



SAN DIEGO STATE
UNIVERSITY

San Diego State University: Sustainability Starts Here



- Carbon
- Energy
- Water
- Waste Reduction
- Transportation
- Green Buildings
- Food
- Academics
- Research
- Get Involved



Carbon



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Carbon Commitment

- In March 2014, President Hirshman signed American College and University Presidents Climate Commitment
- Commits campus to develop a Climate Action Plan to achieve carbon neutrality



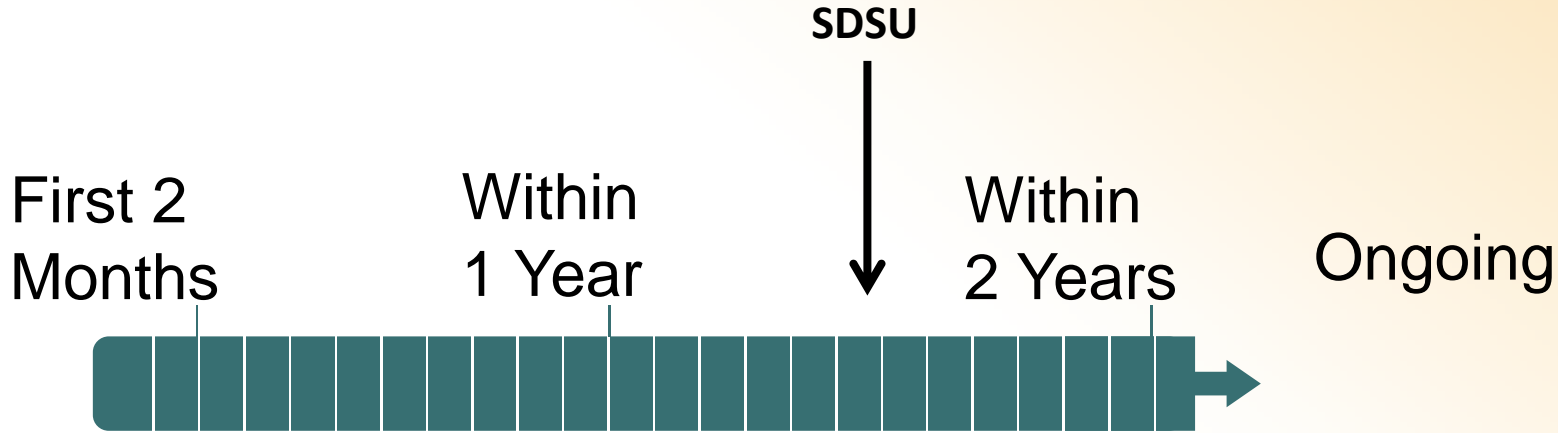
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Climate Challenge

- Over-reliance on fossil fuels: catastrophic climate disruption and national security threat
- Threat to human progress
- Halt growth of global warming pollution & cut GHG emissions by 80%
- Transformation of economy, institutions & daily lives
- Vision & leadership of higher education

Reversing global warming is a defining challenge of the 21st century!

Commitment requirements



Create institutional structures & initiate two of seven suggested actions

Complete inventory of emissions

Develop institutional climate action plan

Submit periodic progress reports

- 1/15/16
- 1/15/18
- 1/15/20
- 1/15/22
- 1/15/24
- 1/15/26

1/15/17

- 1/15/19
- 1/15/21
- 1/15/21
- 1/15/23
- 1/15/25
- 1/15/27



Overview of Presidents Climate Commitment – Tangible Actions

Initiate two or more of the following tangible actions to reduce greenhouse gases while the more comprehensive plan is being developed.

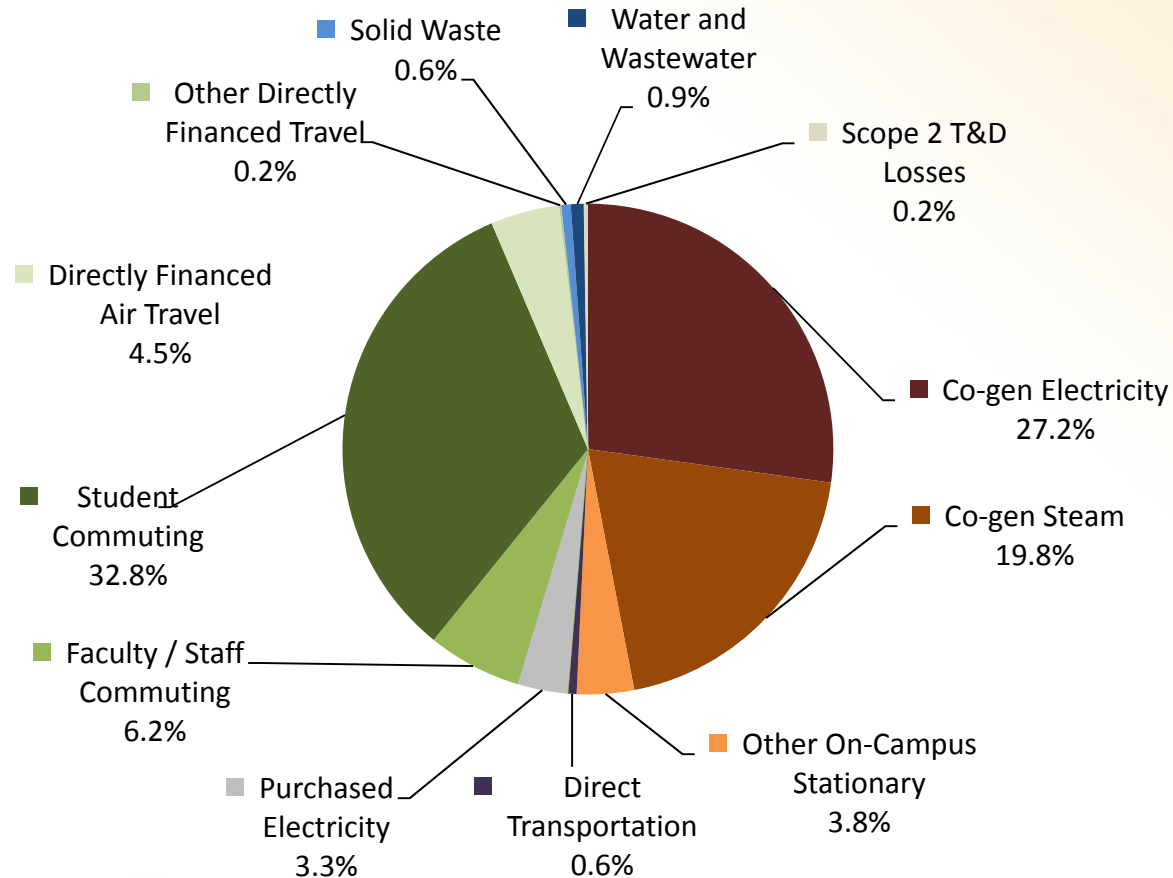
- **Establish a policy that all new campus construction will be built to at least the U.S. Green Building Council's LEED Silver standard or equivalent.**
- **Adopt an energy-efficient appliance purchasing policy requiring purchase of ENERGY STAR certified products in all areas for which such ratings exist.**
- Establish a policy of offsetting all greenhouse gas emissions generated by air travel paid for by our institution.
- Encourage use of and provide access to public transportation for all faculty, staff, students and visitors at our institution.
- Within one year of signing this document, begin purchasing or producing at least 15% of our institution's electricity consumption from renewable sources.
- Establish a policy or a committee that supports climate and sustainability shareholder proposals at companies where our institution's endowment is invested.
- Participate in the Waste Minimization component of the national RecycleMania competition, and adopt 3 or more associated measures to reduce waste.



