded Polystyrene

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus

Implementers: ASU Recycling Program Manager, ASU Recycling Program Technicians

Methods and procedures: As part of this program, collection hampers are located in most Tempe campus buildings for collection of Styrofoam. Since 2011, the campus Recycling Program has accepted block EPS such as is used in packaging fragile goods as well, which goes into collection hampers. Recycling Program staff empty bins weekly and store at the Boneyard. Additional collection occurs on request and during residence hall move-in at Hassayampa and Barrett locations.

Materials, equipment and schedules of operation: Recycling Program has 130 cardboard/EPS collection hampers on the Tempe campus. Utilize flatbed truck for pickup.

Costs: Initial costs will include \$2500 for the procurement of collection hampers

Impacts/benefits: From the Waste Composition Report, 1.5% of ASU's Tempe Campus trash stream is composed of EPS food containers and block EPS. Although some of this is in the form of currently unrecyclable food containers, the collection of consumer block EPS has the potential to divert an additional 30 – 40 tons of waste per year among all four ASU Campuses. In addition to collection of block EPS, encouraging staff and on-campus residential students to bag and give packing peanuts to the on-campus UPS stores would contribute to diversion.

Actions needed for full implementation: Signage on hampers needs to be completed and other communications products need to be produced.

Cardboard Collection

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Cardboard

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus

Implementers: ASU Recycling Program Manager, ASU Recycling Program Technicians, Custodians

Methods and procedures: As part of this program, over a hundred indoor collection hampers are located in facilities across campus locations. Outdoor bins are also located by request where collection loads are heavy. Cardboard is collected as part of the Blue Bin Recycling Program. ASU staff and contracted custodians place broken-down cardboard into the hampers. The campus Recycling Program empties the bins weekly into outdoor roll-off bins or compactors. Waste Management services the compactors and roll-offs on an on-call basis.

Materials, equipment and schedules of operation: Hampers, compactors, and flatbed truck for pickup.

Costs: Initial costs included \$2500 for the procurement of collection hampers

Impacts/benefits: From the Waste Composition Report, 6.6% of ASU's Tempe Campus trash stream is composed of cardboard. Increasing collection of cardboard has the potential of diverting over 442 tons of waste per year among all four ASU Campuses. In the last year, 188 tons of cardboard were diverted from landfill.

Lab Glass Collection

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target waste stream: Heat resistant glass, including beakers, bottle, burettes, test tubes, flasks and other lab glass pieces.

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus

Implementers: Lab Managers, ASU recycling program, EH&S

Methods and procedures: Lab glass is collected and stored in designated bins in labs across campus. ASU recycling program removes collected glass from labs and centralizes in Boneyard. Boxes of recyclable glass are picked up by Granite Express in Mesa, where glass is crushed and used as a component of porous pavement systems.

Materials, equipment and schedules of operation: Collection locations and schedules are determined by lab managers. EH&S transports materials from labs to a central location where it is prepared for transport to Granite Express.

Costs: Total costs for this program are currently being calculated.

Impacts/benefits: In 2012, 18.90 tons of lab glass was diverted from landfill.

Sports Balls Collection

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Used golf balls and tennis balls

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus

Implementers: Tempe campus Sun Devil Fitness Complex equipment room staff, Whiteman Tennis Center staff, ASU recycling program

Methods and procedures: Sun Devil Fitness Complex accepts used athletic balls. The Whiteman Tennis Center accepts used tennis balls.

Golf balls are sent to Dixon Golf, a golf ball manufacture. The recycled golf balls are turned into artificial turf and playground equipment

In partnership with reBounces, tennis balls in good condition are re-pressurized; worn-out balls are distributed to adult-care facilities, hospitals, and schools where they are placed on the bottom of furniture and walkers to provide stability, reduce flooring damage and reduce noise pollution.

Costs: Business-as-usual expenditures.

Materials, equipment and schedules of operation: Athletic balls are accepted at the Tempe campus Sun Devil Fitness Complex equipment room or the Whiteman Tennis Center is open. Materials are picked up as demand arises.

Impacts/benefits: The annual sports ball total diversion has not been measured in the past. Efforts will be made to measure future amounts.

Athletic Shoes Collection

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Athletic Shoes

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus

Implementers: Student Recreation Staff and ASU Recycling Program

Methods and procedures: Campus users can drop used athletic shoes in the lobby of the Student Recreation Centers (SRC) on any campus. Used shoes are collected and sent to the Nike-Reuse-A-Shoe program, where the material is processed and converted into playground and court tread around the country.

Costs: Business-as-usual expenditures.

Materials, equipment and schedules of operation: Bins are available during SRC business hours.

Benefits/impacts: Recycling used shoes keeps them out of the landfill. Approximately 540 pounds of shoes are diverted annually. The program has been in place since 2008.

Construction and Demolition Debris (C&D)

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Building materials from large and small remodeling and renovation projects and from new constructions projects

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus

Implementers: Capital Programs Management Group (CPMG) Project Managers

Methods and procedures: For all projects where the Construction Manager at Risk (CMAR) contracts are used, there is wording in the General Conditions of the contract, section 13.21, that describes what the CMAR is to do for recycling construction waste. This section stipulates that the CMAR is to work with ASU Grounds Maintenance Department for waste containers and that the Grounds Maintenance Department will manage the containers. For New Construction projects where LEED certification is being sought the recycle program is managed by the CMAR for LEED credits. ASU's sustainability program and Policies and Procedures are referenced in Section 13.22 and 13.23 respectively.

Costs: Costs are integrated into total project costs by hired general contractors.

Impacts/benefits: The amount of diverted or averted material from the landfill each year as a result of this effort is dependent upon the magnitude projects for that year.

Actions needed for full implementation: A policy needs to be established to require at least 90% diversion for every C&D project, with clear documentation and tracking. Design guidelines are currently being formulated.

Scrap Metal Collection

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Scrap metal items of all types, shapes and sizes

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus

Implementers: ASU Recycling team, ASU FDM Shops, Waste Management

Methods and procedures: Metal pieces are brought to open top bins where they are stored until the bin is full. Waste Management picks up contents and hauls to their recycling facility. Currently 40 cubic yard open top bins are located at the University Services Building on the Tempe campus and at the Boneyard on the Polytechnic campus. FDM Shops also collect high value metals within individual operations (cooper, brass, etc.)

Costs: Business-as-usual expenditures.

Materials, equipment and schedules of operation: Because large bins are used, pick up occurs at an on-call basis.

Impacts/benefits: In the last year, a total of 110.73 tons of metal was diverted from landfill.

Pallets and Scrap Wood Collection

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target waste stream: Pallets and other scrap wood

Locations: Tempe Campus, Downtown Phoenix Campus

Implementers: ASU Recycling, Renovated Metals, Waste Management

Methods and procedures: Pallets in good condition are collected at the Boneyard to be refurbished for re-use by internal departments or sold locally. Pallets in poor condition are ground into mulch. Waste Management provides a wood box for wood scraps and unpainted pallets. The wood box is hauled to the Lone Butte Transfer Station where it is held until a load is large enough to be hauled to Garick composting facility.

Costs: Business-as-usual expenditures.

Materials, equipment and schedules of operation: Pickups are scheduled upon demand.

Impacts/benefits: Reusing pallets, grinding wood into mulch and turning wood into compost diverts these materials from landfill. In the last year, 32.99 tons of wood waste was diverted.

Mattress De-manufacturing

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Mattresses

Locations: Tempe Campus

Implementers: Residential Life Facilities Management, ASU Recycling Program and Arizona Correctional Industries (ACI)

Methods and procedures: In co-operation with Arizona Correctional Industries, ASU has instituted a mattress de-manufacturing program for its residential locations. Since 2009, more than 2300 used mattresses have been sent from residence halls to ACI, where inmates de-construct them, creating raw material for cellulosic insulation. Metal and wood are also recycled. Continued support and communication between Residential Life Facilities Management and Arizona Correctional Industries will be required for continuation.

Materials, equipment and schedules of operation: all materials and equipment are managed by ACI after being collected at Residence Life locations.

Costs: Approximately \$5.00 per mattress.

Impacts/benefits: in 2012, approximately 15 tons of mattress material was recycled.

Used Vegetable Oil Collection

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Used Vegetable Oil

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus

Implementers: ARAMARK (Sun Devil Dining)

Methods and procedures: This program operates at many key campus venues. Included in these are: Tempe Residential Halls (Barrett, Hassayampa, Pitchforks) Downtown Residential Hall Taylor Place, Polytechnic Residential Hall Citrus, West Residential Hall Verde, Tempe Retail Locations (Memorial Union), Downtown Retail (Main Catering Kitchen and Taylor Place Residential Restaurant & Catering), Polytechnic Retail (Citrus Dining Pavilion and Poly Café), and West Retail (Verde Dining Hall and West Café at the University Center). All used fryer oil is collected by a local Arizona company and refined primarily for biodiesel and industrial use.

Materials, equipment and schedules of operation: Fryer oil is collected in large vessels on the back dock supplied by the vendor.

Costs: Business-as-usual expenditures.

Impacts/benefits: During the 2011-2012 academic year Sun Devil Dining diverted a total of 2.33 tons of fryer oil.



Organics

Organic materials, including food scraps, liquids, yard trim and compostable paper; make up 40% of ASU's current waste stream. A successful program to divert these materials from the landfill is extremely important. To complement the Blue Bins program for co-mingled recycling materials, in Fall 2012 ASU launched a Green Bin pilot program to divert organic materials from landfill. It is the single largest and most important new program in the zero waste effort.

A comprehensive suite of Green Bins is planned for venues and events in dozens of locations, including dining halls, food courts, kitchenettes, and university-sponsored events, including athletics events. The costs associated with implementation of the Green Bin strategy will include many components both on-site for bin investment and operations and off-site for material hauling and composting operations. Many of these costs are currently being determined as infrastructure and regional capacity is expanding. Information used for the pilot program is below:

Waste Management has the necessary equipment, infrastructure, workforce and partnership network to provide Arizona State University with a first class-composting collection program, to include the following organic & compostable materials:

- <u>ALL FOOD</u>: (fruit, vegetables, meat, poultry, seafood, shellfish, bones, rice & other grains, beans, pasta, bread and other bakery goods, cheese, eggshells, pet food)
- **FOOD-SOILED PAPER**: (waxed cardboard, napkins, paper towels, 100% paper plates, tea bags, coffee grounds & filters, 100% paper bags)
- **PLANTS / PLANT MATERIALS:** (flowers, floral trimmings, leaves, plants, potting soil, soil amendments, yard trimmings, clean wood, clean pallets)
- **<u>COMPOSTABLE PLASTICS</u>**: (meetings ASTM D-6400 or D-6868 standards)

Site of Composting Facility: Garick Facility in Maricopa, AZ

22087 N. Ralston Road

Maricopa, AZ 85239

Green Bin Program (Organic Materials to Compost)

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target waste stream: All organic and compostable materials. Acceptable food scraps include practically all components, including fruit, vegetables, meat, poultry, seafood, shellfish, bones, rice and other grains, beans, pasta, bread and other bakery goods, cheese, and eggshells. Compostable paper materials include waxed cardboard, napkins, paper towels, 100% paper plates and paper bags, tea bags, and coffee grounds & filters.

Locations: Tempe Campus

Implementers: ASU Recycling team, USP, ZW communications team, Waste Management

Methods and procedures: In collaboration with USEPA's Food Recovery Challenge, collection and pickup of compostable food items began on November 15, 2012 at dining halls in Barrett (The Honors College) and Hassayampa Academic Village on the Tempe campus. In Spring 2013, the program will be phased in at Palo Verde (also on the Tempe campus) and at athletic events in Wells Fargo Arena. Green Bin containers will be located in all food service areas, including dining halls, food courts, athletics venues, outdoor patios near food service, at strategic locations for special events, and in kitchenettes. Specific service schedules, routing and infrastructure are described below where each of these types of projects is broken out.

Materials, equipment and schedules of operation: Green bins will be paired with Blue Bins where food waste is being generated. Detailed descriptions of infrastructure are provided below.

Costs: The costs associated with implementation of the Green Bin strategy will include many components both on-site for bin investment and operations and off-site for material hauling and composting operations. Many of these costs are currently being determined as infrastructure and regional capacity is expanding.

Impacts/benefits: Approximately one-third of ASU's total waste stream, or 2,200 tons per year, is comprised of organic food and paper towels from restrooms. If 90% of this quantity is diverted from the landfill, waste will be reduced by 2,000 tons per year, and 1,800 MTCO₂e of GHG emissions will be avoided.

Green Bins in Dining Halls

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: All organic and compostable materials. Acceptable food scraps include but are not limited to fruit, vegetables, meat, poultry, seafood, shellfish, bones, rice and other grains, beans, pasta, bread and other bakery goods, cheese, coffee grounds and eggshells. Compostable paper materials include waxed cardboard, napkins, paper towels, 100% paper plates and paper bags, tea bags, and coffee filters.

Locations: Tempe Campus

Implementers:

- ARAMARK empties in-kitchen and front-of-house containers and trains the kitchen staff. Key positions: Kitchen Manager, Sustainability Coordinator, Green Captains
- Waste Management (WM) provides hauling service from campus to compost facility. Key positions: Account Manager.
- University Sustainability Practices (USP) is responsible for coordinating campus engagement efforts. Key positions: Director
- ASU Recycling provides operational support to all parties. Key positions: Recycling Manager, Recycling Marketing Specialist
- Other key positions: ASU Health Inspector, ASU Materials Warehouse Supervisor, ASU Grounds Services Assistant Supervisors, WM Route Manager, ACC Facilities Supervisor, ASU Recycling Program Technicians, WM Project Manager.

Methods and procedures: This program began operating at Hassayampa and Barrett on the Tempe campus in November 2012. Operations will be added to Palo Verde in Tempe and Taylor Place in Downtown Phoenix in Spring 2013. The Memorial Union will be added in the Fall of 2013. These initial sites will allow for the development of best practices to roll out to all other dining facilities. Pre-consumer food scraps from meal preparation and post-consumer food scraps from the plate belt are collected in in-kitchen containers, bagged by kitchen staff, and then emptied into the 3-yard bins located on the dining hall docks. Waste Management then empties the bins, hauling the material to the Sky Harbor Transfer Station where it is centralized into a sludge box. When full, the sludge box is emptied at the Maricopa Organics Recycling Facility in Maricopa, AZ where it is turned into compost.

Materials, equipment and schedules of operation:

Equipment:

- On-dock bins currently one 3-cubic yard front-load bin at each location
- In-kitchen containers currently one 20-gallon rolling container at each location
- Compostable bags certified by the Biodegradable Products Institute

Schedules of Operation:

- Kitchen containers are emptied at least 3 times daily, 7 days a week
- 3-cubic yard dock bins are emptied 5 days a week, Tuesday Saturday
- Sky Harbor central collection is taken to Garick approximately once a week

Costs: Finalized project costs are being determined, but will include capital investment in green bins as well as operational costs negotiated and written into the vendor contract.

Impacts/benefits: From the Waste Characterization Study, one-third of ASU's Tempe Campus waste stream is composed of organic materials, including liquids, food scraps, and compostable low-grade paper items. This represents approximately 2,200 tons of potentially divertible waste per year among all four ASU Campuses, given a fully functioning and adopted organic materials diversion program. In addition to waste-to-landfill reduction, the program will also encourage behavioral changes towards other key recycling and sustainability programs.

Actions needed for full implementation: Achieving full implementation across all four ASU Campuses will require long-term investment in the operational resources necessary to establish and maintain the program. It will also require solidification of a long-term partnership between ASU and a hauler, which includes identification of a facility capable of handling the large volume of materials generated on ASU campuses. The hauler and processor must be able to provide full assurance that no materials go to a landfill or incinerator. Full adoption of the program by ASU campus users will be dependent on a fully-funded and on-going social marketing and campus awareness program.

Green Bins at Sun Devil Athletics Facilities

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: All organic and compostable materials. Acceptable food scraps include but are not limited to fruit, vegetables, meat, poultry, seafood, shellfish, bones, rice and other grains, beans, pasta, bread and other bakery goods, cheese, coffee grounds, and eggshells. Compostable paper materials include waxed cardboard, napkins, paper towels, 100% paper plates and paper bags, tea bags, and coffee filters.

Locations: Tempe Campus

Implementers:

- Sun Devil Athletics is responsible for training volunteers and custodial crews Key positions: Facilities managers, volunteers, stadium custodians
- University Sustainability Practices (USP) is responsible for coordinating fan engagement Key positions: Director
- ASU Recycling provides operational support to all parties Key positions: Recycling Manager, Recycling Marketing Specialist
- Other key positions: ASU Health Inspector, ASU Materials Warehouse Supervisor, ASU Grounds Services Assistant Supervisors, WM Route Manager, ASU Recycling Program Technicians

Methods and procedures: This program will initially operate at four campus athletic venues: Wells Fargo Stadium, Sun Devil Stadium, Packard Stadium, and Sun Angel Stadium. Preconsumer food scraps from meal preparation will be collected in in-kitchen containers, bagged by kitchen staff, and then emptied into centralized bin locations on the docks. Stadium volunteers will manage Green and Blue Bins where fans bring scraps from snacks and meals. The bins will then be emptied into a centralized bin located on the athletic facility docks. Contract haulers will empty the bin and transport the material to a composting location. USP or Recycling will hire workers for post-event sorting of Green Bins and Blue Bins at athletics events.