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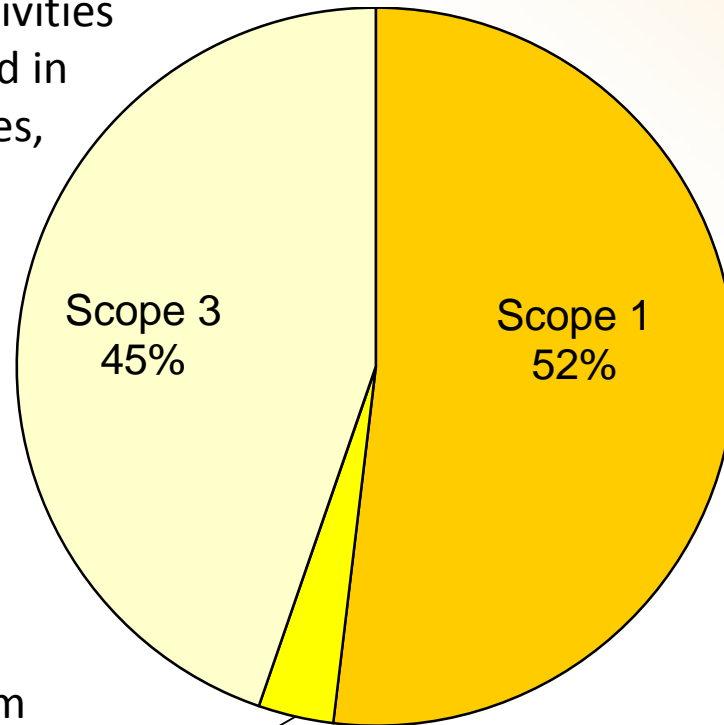
Greenhouse Gas Inventory

Within one year of signing this document, complete a comprehensive inventory of all greenhouse gas emissions (including emissions from electricity, heating, commuting, and air travel) and update the inventory every other year thereafter.



Greenhouse Gas Inventory

Other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities (e.g. T&D losses) not covered in Scope 2, outsourced activities, waste disposal, etc.



All direct GHG emissions

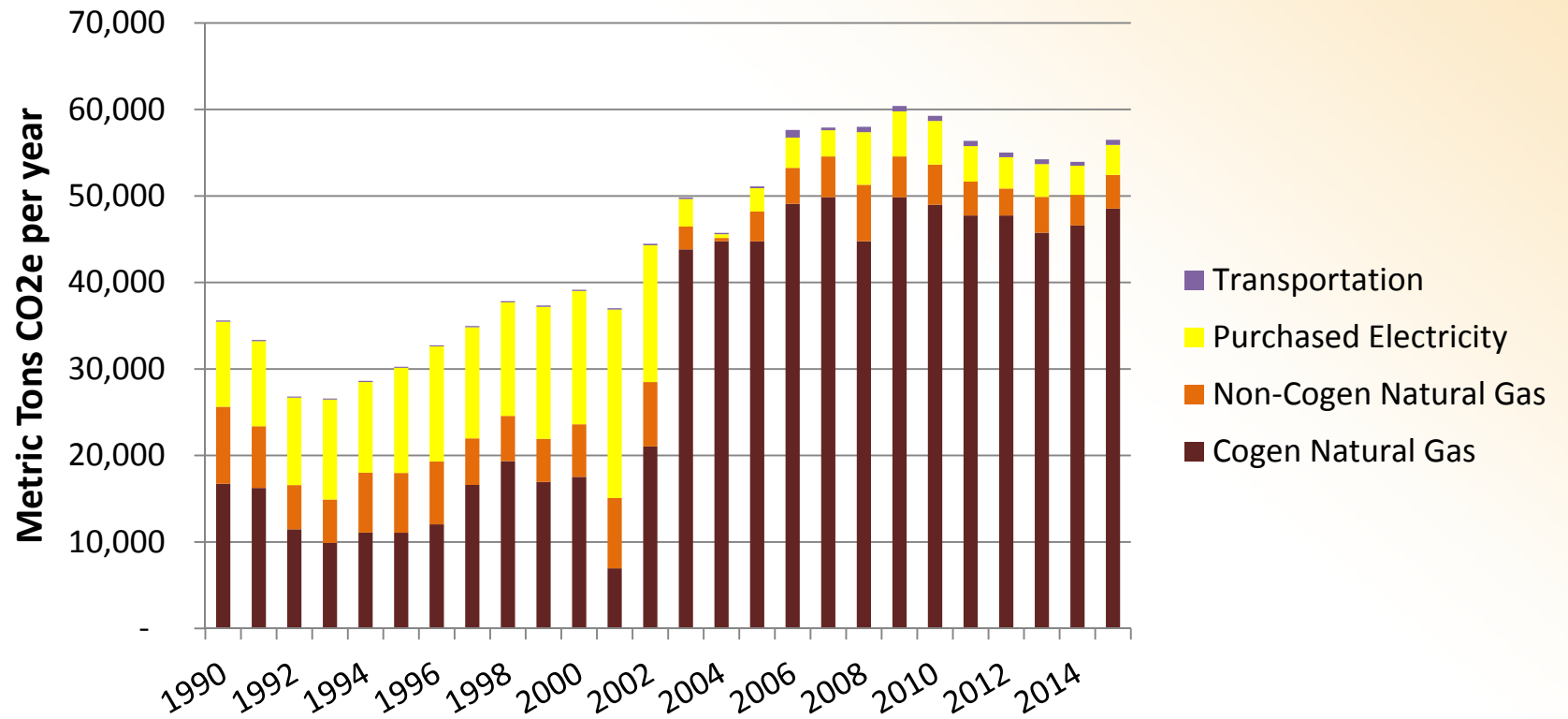
Indirect GHG emissions from consumption of purchased electricity, heat, or steam

Scope 2
3%

FY 14/15

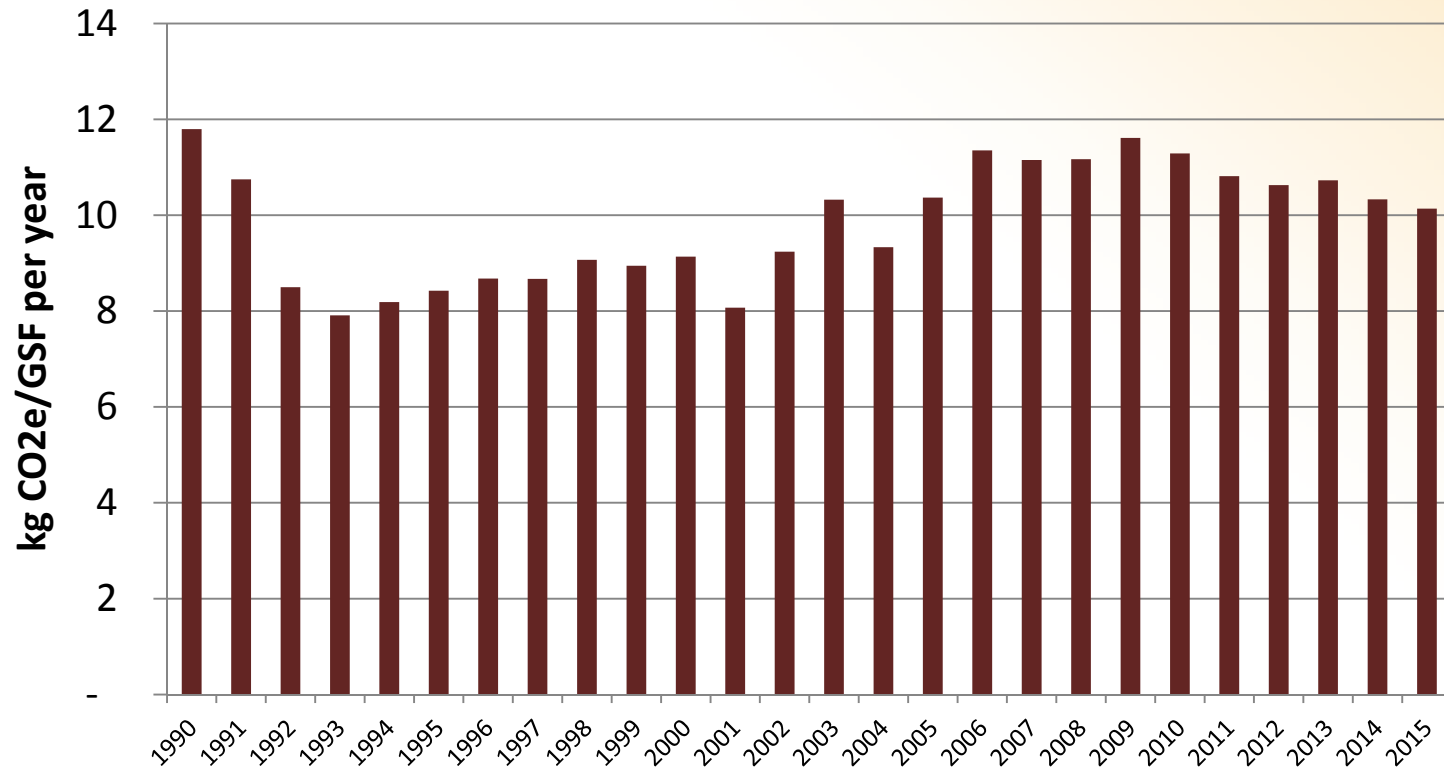
Greenhouse Gas Trends

Operational Emissions (Scopes 1 and 2)



Greenhouse Gas Trends

Operational Emissions (Scopes 1 and 2) Normalized to Square Footage



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Overview of Presidents Climate Commitment – Climate Action Plan

Within two years of signing this document, develop an institutional action plan for becoming climate neutral, which will include:

- Actions to make climate neutrality and sustainability a part of the curriculum and other educational experience for all students.
- Actions to expand research or other efforts necessary to achieve climate neutrality.
- Mechanisms for tracking progress on goals and actions.

Make the action plan, inventory, and periodic progress reports publicly available by submitting them to the Reporting System for posting and dissemination.



Sustainability
MAJOR



Center For Regional Sustainability
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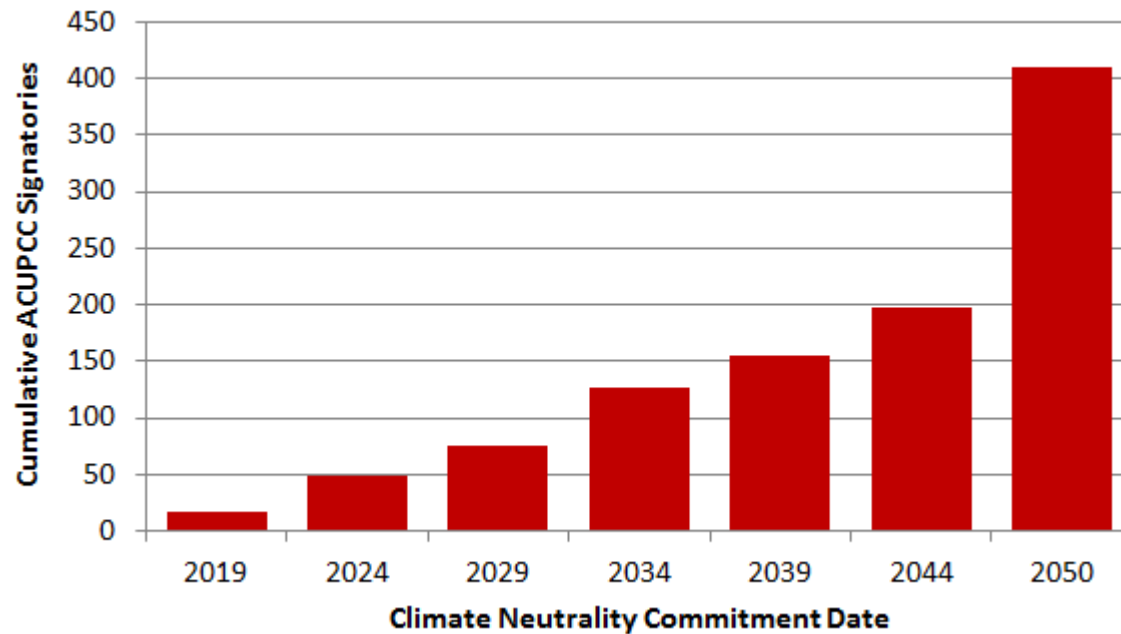


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Overview of Presidents Climate Commitment – Carbon Goals

Within two years of signing this document, develop an institutional action plan for becoming climate neutral, which will include:

- A target date for achieving climate neutrality as soon as possible.
- Interim targets for goals and actions that will lead to climate neutrality.



Overview of Presidents Climate Commitment – Carbon Goals



California State University System

Reduce direct (Scope 1 and 2) greenhouse gas (GHG) emissions to 1990 levels by 2020 and 80% below 1990 levels by 2040.