Costs: Finalized project costs are being determined, but will include capital investment in green bins as well as operational costs negotiated and written into the vendor contract.
Materials, equipment and schedules of operation:

Equipment:

- In-kitchen containers (one 20-gallon rolling container at each main kitchen location)
- Paired bins (one 20-gallon Green Bin and one Blue Bin, both on castors, at designated aisle and concourse areas)
- On-dock bins (size and number to be determined by amount of organic material generated)
- Compostable bags (BPI certified)

Schedules of Operation

- Kitchen bins serviced at least twice at each sports event, weekly schedule varies depending on season schedule
- Green and Blue Bins emptied as needed during events
- Pulls from dock scheduled in follow up to each sports events

Actions needed for full implementation: Achieving full implementation across all ASU athletics facilities will require long-term investment in the operational resources necessary to establish and maintain the program. It will also require solidification of a long-term partnership between ASU and a hauler, which includes identification of a facility capable of handling the large volume of materials generated in a way that corresponds with ASU's overall sustainability goals. Full adoption of the program by ASU fans will be dependent on a fully funded and ongoing campus engagement and social marketing program.

Green Bins in Food Courts

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: All organic and compostable materials. Acceptable food scraps include but are not limited to fruit, vegetables, meat, poultry, seafood, shellfish, bones, rice and other grains, beans, pasta, bread and other bakery goods, cheese, coffee grounds, and eggshells. Compostable paper materials include waxed cardboard, napkins, paper towels, 100% paper plates and paper bags, tea bags, and coffee filters.

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus

Implementers:

- Aramark empties in-kitchen containers and trains kitchen staff Key positions: Kitchen Manager, Sustainability Coordinator, Green Captains
- Facility staff responsible for emptying front-of-house containers Key positions: Facility Managers, Custodial Staff
- University Sustainability Practices (USP) is responsible for coordinating campus engagement
 - Key positions: Director
- ASU Recycling provides operational support to all parties Key positions: Recycling Manager, Recycling Marketing Specialist
- Other key positions: ASU Health Inspector, ASU Materials Warehouse Supervisor, ASU Grounds Services Assistant Supervisors, WM Route Manager, ASU Recycling Program Technicians, WM Project Manager.

Methods and procedures: This program will target five initial campus locations: Memorial Union, Palo Verde Main, Polytechnic, West, and Taylor Place Downtown. Pre-consumer food scraps from meal preparation is collected in in-kitchen containers, bagged by kitchen staff, and then emptied into centralized bin locations on the docks. Initially, student workers and volunteers will tend paired bins where diners bring scraps from snacks and meals. The bins are then emptied into service bin located on building docks. Contract haulers empty the bins and transport the material to a composting location.

Costs: Finalized project costs are being determined, but will include capital investment in green bins as well as operational costs negotiated and written into the vendor contract.

Materials, equipment and schedules of operation:

Equipment:

- In-kitchen containers (one 20-gallon rolling container at each main kitchen location)
- Paired bins (one 20-gallon Green Bin and one Blue Bin, both on castors, at designated aisle and concourse areas)
- On-dock bins (size and number to be determined by amount of organic material generated)
- Compostable bags (BPI certified)

Schedules of Operation

- Kitchen bins emptied at least 3 times daily, 7 days a week
- 3-yard dock bins are initially emptied 5 days a week (Tuesday Saturday), but the schedule may vary with the academic schedule and seasons

Actions needed for full implementation: Achieving full implementation across all ASU food courts will require long-term investment in the operational resources necessary to establish and maintain the program. It will also require solidification of a long-term partnership between ASU and a hauler, which includes identification of a facility capable of handling the large volume of materials generated in a way that corresponds with ASU's overall sustainability goals. Full adoption of the program by ASU campus users will be dependent on a fully-funded program and an effective, on-going campus engagement and social marketing program.

Green Bins in Kitchenettes

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: All organic and compostable materials. Acceptable food scraps include but are not limited to fruit, vegetables, meat, poultry, seafood, shellfish, bones, rice and other grains, beans, pasta, bread and other bakery goods, cheese, coffee grounds, and eggshells. Compostable paper materials include waxed cardboard, napkins, paper towels, 100% paper plates and paper bags, tea bags, and coffee filters.

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus, Lake Havasu City Campus

Implementers:

- Facility staff responsible for emptying front-of-house containers Key positions: Building managers, custodial staff
- University Sustainability Practices (USP) is responsible for coordinating campus engagement
 - Key positions: Director
- ASU Recycling provides operational support to all parties Key positions: Recycling Manager, Recycling Marketing Specialist
- Other key positions: ASU Health Inspector, ASU Materials Warehouse Supervisor, ASU Grounds Services Assistant Supervisors, WM Route Manager, ASU Recycling Program Technicians, WM Project Manager.

Methods and procedures: Kitchenettes are located across campus in break rooms and lunchrooms in academic and administrative buildings. Green Bins will be placed in each of these kitchenettes at all ASU facilities. Custodial staff within each building will be responsible for servicing the bins and delivering contents to compactors and open top bins. A service schedule will be coordinated with each building custodian by each building's business operations manager (BOM).

Costs: Finalized project costs are being determined, but will include capital investment in green bins as well as operational costs negotiated and written into the vendor contract.

Materials, equipment and schedules of operation:

Equipment:

- On-dock bins will be shared by several buildings, the size and number to be determined by Recycling and BOMs in Spring 2013
- In-kitchen containers will be small, usually a five-gallon bucket with screw lid, one in each kitchenette and break room location
- Compostable bags (BPI certified)

Schedules of Operation

- Green Bins will be emptied from kitchenettes and break rooms daily, 5 days a week
- Pulls from dock bins will be scheduled between Recycling and haulers based on volume, varying with the academic schedule and season

Actions needed for full implementation: Achieving full implementation in all ASU kitchenettes and break rooms will require long-term investment in the operational resources necessary to establish and maintain the program, and training and cooperation by contract custodial services. It will also require solidification of a long-term partnership between ASU and a hauler, which includes identification of a composting facility capable of handling the large volume of materials generated in a way that corresponds with ASU's overall sustainability goals. Full adoption of the program by ASU campus users will be dependent on a fully-funded and a successful, on-going campus engagement and social marketing program.

Green Bins at Catered Events

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: All organic & compostable materials. Acceptable food scraps include practically all components, including fruit, vegetables, meat, poultry, seafood, shellfish, bones, rice & other grains, beans, pasta, bread and other bakery goods, cheese, and eggshells. Compostable paper materials include waxed cardboard, napkins, paper towels, 100% paper plates and paper bags, tea bags, and coffee grounds & filters.

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus, Lake Havasu City Campus

Implementers:

- Event planners
- Facility staff responsible for emptying front-of-house containers Key positions: Building managers, custodial staff Contracted caterers
- University Sustainability Practices (USP) is responsible for coordinating campus engagement
 - Key positions: Director, Manager, Program Coordinators
- ASU Recycling provides operational support to all parties Key positions: Recycling Manager, Recycling Marketing Specialist
- Other key positions: ASU Health Inspector, ASU Materials Warehouse Supervisor, ASU Grounds Services Assistant Supervisors, WM Route Manager, ASU Recycling Program Technicians, WM Project Manager.

Methods and procedures: To fulfill requirements of the Green Events Program or to do on their own, event planners will utilize break room or kitchenette Green Bins when needed for use during indoor and outdoor events. Planners will supplement containers with caterer's containers when available. Event organizers may also engage the campus Recycling Program to supply additional green bins when and where needed.

Materials, equipment and schedules of operation:

Equipment:

 On-dock bins will be shared by several buildings, the size and number to be determined by Recycling and BOMs in Spring 2013

- In-kitchen containers will be small, usually a five-gallon bucket with screw lid, one in each kitchenette and break room location
- Compostable bags (BPI certified)

Schedules of Operation

- Post event Green Bins will be emptied from kitchenettes and break rooms daily, 5 days a week
- Pulls from dock bins will be scheduled between Recycling and haulers based on volume, varying with the academic schedule and season

Costs: Finalized project costs are being determined, but will include capital investment in green bins as well as operational costs negotiated and written into the vendor contract.

Actions needed for full implementation: Achieving full implementation at all ASU catered events will require long-term investment in the operational resources necessary to establish and maintain the program, and training and cooperation by contract custodial services. It will also require solidification of a long-term partnership between ASU and a hauler, which includes identification of a composting facility capable of handling the large volume of materials generated in a way that corresponds with ASU's overall sustainability goals. Full adoption of the program by ASU campus users will be dependent on a fully funded and a successful, on-going campus engagement and social marketing program.

Restroom Hand Towels to Compost

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Paper hand towels

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus, Lake Havasu City Campus

Implementers:

- Custodial staff responsible for servicing restrooms
 Key positions: Building managers, custodial supervisors, custodial staff,
- University Sustainability Practices (USP) is responsible for coordinating campus awareness
 Key positions: Director
- ASU Recycling provides operational support to all parties and trains all custodial staff Key positions: Recycling Manager, Recycling Marketing Specialist
- Other key positions: ASU Health Inspector, ASU Materials Warehouse Supervisor, ASU Grounds Services Assistant Supervisors, WM Route Manager, ASU Recycling Program Technicians

Methods and procedures: All restrooms located in campus facilities will participate in this program. Contracted custodial staff that service these locations will be required to empty restroom waste receptacles containing only restroom hand towels into compostable bags that could then be placed into centralized bin locations to be hauled off campus.

Materials, equipment and schedules of operation:

Equipment:

- On-dock bins in centralized locations (size and number to be determined by amount of organics waste generated)
- Compostable bags (BPI certified)

Schedules of Operation

- Containers to be emptied from restrooms at least once daily, 5 days a week
- The dock bin servicing schedule is established by agreement between Recycling and the contract hauler

Costs: Costs are currently being calculated for this initiative.

Impacts/benefits: From the WM/ASU waste composition assessment, 13.7% of ASU's Tempe campus waste stream is composed of paper towels. About half of this volume is from food services, and half from restrooms. Hand towels from restrooms therefore consist of 460 tons of potentially-divertible waste per year among the four main ASU Campuses, given a fully functioning and adopted organics program.

Actions needed for full implementation: Decision makers from university administration will need to elect to move forward with this project. Once that decision has been made an investment in the Green Bin program and bin infrastructure will need to be made and collection strategies implemented.

Yard Trim to Compost, Tempe Campus

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Landscaping yard trim

Locations: Tempe Campus

Implementers: ASU Grounds, Singh Farms, Waste Management

Methods and procedures: Yard trim is generated while pruning trees and shrubs, scalping turf for over seeding, and general weeding and cleanup. Individual crews take their green waste in burlap bundles to 2 large bins left on campus by the department's swap truck or chip the larger waste on site or at the grounds storage area. Material is held at the Boneyard and/or hauled directly to Singh Farms six miles from campus. The material is then composted at Singh's for approximately 6 months along with green waste brought in by other entities. FDM Grounds than purchases finished compost along with compost teas, also produced at Singh's for use as fertilizer and organic matter for soil improvement on campus. Trips often include taking green waste to Singh's and returning with a load of compost. In the first year of implementation, Waste Management hauled 225.6 tons of the yard-trim generated and ASU Grounds hauled 140 tons to Singh Farms.

Materials, equipment and schedules of operation: FM Grounds supplies the swap truck, swap truck boxes, chipper, and dump truck to haul green waste to Singh Farms and the same equipment to return the finished compost.

Costs: Singh Farms accepts yard trim at no cost, avoiding the \$71.64/ton hauling-tipping fee when the material was taken to the landfill. The department averages 7-10 tons per month trim, avoiding \$500 to \$700 per month hauling fees.

The compost is purchased for \$38 a cubic yard and compost teas for \$5 a gallon. Commercial fertilizer is no longer purchased.

Impacts/Benefits: This is a closed loop system; the yard trim generated on the Tempe campus is returned to the landscape in the form of compost. The compost adds nutrients and organic matter to the soil which aids water retention. Compost aids in releasing nutrients slowly

to the soil through microbial action, this helps avoid the high nitrate runoff, leaching to the aquifer, and/or evaporation common with commercial fertilizers (even so called slow release).

Yard Trim to Compost, Polytechnic campus

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Landscaping yard trim

Location: Polytechnic Campus

Implementers: ASU contracts grounds management on the Polytechnic campus with Artistic Land Management (ALM). The contract is managed by the Director of Facilities Development and Management at the Polytechnic Campus.

Methods and procedures: ALM periodically trims vegetation from Polytechnic's 600acre campus, collects it, and chips it to medium size mulch. This mulch is then applied to cultivated and bare areas of the campus landscape for weed suppression and dust control. Areas where this method has been applied are found across campus, but especially in outer areas.

Costs: Business-as-usual expenditures.

Materials, equipment and schedules of operation: The ALM crew runs a chipper four days a week, 5am-2pm

Impacts/benefits: An average of 12 tons of yard debris is diverted each month for an approximate annual total of 144 tons.

Yard Trim to Compost, West Campus

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Landscaping yard trim

Location: West Campus

Implementers: West Campus Grounds will work with an outside vendor to initiate a composting program directed at yard trim.

Methods and procedures: Yard trim and debris will be removed from West Campus and hauled to a composting site. If a suitable relationship can be established, compost may be returned to campus grounds, allowing a full circle of nutrient collection and use on campus grounds.

Materials, equipment and schedules of operation: A yard trim collection area and one or more bins for temporary storage have been identified. Schedules may be negotiated with service providers.

Costs: Business-as-usual expenditures.

Impacts/benefits: West campus includes 14 acres of turf and 50 acres of xeriscape located primarily on the periphery of the campus. Turf clippings will continue to be managed as 'mulch-in-place.' An estimated 150 tons of yard trim is produced each year, and this will be diverted from the landfill through this program. At a cost of \$72 per ton hauled, this is a potential benefit of \$10,746/year. Actual savings will be determined by contract with a hauler, and will be influenced by the cost and availability of compost returned to the campus.

Actions needed for full implementation: Implementation of this project is dependent upon identification of a vendor with interest and capacity to service the volume produced, and funding to implement it.

Grounds for Grounds

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Coffee grounds

Locations: Tempe Campus

Implementers: Aramark and ASU Recycling Program supply the bins and bags for initial collection. The Recycling Program supplies the central dock pick up bins and the labor to take them to the FDM Grounds storage site.

Methods and Procedures: Sales associates collect coffee grounds at participating brewing sites across campus locations (e.g. Starbucks, Burning Bee, and Oasis Cafe), and then the Aramark beverage team collects the grounds with an operations cart. Grounds are taken to the central pick up site at the Memorial Union loading dock and Oasis Café. The campus Recycling Program collects the coffee grounds and uses as fertilizer on for campus landscaping.

Materials, Equipment, and schedules of Operation: Sales associates collect the used coffee grounds from the kitchens 2-3 times a week and take them down to the larger collection bin on the loading dock. FM Recycling or Grounds picks up the grounds weekly for use as fertilizer on the campus lawns, flower, and shrub beds.

Hourly associates with Aramark Sun Devil Dining at each store site collect the espresso grounds and place in bins (each site will have 2) lined with plastic bags (no liquid coffee). Every evening the Beverage team goes to each site in a GEM cart and collects the grounds to then be placed in the larger pick up bin at either the MU loading dock or the Oasis Café-whichever is closer. The plastic bags are emptied into the larger collection bin at the dock and the smaller bins are returned to each location for the following day. FM Recycling or grounds will pick up the grounds every Wednesday.

The grounds are then used alone as fertilizer or mixed with the campus compost to supplement the compost nutrients.

Costs: Business-as-usual expenditures.

Impacts/Benefits: In the last year, 2.75 tons of coffee grounds were diverted from landfill. *Grounds for Grounds* avoids hauling and tipping costs and provides a nutrient and protein rich fertilizer that adds organic matter to soils where it is applied. From March through November 2012, 6.25 tons of coffee grounds were diverted from the landfill by this program.



Re-Use

Re-use is the final step in our approach to a comprehensive zero waste strategy and often needs the most creative thinking to be effective. Material re-use can include any process by which end-of life materials are repurposed or reused to fulfill newly defined services or become newly manufactured products. Re-use campaigns have been gaining momentum nationally and globally over the past decade. E-bay and Craigslist represent some of the most successful ventures for re-use re-sale strategies, capitalizing on the consumer-to-consumer market. More recently, up-cycling ventures represent a new material sourcing strategy for companies and manufacturers by which raw materials are no longer harvested from the environment but rather captured from the waste stream as a source for product development and manufacturing.

Arizona Statue University is taking advantage of this strategy to both reduce waste stream materials destined for the landfill and also create value in new product development. Several programs described below represent institution-wide initiatives that recapture material value at end-of-life. Other projects described below represent the tip of the iceberg for what is possible with innovations in material reuse. The vast resource of student creativity and innovation will contribute to material re-use projects and ventures over the coming years.

Surplus Property Program

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: All ASU-owned durable goods and rolling stock (cars, golf carts, trucks, trailers, yard equipment) that have reached end-of-life; ASU-owned electronic equipment

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus

Implementers: Surplus Property staff, business operations managers

Methods and procedures: Arizona State University Surplus Property offers excess University property for sale to the general public via monthly auctions (in-person and online bidding), online-only auctions (much like eBay.com or PublicSurplus.com), and retail sales.

https://webapp3.asu.edu/spms/public.aspx

• Monthly Auctions: The second Thursday of each month, Surplus Property conducts its live auctions. Bidding for the live auctions takes place in-person and online simultaneously. All proxy (absentee) bids must be placed online before the start of the auction, no proxy bids will be accepted in person. In order to bid at Surplus Property auctions, whether in-person or online, you must be a registered bidder. If you are not yet signed-up, please register.

• Online-Only Auctions: Surplus Property offers online-only auctions from time to time in which all the bidding takes place online during a two week period. Much like the fashion of eBay.com and PublicSurplus.com, the Surplus Property Online-Only Auctions allow bidders to place a single bid or a maximum bid to allow the computer to bid on their behalf. In order to bid at Surplus Property Online Auctions, you must be a registered bidder.

• Electronics Re-use: Electronics and appliances in good condition are collected by ASU Property Surplus and sold to auction bidders. These items are refurbished for continued use. Electronics and appliances that are in poor condition and those generated from residence halls are taken to Westech, a recycling company located near downtown Phoenix. Whenever possible, Westech keeps items in local and regional markets.