For SDSU, this would require 37% reduction from current levels in next five years
And 87% reduction in next 25 years.

University of California System

In 2013, President Janet Napolitano committed UC system to operational carbon neutrality by 2025.

State of California

AB 32 and Executive Order S-3-05 call for 1990 levels by 2020 and 80% 1990 levels by 2050.

Renewable portfolio standard – 33% electricity renewable by 2020, 50% by 2030



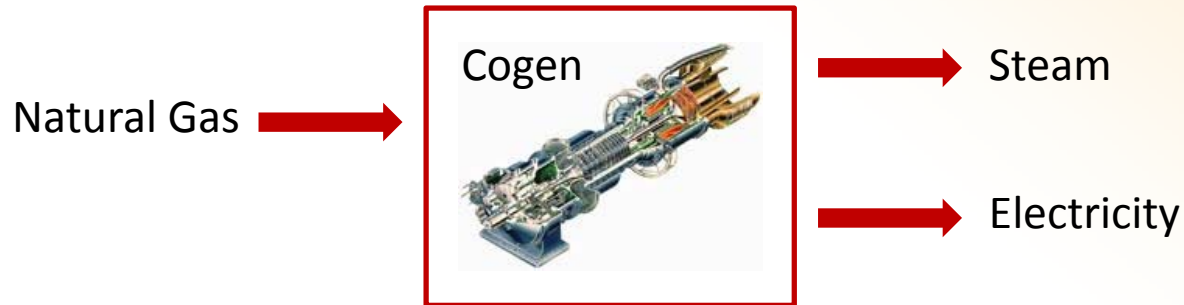
Energy



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Energy Overview

Most energy on campus provided by cogeneration plant



Reduces energy costs

Islanding capability

Historically, reduces environmental impact; but the grid is getting cleaner

Optimization effort expected to reduce operational emissions by nearly 10%

Energy - Chillers



20% of campus electricity

Energy - Thermal Storage



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Energy – Solar PV

Nearly 1 MW of Solar photovoltaic panels on campus – up to 10% of peak, 3% total use

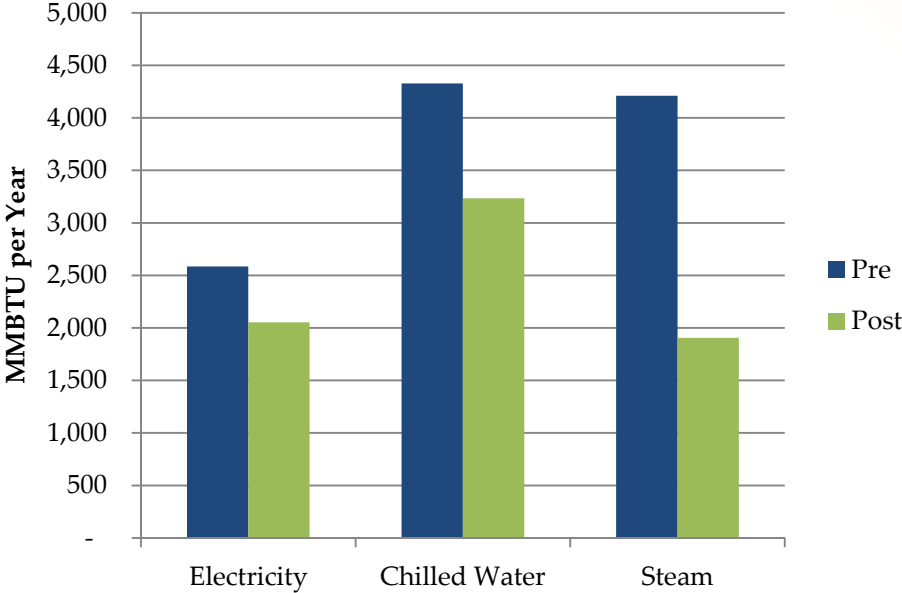


Energy – Solar PV



Monitoring Based Commissioning

Monitoring Based Commissioning – make a building work right.
Deferred maintenance, optimize HVAC sequences, efficiency upgrades