Materials, equipment and schedules of operation: Auction lots for the live auctions may be previewed online the day prior to the auction. Preview is also available in-person the day before the auction from 12:00 PM to 4:00 PM. Retail Sales are open to the public Monday - Saturday from 12:00PM - 4:00PM for retail sales.

Costs: Business-as-usual expenditures.

Impacts/benefits: An estimated 760 tons of durable goods (furniture, electronics, scrap) and 48 tons of rolling stock (cars, golf carts, trucks, trailers, yard equipment) are diverted from landfill annually.

Ditch the Dumpster

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Clothing, personal items, furniture, electronics

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus

Implementers: University Residential Life, ASU Recycling Program, ASU FDM

Methods and procedures: ASU Residence Life in collaboration with ASU Recycling Program has taken the lead in promoting and managing this program that works directly with our community partner, Swift Charities. The program operates at residential halls on all campus locations. Staff establishes a route and schedule each year with the residential portions of our campuses to station small bins for clothing and personal items and establish larger drop off points for larger items such as electronics and furniture. The year round recycling program is promoted alongside special collections during move out.

Materials, equipment and schedules of operation: Swift trucks, metal collection bins, community rooms (for furniture drop off), signage, website maintenance, door hangers

Costs: Business-as-usual expenditures.

Impacts/benefits: Six to eight tons of material is diverted each year through this program.

Paint Reclamation and Re-use

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Surplus water based paint

Locations: Tempe Campus

Implementers: Tempe campus Paint Services personnel

Methods and procedures: Since January 2008, ASU Facilities Development and Management have implemented a reclaimed paint program. Unused paint from new construction and renovations is collected and warehoused in the Paint Shop, where it is organized by type and color, and is subsequently used for a variety of work, including covering graffiti, painting restrooms, handrails, exterior doors; and as a primer for new construction and accent walls.

Materials, equipment and schedules of operation: Business-as-usual equipment and operations.

Costs: Business-as-usual expenditures.

Impacts/benefits: To date, more than 1270 gallons of recycled paint has been diverted from the landfill and used for various projects.

Bicycle Parts

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Bicycle parts

Locations: Tempe Campus, Polytechnic Campus

Implementers: ASU Bike Cooperative workers, which are student workers hired by Educational Outreach and Student Services.

Methods and procedures: ASU Bike Cooperatives are located on the southwest corner of the Student Recreation Complex in Tempe and at the Polytechnic Student Recreation Complex on the Polytechnic campus.

Bike co-op staff collects bike parts, and restores those that can be re-used. Students may bring bikes to the co-ops for free minor repairs, contingent upon the availability of labor, parts and expertise. A limited fleet of bicycles is available for free checkout. The service is especially convenient for casual riders who ride cruisers for basic transportation but are not interested in learning bicycle maintenance and repair. Flat repair is a staple service of ASU bike co-ops.

Materials, equipment and schedules of operation: Bicycle co-ops are open Monday -Friday noon until 5:00pm on the Polytechnic campus and Monday - Friday 10:00AM - 4:00PM on the Tempe campus.

Costs: Business-as-usual expenditures.

Impacts/Benefits: ASU Bike Cooperative workers change hundreds of flat tires annually and perform minor maintenance on thousands of bicycles. The quantity of recycled parts has not been calculated.

Banner Bags/Seat Cushions

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Used banners

Locations: Tempe Campus, Polytechnic Campus, Downtown Phoenix Campus, West Campus, Lake Havasu City Campus

Implementers: University Sustainability Practices, ASU Recycling

Methods and procedures: Departments that generate-date specific or single-use vinyl banners across all campuses will collect used banners, and deliver them sent to USP offices for storage. Twice a year, USP delivers the banners to a shop that up-cycles the material into ASU branded seat cushions and messenger bags from banner materials.

Materials, equipment and schedules of operation: Transport from the sources to USP is informal, and uses any practical means. Temporary storage is provided in the basement of Mathews Hall.

Costs: Business-as-usual expenditures.

Impacts: 80 banners of various sizes have been reclaimed to date.

Actions needed for full implementation: We are currently investigating a more efficient and accessible system of collection through ASU Recycling, and are seeking a manufacturing partner closer to the Tempe campus than the current one, who is located in northeast Arizona.



Hazardous Material Management

Arizona State University's academic and research laboratories, along with other university operations, e.g., Facilities Management, generate a variety of hazardous chemical materials. The U.S. Environmental Protection Agency (EPA) and the Arizona Department of Environmental Quality (ADEQ) classify ASU as a hazardous waste generator. As a hazardous waste generator, ASU is required to comply with a number of hazardous waste laws and regulations. Environmental Health & Safety (EH&S) is responsible for coordinating an effective hazardous waste management program for university facilities. The primary objectives of the program are to protect human health and the environment and insure compliance with university, local, state, and federal hazardous waste regulations. University personnel and facilities involved in activities that generate hazardous waste are also subject to a number of requirements designed to protect personnel, property, and the environment.

University hazardous waste management programs can be somewhat complex and confusing because of the enormous variety of hazardous waste generated; it is the responsibility of each individual university generator to comply with accumulation requirements. The following section outlines a brief summary of the waste materials diverted from the landfill as a result of this program.

Hazardous Material Management

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target Waste Stream: Hazardous materials

Locations: Tempe campus

Implementers: EH&S hazardous material management group

Methods and procedures: Properly collect and identify hazardous wastes, propose pollution prevention tactics, sample waste streams to remove waste from hazardous waste disposal cycle, and divert hazardous waste into recycling opportunities.

Materials, equipment and schedules of operation: Six hazardous waste workers use a university truck to collect hazardous materials, upon request.

Costs: Business-as-usual expenditures

Impacts/benefits: For a complete listing of Hazardous Waste materials managed by EH&S please visit the university website here: <u>https://cfo.asu.edu/ehs-environmentalaffairs</u>.



Communications and Engagement

ZERO WASTE BY 2015 Communications Plan 2012-13

Goal

Eliminate 90 percent of campus solid waste from the landfill by 2015 through diversion efforts including recycling, repurposing, reusing and composting practices and/or aversion efforts by a reduction in overall consumption and procurement of materials. *This goal will be assessed based on fiscal year 2007-2008 waste collection data*.

Mission

Implement a strong, well thought, successful zero waste program that further reduces Arizona State University's negative impact on the planet and maximizes the positive impact on the world and its inhabitants setting a strong example for others to follow.

General Zero Waste Initiative

Definition

Zero Waste is defined by the reduction and ultimate elimination of institutional and community material that are hauled to the landfill. This process is completed through methods of aversion and diversion.

Primary Audiences

- Students
- New Students (orientations)
- Staff Betty
- New Employees (orientations) Betty
- Faculty Nick
- Administrators John and Nick
- Fans

Secondary Audiences

- 3rd party vendors/partners Nick
- Event patrons/visitors Susan and Kendon
- Parents Katia, Ali, Dani
- Media Outlets Kendon and Abe
- Peer universities
- Sustainability organizations –Ali and Katia

Objectives

- Education about Zero Waste initiative
- Action/Participation focusing on behavioral change
- Create a network of Zero Waste Ambassadors

- Zero Waste Factbook
 - Comprehensive "Factbook" that describes all policies, procedures, and practices for zero waste; with specific actions for aversion, recycling, organics, and re-use.
 - o Includes lists of all recyclable materials and process for recycling.
 - Institutional memory necessary for the creation of marketing materials.
- Zero Waste Brandbook

- Comprehensive "Brandbook" that allows those areas developing materials to have the ability to create materials that will be cohesive in messaging and look.
- Zero Waste Project Tracking
 - Create Google spreadsheet to track project progress, data, contacts, etc.
- Website for all Zero Waste Info
 - Zero Waste landing page housed on the GIOS website
 - Community interface for project information and tracking
- Sustainability Literacy Expansion Focused on Zero Waste Topics
 - Aversion, Recycling, Organics, and Re-use.
- Social Media Outlets to Promote Zero Waste Initiatives
 - Ensure messaging promotes Zero Waste and ASU-related recycling events and information (per the Zero Waste plan timelines).
- Educate Audiences about Zero Waste and its Components Ambassadorship
 - PowerPoint for Nick Brown to use during presentations to ASU organizations/administration/events/BOMs
 - PowerPoint for departments to use as an educational component at departmental meetings, etc.
 - Revise messaging/marketing materials for New Employee Orientations
 - Incorporate Zero Waste messaging at New Student Orientations
 - Incorporate Zero Waste messaging within ASU 101 courses

Aversion

Definition

Avoiding the procurement or usage of products preventing them from ever entering consumption and waste stream process. Examples include elimination of single-use disposal products such as single-use plastic water bottles and bags.

Audiences

- Staff
- Administrators
- Business Operations Managers (BOMs)

Objectives

- Education about Zero Waste initiative
- Action/Participation focusing on behavioral change

- Educate Administrative buyers and Business Operations Managers
 - Email message to administrators/BOMs from Ray Jensen and/or Nick Brown
 - PowerPoint for Nick Brown to use during presentations to administrators/BOMs
 - PowerPoint for administrators/buyers to use as an educational component at departmental meetings, etc.
- Develop Simple, 1-3 minute, online educational tips and tutorials
 - Develop for mobile devices so that content can be accessed anytime, anywhere.

Recycling (Blue Bin Program)

Definition

Recycling for ASU is defined as the collection process for all recyclable materials into a Blue Bin Program implemented across all campus locations. Recycling prevents used products from reaching the landfill by collecting those products and processing them back into raw material.

Primary Audiences

- Students
- Community Assistants (CAs)
- New Students (orientations)
- Staff
- New Employees (orientations)
- Faculty

Secondary Audiences

- Administrators
- 3rd party vendors/partners
- Event patrons/visitors

Objectives

- Education about Zero Waste initiative
- Action/Participation focusing on behavioral change
- Create a network of Zero Waste Ambassadors

- Promote Recycling Program through Green Events Happening on Campus
 - Recyclemania, Green Games, Green Events, and Green Communities
- Educate New Students and New Employees About Recycling
 - Incorporate recycling messaging at New Student Orientations
 - Revise messaging/marketing materials for New Employee Orientations
 - Incorporate Recycling messaging within ASU 101 courses
- Develop Campus Challenges and Campaigns to Promote Recycling
 - Zero Waste Greek Life Programs, Zero Waste athletic travel challenges.
- Ongoing Measurement Reporting
 - Campus Metabolism and Zero Waste website platform
- Develop Simple, 1-3 minute, Online Educational Tips and Tutorials

Organics (Green Bin Program)

Definition

Organic material as a waste stream that primarily results from food waste and landscaping operations. This organic material can be actively decomposed and turned into soil and fertilizer.

Audiences

- Students
- New Students (orientations)
- Residence Hall Assistants (RAs)

Secondary Audiences

- Staff primarily focuses on kitchen/kitchenette composting
- New Employees (orientations)
- Faculty
- Administrators

Objectives

- Education about Zero Waste initiative
- Action/Participation focusing on behavioral change
- Create a network of Zero Waste Ambassadors

- Green Bin Program Roll Out: January 2013
 - Create signage similar to Blue Bin Program signage
 - Training and coordination with partnering departments
 - PowerPoint for Nick Brown and Community Assistants to use as an educational component at hall meetings, etc.
- ASU Athletics Wells Fargo Composting Roll Out February 2013
- Ongoing Measurement Reporting
 - Campus Metabolism and Zero Waste website platform
- Ongoing Departmental Education About Office Composting
 - Update Green Office Information to Include Composting
 - Create office-specific signage, information targeting office kitchenettes
- Develop Simple, 1-3 minute, online educational tips and tutorials
 - Develop for mobile devices so that content can be accessed anytime, anywhere.

Re-Use

Definition

Third party takes a used item and increases its stand-alone value by converting it into an item of better quality/higher value (i.e.: turning gum wrappers into purses).

Audiences

- Students
- Staff
- Administrators
- Business Operations Managers (BOMs)

Objectives

- Define re-usable products and identify partners
- Target specific collection goals
- Find markets for re-usable products

- Establish marketing and messaging with partners
- Brainstorm special events or competitions to increase participation
- Develop student team of up-cycling innovators
- Expand and develop ideas from the Center for Excellence: Zero Waste

Zero Waste Internal Media Strategy

Situation - ZERO WASTE BY 2015

Eliminate 90 percent of campus solid waste from the landfill by 2015 through diversion efforts including recycling, repurposing, reusing and composting practices and/or aversion efforts by a reduction in overall consumption and procurement of materials. (*This goal will be assessed based on fiscal year 2007-2008 waste collection data.*)

Primary Audiences

- ASU Students
- ASU Faculty
- ASU Staff
- Prospective Students

Secondary Audiences

- Arizona Board Of Regents
- Legislators
- Journalists
- Peer Institutions
- Community Partners
- Vendors and Contractors

Key Messages

- Creating and implementing a comprehensive zero waste strategy is essential in accomplishing the larger institutional goal of Carbon Neutrality.
- Every individual is part of the campus community as a whole and has important role to play in accomplishing this goal including all students, faculty, staff, and institutional partners.
- Zero waste happens through aversion and diversion. Aversion primarily takes place through changes to policy and procurement. Diversion takes place through four main tactics: recycling, repurposing, reusing, and composting.
- A zero waste campus creates an example for other institutions giving ASU a competitive advantage in the higher education field.
- A zero waste campus will improve the student experience.
- A zero waste campus improves the institutions triple bottom line: creating an economically efficient, socially just, and environmentally safe operation.

Objectives & Strategies

- Objective 1: Educate the campus community and other institutional partners about zero waste policies and practices.
- Objective 2: Educate the campus community about availability of zero waste and green programs.
- Objective 3: Institutionalize zero waste practices and operational programs throughout campus facilities and communities.
- Objective 4: Maximize national press that will focus on the institution's progressive, innovative, and trend-setting practices.
- Strategy 1 Announcement of Official Roadmap to Zero Solid Waste.
 - Video Statement/Interview with President Crowe
- Strategy 2 Utilize Roadmap to Zero Solid Waste as PR document.
- Send plan to key stakeholders at ASU and peer institutions in Higher Education.
- Strategy 3 Promote recycling messages through on campus green initiatives.
 - Green Events, Green Games, Green Communities, Green Classrooms
- Strategy 4 Educate new students and new employees about zero waste
 - Target new student orientation and new staff orientation
- Strategy 5 Develop contests and special events to further build awareness
 - Examples: Zero Waste Greek Life programs, Zero Waste athletic travel challenges.
- Strategy 6 Ongoing zero waste reporting of progress
 - Utilize web presence and Campus Metabolism to show progress
- Strategy 7 Develop simple, 1-3 minute, online educational tips and tutorials
 - Utilize recycling program website to communicate information and projects
- Strategy 8 Develop and expand Zero Waste Ambassadors Program
 - Recruit peer leaders from across campus to become change agents.

Glossary of Terms

University Sustainability Practices (USP): The Office of University Sustainability Practices is charged with ensuring that ASU achieves all of the goals outlined in the university's sustainability operations plan — particularly through overseeing the design and implementation of programs to address the plan's four pillars: carbon neutrality, zero waste, active engagement and principled practice.

University Business Services: University Business Services provides products and services to faculty, students and staff of Arizona State University. University Business Services is a leader in business services and customer satisfaction and follows four core values: integrity, commitment to excellence, customer focus and recognized leadership.

University Services Building: The University Services Building, designed by Butler Design Group, features angular walls with deep-set windows on all sides, desert colors of tan and green, and decorative steel awnings. Human Resources, University Services and Facilities Management, Financial Services, Purchasing and Business Services, and Internal Audit and Management Services serve the university from this building.

Facilities Development and Management (FDM): ASU Facilities Development and Management is responsible for University facilities, infrastructure and grounds, and manages planning, design, construction, renovation, maintenance and repair at each Arizona State University campus. Departments within FDM include the Office of the University Architect, Capital Programs Management Group, Facilities Management, Administrative Services and Business Operations.

University Recycling Program: Department under FDM responsible for carrying out all recycling programs associated with the campus Zero Waste initiative.

University Recycling Manager: Position responsible for leading the University Recycling Program

Municipal Solid Waste (MSW): Municipal Solid Waste—more commonly known as trash or garbage consists of everyday items we use and then throw away, such as product packaging, grass clippings, furniture, clothing, bottles, food scraps, newspapers, appliances, paint, and batteries. This comes from our homes, schools, hospitals, and businesses. Most of these materials can be diverted via recycling, organics composting, and re-use programs.

Hazardous Waste: Hazardous waste is waste that is dangerous or potentially harmful to our health or the environment. Hazardous wastes can be liquids, solids, gases, or sludges. They can be discarded commercial products, like cleaning fluids or pesticides, or the by-products of manufacturing processes.

Compost: Compost is organic matter that has been decomposed and recycled as a fertilizer or soil amendment. Compost is a key ingredient in organic farming. At the simplest level, the process of composting simply requires making a pile of wetted organic matter (leaves, "green" food waste) and waiting for the materials to break down into humus after a period of weeks or months.

Zero Waste: Eliminate 90 percent of campus solid waste from the landfill by 2015 through diversion efforts including recycling, repurposing, reusing and composting practices and/or aversion efforts by a reduction in overall consumption and procurement of materials. (*This goal will be assessed based on fiscal year 2007-2008 waste collection data.*)

Sustainability Projects Assessment Tool (SPAT): SPAT is a decision support tool that stands on four legs: assessment of environmental, social, financial and life cycle impacts of proposed projects. The tool is interactive allowing what-if type changes in assumptions and it provides outputs that reflect changes in those assumptions. SPAT seeks to identify total cost of ownership of projects and their components. The program scores external impacts of pollution and environmental degradation.

Green House Gas (GHG): Any gas that absorbs infrared radiation in the atmosphere. Greenhouse gases include water vapor, carbon dioxide, methane, nitrous oxide, ozone, chlorofluorocarbons, hydrochlorofluorocarbons, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, nitrogen trifloride.