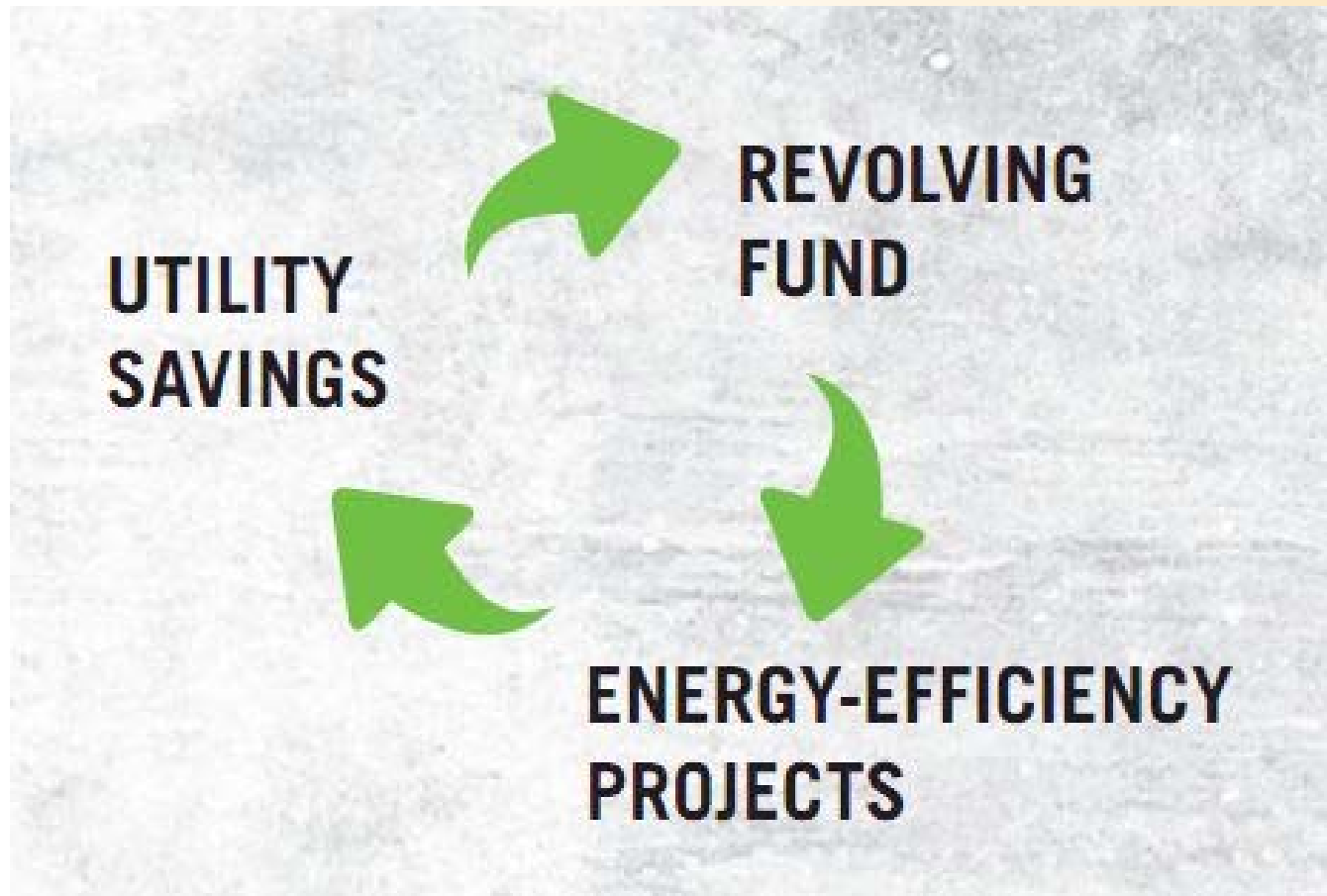
Arts and Letters MBCx Results



CSL Wind Tunnel Model

Next up: GMCS, Peterson Gym, Fowler Athletics

Energy Revolving Fund

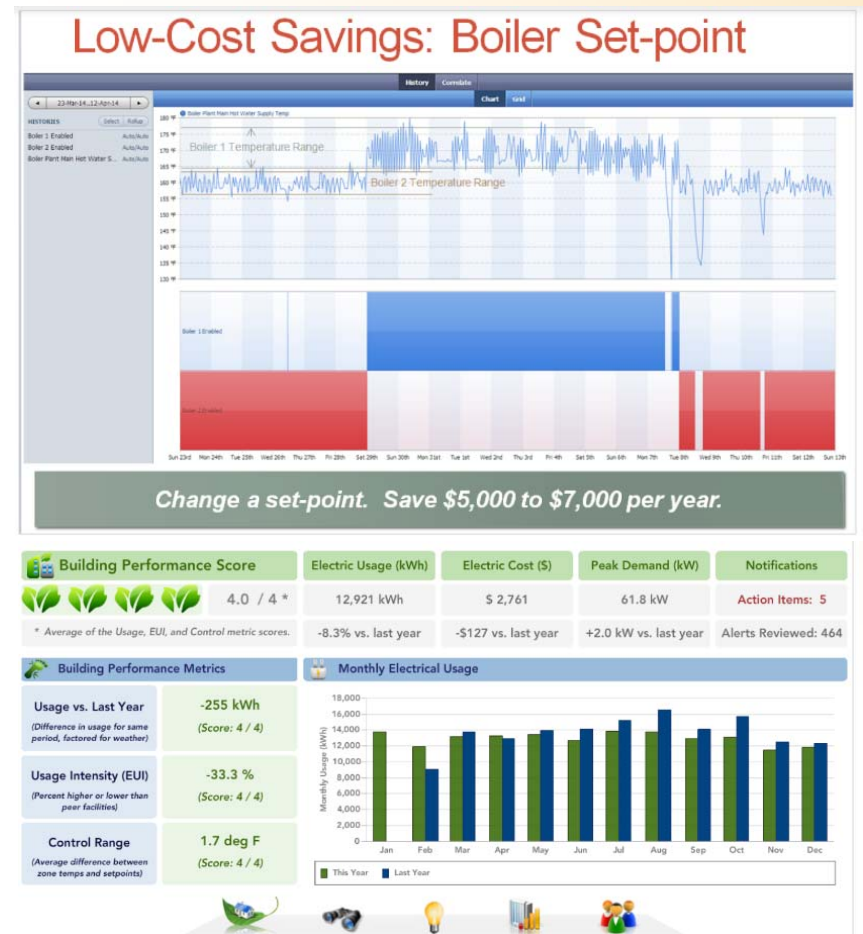
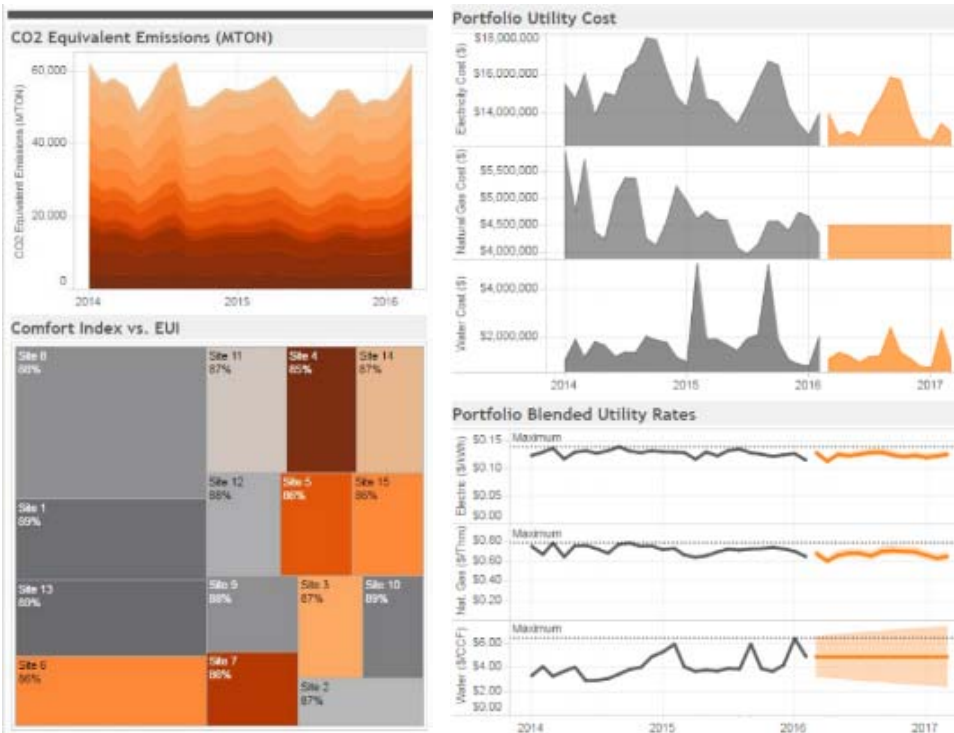


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Energy Information System

New system will be advanced energy and sustainability data collection and analysis

Utility bill management, auxilliary billing, portfolio snapshot, comparisons, public dashboards, and fault detection diagnostics