GHG Protocol: The process by which an institution or organization calculates and manages its GHG emissions. The GHG Protocol defines direct and indirect emissions as follows: Direct GHG emissions are emissions from sources that are owned or controlled by the reporting entity. Indirect GHG emissions are emissions that are a consequence of the activities of the reporting entity, but occur at sources owned or controlled by another entity.

Comingle/Single Stream: Single stream or co-mingled recycling allows for all source-separated recyclables to be combined into one collection container for sorting at a specialty recycling center called a Material Recovery Facility (MRF).

Material Recovery Facility (MRF): Specialty recycling center that separated single stream recyclables and bales these materials to be sold into the commodity markets.

Old Corrugated Containers (OCC): Cardboard materials.

Styrofoam/EPS (Expanded Polystyrene): EPS is a synthetic aromatic polymer made from the monomer styrene, a liquid petrochemical. Polystyrene can be rigid or foamed.

PET: Type 1 Plastic or Polyethylene Terephthalate. Soft drink bottles, food and non-food containers. Standard beverage containers are easily recycled.

HDPE: Type 2 Plastic or High Density Polyethylene. Bottles for beverages with a short shelf life, such as milk and juice. Also used for industrial chemicals and to manufacture grocery bags. Easily recycled.

Life Cycle Assessment (LCA): LCA is a technique to assess the environmental aspects and potential impacts associated with a product, process, or service.

Boneyard: Storage area facility used by ASU Business Services, FDM, and the Recycling Program.

ARAMARK: Contracted food service provider for Arizona State University.

SODEXO: Contracted athletics concessions provider for Arizona State University.

ATLASTA: Contracted catering provider for Arizona State University.

WM GARICK: Organics composting facility utilized for ASU Organics program.

Protocol for Adding ZW Projects to the Road Map

- 1. Single Page project description should be written up utilizing the road map project template included in the original document format. Including:
 - a. Implementation Responsible party
 - b. Timeline for implementation and completion
 - c. Project description and support
 - d. Resources needed.
- 2. All relative supporting information should be included as an appendix to the document.
- 3. The proposed ZW project will be reviewed and vetted by the ZW Campus Committee.
- 4. The ZW Campus Committee will include
 - a. 1 representative from the ASU Sustainability Practices Office
 - b. 1 representative from the ASU Recycling Program
 - c. 1 representative from Waste Management
 - d. 1 student representative.
- 5. ZW Project must have a quantifiable impact on ASU's ZW goals including diversion results.
- 6. ZW Project can be proposed in any "Stage" of the project's life.
- 7. The ZW Campus Committee must unanimously approve the project.
- In the event that the ZW Campus Committee cannot unanimously approve a project, and one or more committee members feel strongly enough about moving forward, upper administrative support must be lobbied.
- 9. The ZW Campus Committee will meet on an as-needed basis.
- 10. Approved ZW Projects will only be added to the official Road Map once the project has been set up within both SPAT and the ZW Reporting Tool.

ZW Project Title - Template

In providing information about ZW projects, please use the structure below.

Status: \rightarrow Proposed \rightarrow Piloting \rightarrow Adopted at Various Locations \rightarrow Fully in Place Enterprise-Wide.

Target waste stream: Ex: paper towels from restrooms, office paper, food scraps, electronics, yard trim, etc.

Locations: Campus locations where project or program is/will be taking place.

Implementers: A brief description of the department and positions of workers who implement the project.

Methods and procedures: Description of procurement, materials flows, transport, and communications.

Materials, equipment and schedules of operation: Hardware, infrastructure, periodicity of activities.

Costs: Description of the costs of implementing the project or program.

Impacts/benefits: How much material is averted or diverted from the landfill each year as a result of this project? What percent aversion or diversion is being achieved? How much will it achieve when it is fully implemented? What other benefits are achieved?

Actions needed for full implementation: Include funding, equipment specification and purchase, site determination, contract development, etc.
Appendix 1. *Draft* Zero Waste Policy

Facilities Management Manual (FAC)

Effective: XX/XX/2014

Revised: 8/1/2013

FAC XXX: Zero Waste, Recycling, Composting, and Solid Waste Management

Purpose

To establish effective, consistent practices for aversion of waste materials, recycling, composting, and waste management at Arizona State University (ASU). This policy will outline Standard Operating Procedures required by the campus community to assist in the achievement of the University's Zero Waste operational goals.

Source

USGBC Guidelines

Arizona Solid Waste Recycling Act A.R.S. 49.831 et seq.

Arizona State University Strategic Plan for Sustainability

ASU Sustainable Design Guidelines

ASU Laboratory Solid Waste Standard Operating Procedures

ASU Green Office, Green Lab, etc.

ASU Asset Management/Property Control policies

ASU Green Procurement Policies

Facilities Management Recycling Program

University Sustainability Practices

Applicability

All members of the ASU community (including ASU and ASU-related employees, graduate students, undergraduate students, postdoctoral researchers, visiting researchers, volunteers, contractors and sub-contractors, service providers, and visitors) and at all ASU-owned/leased/controlled facilities.

Background

In August 2011, ASU published a set of Strategic Sustainability Goals that include achieving Zero Solid Waste by 2015. ASU defines zero solid waste as a 90-percent reduction in waste to area landfills from our current business as usual status. This policy serves to further outline responsibilities of ASU community members in reaching that goal. The full ASU Strategic Plan for Sustainability Practices and Operations including Zero Waste can be found at http://sustainabilityplan.asu.edu/

Definitions

Aversion: The process of ensuring that certain materials do not enter campus or its operations via procurement and purchasing. Materials that never enter campus will never need to be disposed of by campus operations.

Diversion: The process of ensuring that end-of-use materials from campus or its operations do not reach the landfill. Diversion strategies include composting, recycling, and property surplus. **Municipal Solid Waste (MSW):** Municipal Solid Waste—more commonly known as trash or garbage—consists of everyday items we use and then throw away, such as product packaging, grass clippings, furniture, clothing, bottles, food scraps, newspapers, appliances, paint, and batteries. This comes from our homes, schools, hospitals, and businesses. Most of these materials can be diverted via recycling, organics composting, and re-use programs.

Hazardous Waste: Hazardous waste is waste that is dangerous or potentially harmful to our health or the environment. Hazardous wastes can be liquids, solids, gases, or sludges. They can be discarded commercial products, like cleaning fluids or pesticides, or the by-products of manufacturing processes.

Compost: Compost is organic matter that has been decomposed and recycled as a fertilizer or soil amendment. Compost is a key ingredient in organic farming. At the simplest level, the process of composting simply requires making a pile of wetted organic matter (leaves, "green" food waste) and waiting for the materials to break down into humus after a period of weeks or months.

Zero Waste: Eliminate 90 percent of campus solid waste from the landfill by 2015 through diversion efforts including recycling, repurposing, reusing and composting practices and/or aversion efforts by a reduction in overall consumption and procurement of materials. (*This goal will be assessed based on fiscal year 2007-2008 waste collection data.*)

Sustainability Projects Assessment Tool (SPAT): SPAT is a decision support tool that stands on four legs: assessment of environmental, social, financial and life cycle impacts of proposed projects. The tool is interactive allowing what-if type changes in assumptions and it provides outputs that reflect changes in those assumptions. SPAT seeks to identify total cost of ownership of projects and their components. The program scores external impacts of pollution and environmental degradation.

Green House Gas (GHG): Any gas that absorbs infrared radiation in the atmosphere. Greenhouse gases include, carbon dioxide, methane, nitrous oxide, ozone, chlorofluorocarbons, hydrochlorofluorocarbons, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride.

GHG Protocol: The process by which an institution or organization calculates and manages its GHG emissions. The GHG Protocol defines direct and indirect emissions as follows: Direct GHG emissions are emissions from sources that are owned or controlled by the reporting entity. Indirect GHG emissions are emissions that are a consequence of the activities of the reporting entity, but occur at sources owned or controlled by another entity.

Comingle/Single Stream: Single stream or co-mingled recycling allows for all source-separated recyclables to be combined into one collection container for sorting at a specialty recycling center called a Material Recovery Facility (MRF).

Material Recovery Facility (MRF): Specialty recycling center that separated single stream recyclables and bales these materials to be sold into the commodity markets.

Old Corrugated Containers (OCC): Cardboard materials.

Styrofoam/EPS (Expanded Polystyrene): EPS is a synthetic aromatic polymer made from the monomer styrene, a liquid petrochemical. Polystyrene can be rigid or foamed.

PET: Type 1 Plastic or Polyethylene Terephthalate. Soft drink bottles, food and non-food containers. Standard beverage containers are easily recycled.

HDPE: Type 2 Plastic or High Density Polyethylene. Bottles for beverages with a short shelf life, such as milk and juice. Also used for industrial chemicals and to manufacture grocery bags. Easily recycled.

Life Cycle Assessment (LCA): LCA is a technique to assess the environmental aspects and potential impacts associated with a product, process, or service.

Boneyard: Storage area facility used by ASU Business Services, FDM, and the Recycling Program.