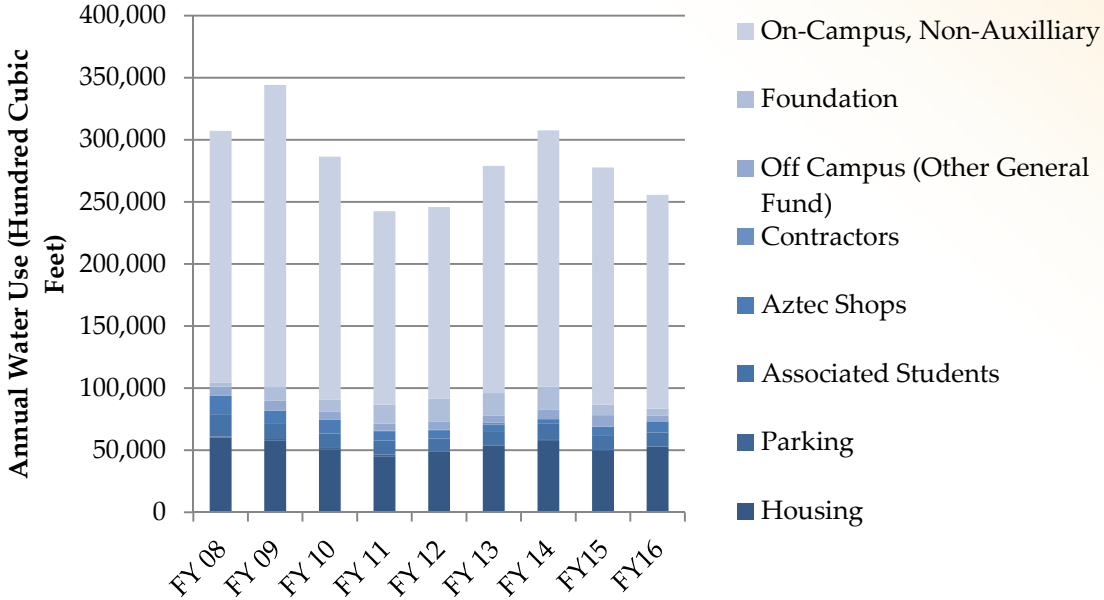
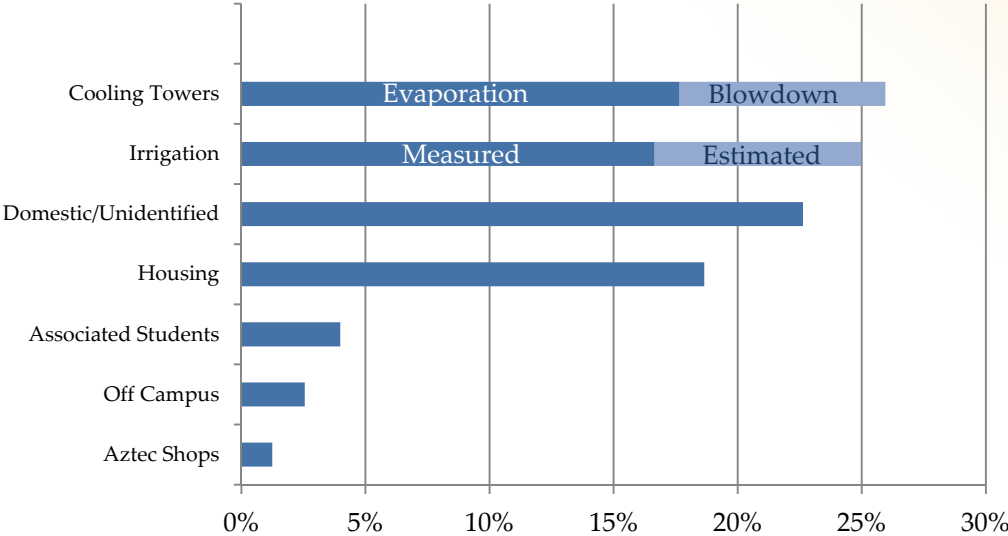
Water



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Water Overview

Water Use Breakdown (FY14)



Water – Campus as a Living Lab

- Chancellors Office funding – collaboration between Facilities Services and academics (Dept. of Geography, Dr. Diana Richardson)
- Students identified biggest needs were shading and seating
- Redirected from proposed site



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Water – Campus as a Living Lab

- Turf removal, shade trees
- Enhanced irrigation
- Biochar – water conservation amendment



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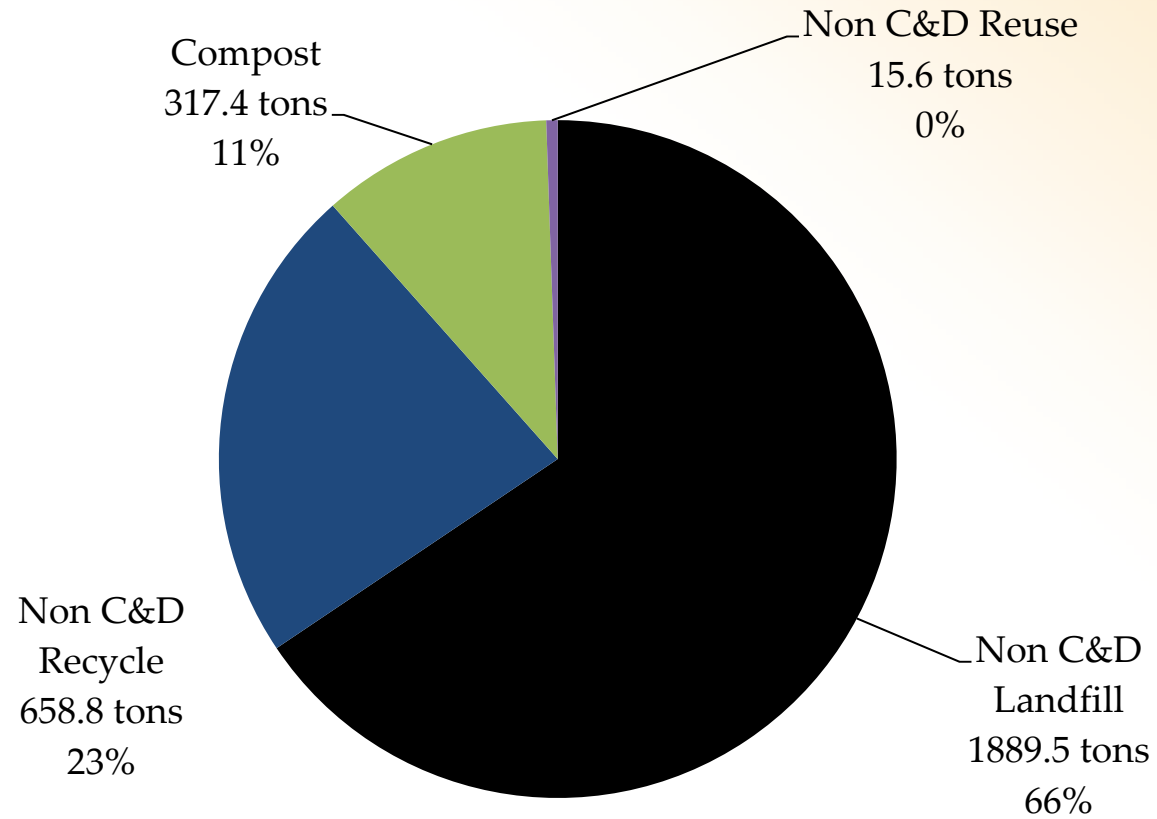
Waste Reduction



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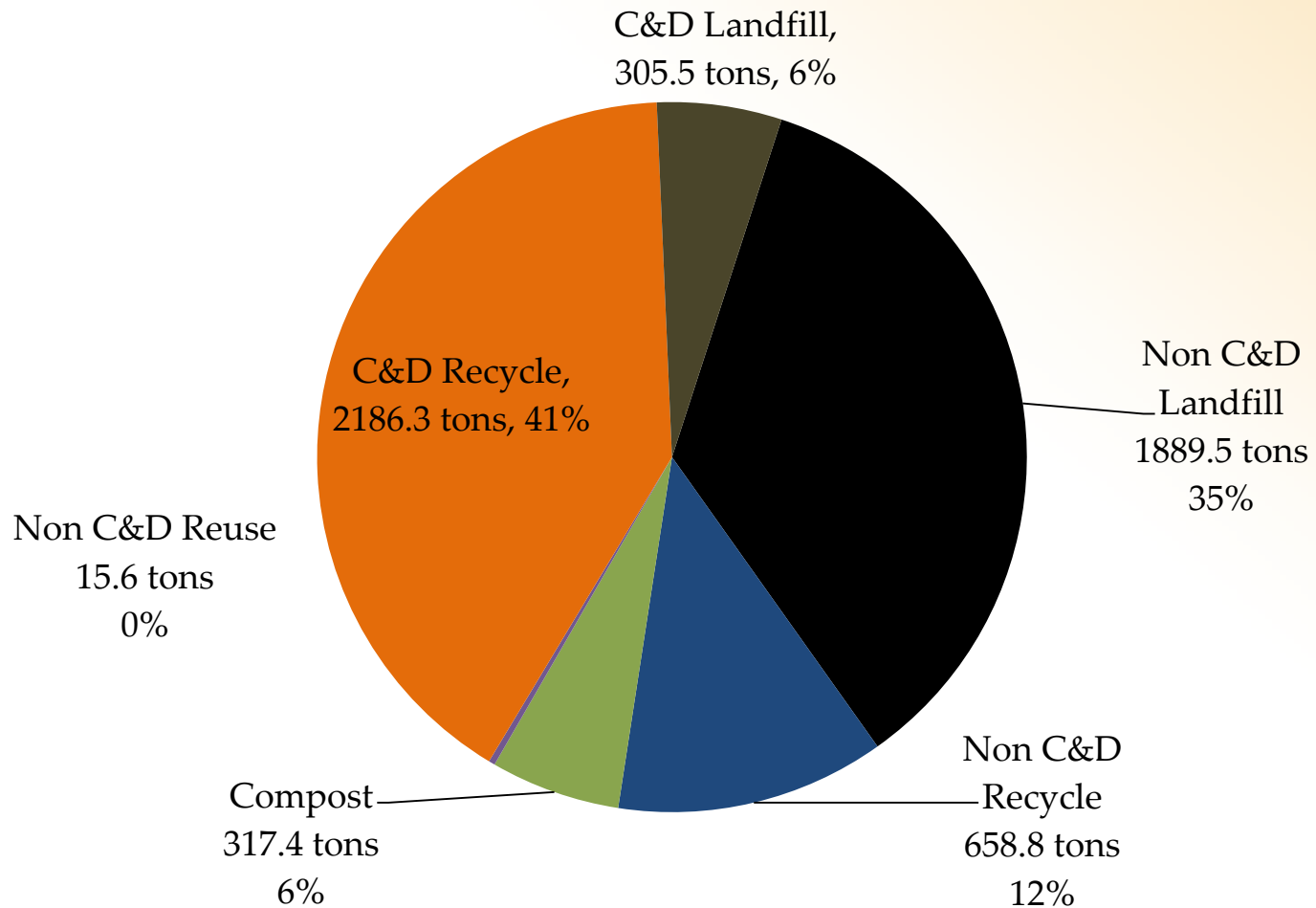
Waste Reduction

Non C&D Diversion (7/15 to 6/16)



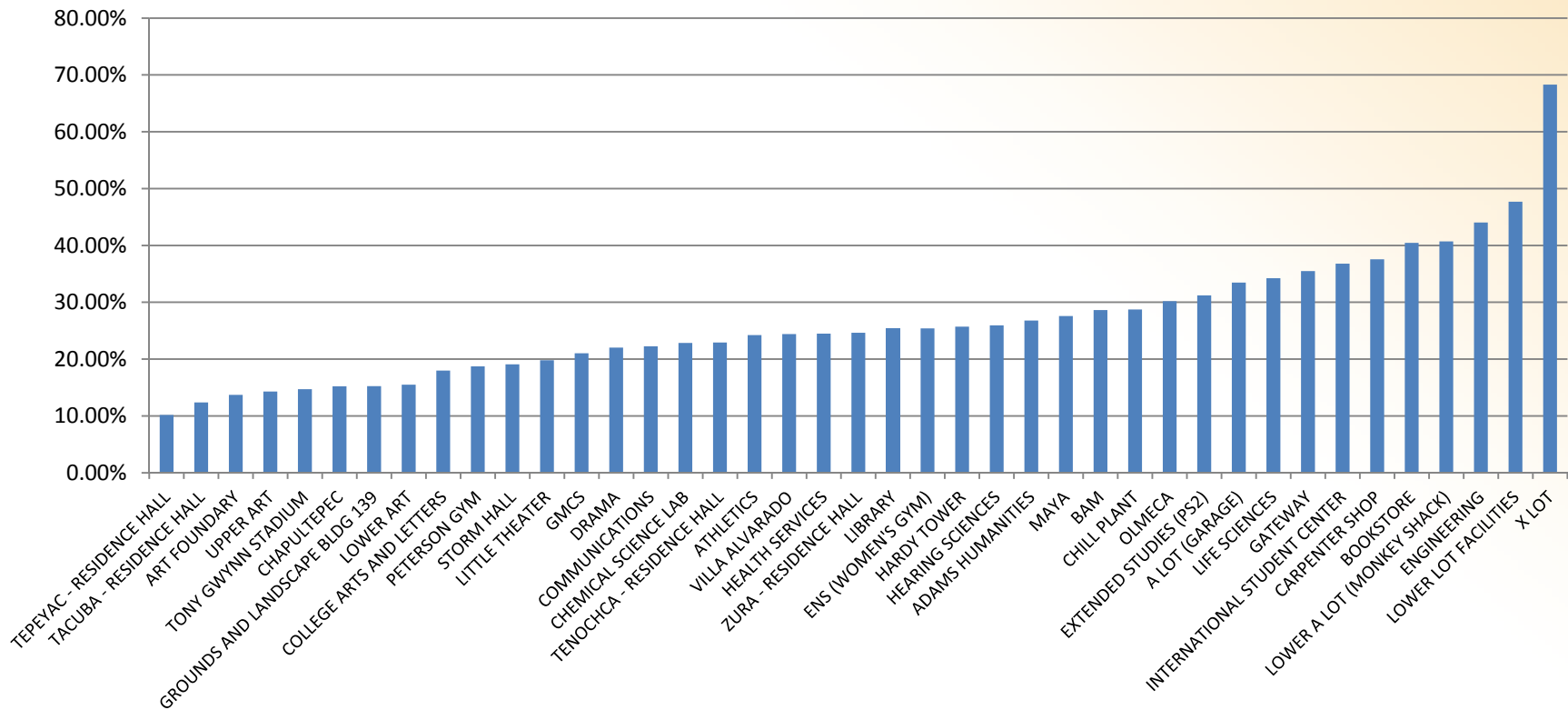
Waste Reduction

Total Diversion (7/15 to 6/16)