Policy

The ASU campus community and all those applicable under this policy are required to participate in the Standard Operating Procedures outline on behalf of this policy for the achievement of Zero Waste Campus Operations. In addition, the ASU campus community and all those applicable under this policy will actively work to maintain existing programs and develop new opportunities to recycle, compost, and re-use materials from the waste stream. As part of every role at the University, individuals must work to avert and divert materials from landfills wherever and whenever possible.

Procedures

Facilities Development and Management shall provide consultation, training, standard operating procedures, and informational resources for all ASU solid waste producers and handlers.

1) Building Walkthroughs (Waste Assessments)

a) Our buildings must meet the infrastructure requirements necessary for waste diversion. This includes the placement and servicing of waste stream bins including recycling, compost, landfill, and other special streams. Building managers must work with the Recyclig Program to complete <u>Building Walkthroughs (Waste Assessments)</u>.

2) Environmental Health & Safety (EH&S)

- a) EH&S shall provide annual training for the departmental EH&S compliance officers and shall provide a manual of fact sheets for their reference. In addition, EH&S shall maintain a campus internet resource that shall include current ASU EH&S bulletins, safety and health information, and links to other appropriate regulatory agencies, material safety data, etc.
- b) The director of EH&S, or a designee, shall maintain regular communications with the EH&S compliance officers and shall respond in a timely manner to all requests for advice or assistance.

3) Blue Bin Recycling Program

 a) All indoor and outdoor areas of campus including offices, classrooms, lobbies, bathrooms, auditoriums, malls and other spaces must comply with the Standard Operating Procedure for bin placement for material collection. Guidelines for implementation based on your area can be found at the <u>Campus Material Collection Bin</u> <u>Guide.</u>

- b) Paper, plastic, metal, and glass belong in the Blue Bin to support campus diversion and the Recycling Program. All campus individuals must consult the <u>Recycling Program</u> <u>Website</u> for user procedures.
- c) Paper, plastic, metal, and glass should not be placed in the landfill bin.

4) Green Bin Composting Program

- a) All indoor and outdoor areas of campus including offices, classrooms, lobbies, bathrooms, auditoriums, malls and other spaces must comply with the Standard Operating Procedure for bin placement for material collection. Guidelines for implementation based on your area can be found at the <u>Campus Material Collection Bin</u> <u>Guide.</u>
- b) Food and liquid belong in the Green Bin to support campus diversion and the Recycling Program. All campus individuals must consult the <u>Recycling Program Website</u> for bin placement guidelines.
- c) Food and liquid should not be placed in the landfill bin.

5) Campus Property Surplus Program

- a) All materials on campus used by campus departments are owned by the University. When these items have reached the end of their useful life for the purpose originally intended, campus users should contact <u>Campus Property Surplus</u> for pickup rather than dispose of these items in the trash. Campus staff must follow guidelines established by Campus Property Surplus. Items might include but are not limited to the follow: office furniture, functional electronics, functional equipment, classroom equipment, etc.
- b) Utilize Campus Property Surplus's online platform, Sunset.

6) Signage and Messaging – Communications

a) All signage and messaging used on campus or by its operations are required to be sourced from the approved <u>Campus Zero Waste Signage and Communications guide.</u>

7) Material Handling – Training, Bin Servicing, Material Disposal Guidelines

- a) Grounds S.O.P.
- b) Residence Life S.O.P.
- c) Custodial S.O.P.
- d) Dining S.O.P.
- e) Catering S.O.P.
- f) Moving Crew S.O.P.
- g) Athletics S.O.P.
- h) Third Party S.O.P.
- 8) Recycling Requests
 - a) All requests for recycling services should follow the approved S.O.P.
 - b) Service Route S.O.P.
- 9) Bin Placement

a) All placement of Blue Bin, Green Bin, Landfill, or any material receptable S.O.P.

10) Events Guidelines

a) All campus events should follow the Zero Waste Events S.O.P.

11) Construction and Demolition

a) See other Policies

Responsibilities

- 1. Departments and Units
 - i. General
 - Designate one or more individuals to perform duties and serve as main contact for solid waste issues (recommended Business or Building Operations Manager);
 - 2. Purchase and place adequate bins for all public, individual, and shared spaces (see ASU Bin Guide);
 - 3. Ensure that bin sets are properly configured, well maintained, and labeled see ASU Bin Guide;
 - For events bin configuration and procedures, refer to the ASU Zero Waste Event SoP;
 - Communicate with students, faculty, employees, and other community members about ASU Zero Waste Goals and appropriate use of bins see ASU Bin Guide;
 - Utilize only the two shredding vendors as designated by ASU Contracting see XXXXXXX;
 - Coordinate appropriate receptacles for clean-outs and moves; Ditch the Dumpster
 - 8. Consult ASU Bin Guide for more information or contact ASU Recycling.
 - ii. OUA
 - Design facilities and spaces that facilitate maximum diversion of materials, ie. sufficient loading dock space for multiple collection streams and fully paired public collection bins;
 - 2. See ASU FDM Sustainable Design Guidelines for a full description of responsibilities.
 - iii. CPMG
 - Monitor onsite diversion and reuse by contractors and subcontractors;

- 2. Report solid waste data according to Reporting Guidelines to ASU Recycling upon project completion;
- 3. Ensure adequate numbers and placement of bins during commissioning.
- iv. EH&S
 - 1. Integrate recycling practices into disposal procedures for lab personnel;
 - 2. Refer to ASU Lab Solid Waste SoP;
 - 3.
- v. USP
- vi. ASU Recycling
 - 1. Establish what can and cannot be recycled or composted;
 - 2. In conjunction with OUA, specify bin types and configurations for all ASU facilities and spaces;
 - 3. Provide signage and labels with standardized messaging;
 - 4. Maintain list of unit-assigned designees;
 - 5. Provide guidance on best practices and
- vii. ASU Moving and Setups
 - 1. Provide blue, green, and grey bins to events;
- viii. ASU Surplus Property
- ix. ASU Purchasing & Contracting
 - Insert into all contracts language outlining vendor responsibilities to utilize and follow recycling guidelines when providing services and products to ASU;
 - 2. Work towards bringing to ASU only products and packaging that are either recyclable or compostable within the ASU program;
- x. ASU Housing and Residential Life
- 2. Students
 - i. See Student Manual.
- 3. Contractors and Sub-Contractors
 - i. Participation as defined by contracts;
 - ii. When not specified within contracts, Department and Unit policies apply;
 - iii. Specific responsibilities apply to all Custodial contractors1.
 - iv. Specific responsibilities apply to all Dining and Catering contractors 1.
 - v. Specific responsibilities apply to Construction contractors and subcontractors

1.

- vi. Specific responsibilities apply to Residential Housing contractors and subcontractors
 - 1.

ZERO WASTE EVENT S.O.P.

Waste stream managemest at Arizona State University events will include the following operational procedures and protocols.

- 1. The event should ONLY source materials that can be **<u>Recycled</u>** or <u>**Composted**</u>.
- 2. The event should NOT source any material that is destined for the Landfill.
- 3. Front of House should have *paired* <u>Recylcing Blue Bin</u> and <u>Composting Green Bin</u>.
- 4. Back of House may have a **Landfill Bin** for unexpected waste materials.
- 5. All bins should be the same size according to the Bin Guide S.O.P.
- 6. All bins should have appropriate signage design according to the Bin Guide S.O.P.
- 7. All bins should utilize appropriate color and style bags according to the Bin Guide S.O.P.
- 8. Event staff will be responsible for operational tasks including the emptying of bins.
- 9. Event staff should be knolwedgable regarding materials that are to be disposed of in each bin and be responsible for educating attendees of the event.

REQUIRED BIN SETS

EVENT	Small (1-50)	Medium (51-100)	Large (101-	Huge (501+)
			500)	
Indoor – Food	Blue / Green	Blue / Green	Blue / Green	Blue / Green
Indoor – No Food	Blue / Green	Blue / Green	Blue / Green	Blue / Green
Outdoor – Food	Blue / Green / Grey	Blue / Green /	Blue / Green /	Blue / Green /
		Grey	Grey	Grey
Outdoor – No Food	Blue / Green / Grey	Blue / Green /	Blue / Green /	Blue / Green /
		Grey	Grey	Grey

SERVICING

EVENT	Small (1-50)	Medium (51-100)	Large (101-500)	Huge (501+)
Indoor – Food	Custodial	Custodial	Custodial	Custodial
Indoor – No Food	Custodial	Custodial	Custodial	Custodial
Outdoor – Food	Moving	Moving	Moving	Moving
Outdoor – No Food	Moving	Moving	Moving	Moving

ADD LINK BACK TO RECYCLABLE LIST ADD LINK BACK TO COMPOSTABLE LIST ADD LINK TO BPI AND PURCHASING ALTERNATIVES

DOCUMENTS

- 1. ASU Bin Guide
- 2. ASU FDM Sust. Design Guidelines
- 3. ZW Signage and Comms Guidelines
- 4. ASU Lab ZW Guidelines
- 5. Student Manual
- 6. Specialty Stream Guielines