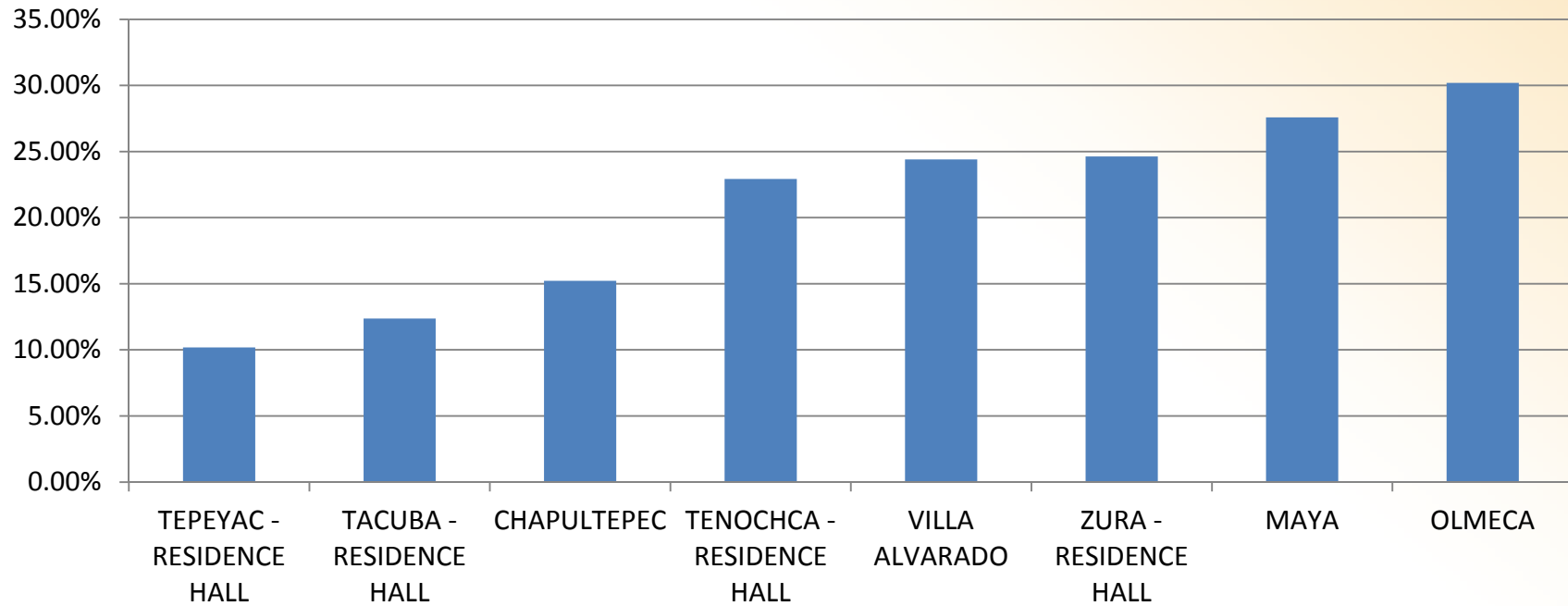
Waste Reduction

FY 15-16 Diversion Rate by Dumpster Location



Waste Reduction

FY 15-16 Diversion Rate by Dumpster Location



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Waste Outreach

- Launching recycling outreach effort
 - Spearheaded by student intern, Taylor Flores
- New recycling and waste bins with new contract
- Piloting sidecar landfill bins



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Waste Outreach

RECYCLE

almost everything!



Paper
(non-waxed/lightly-soiled ok)

- newspaper/magazines
- cardboard/pizza boxes
- 100% paper cups**
- paper plates
- office paper
- paper bags

Cartons
(no liquids)

- soup/broth cartons
- milk cartons
- juice cartons

Metal
(no liquids)

- aluminum/tin cans
- empty aerosol cans
- aluminum trays/bowls
- aluminum foil
- scrap metal

Glass
(all colors)

- glass bottles & jars

Plastic*
(no liquids)

- plastic bottles & jars
- plastic yogurt/dairy tubs
- plastic food containers
- plastic caps

Styrofoam Containers & Packaging
(clean/no peanuts)


DUMP ALL LIQUIDS AND FOOD BEFORE RECYCLING!

* all containers, cups, and lids marked ♻️ - ♻️ are recyclable
** including: Starbucks, Big City Bagels, and Juice It Up cups

LANDFILL


almost nothing!

Heavily-Soiled Paper, Bags, Plastic Wrap, or Foil




Paper Towels, Napkins, & Tissues


Disposable Cups & Lids NOT Marked ♻️ - ♻️
(including plastic creamer cups)




Chip Bags, Food Wrappers, & Bread Clips



Glass Shards or Mirrors




Plastic Straws, Utensils, Rubber Bands, & Twist Ties



SPECIAL DISPOSAL

Clean Plastic Bags
(plus Wrap & Gloves)




reuse, return to store, or drop-off on campus

Batteries & Light Bulbs



call EH&S at 4-6778 for proper disposal

Surplus
(Toners, Electronics, Books, & Furniture)



call Business Services at 4-0741 for proper disposal



Sustainability Starts Here
sustainable.sdsu.edu

For more rules on SDSU recycling, visit: edcodisposal.com



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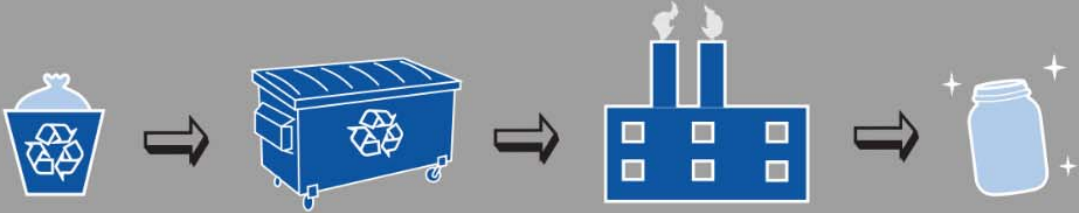
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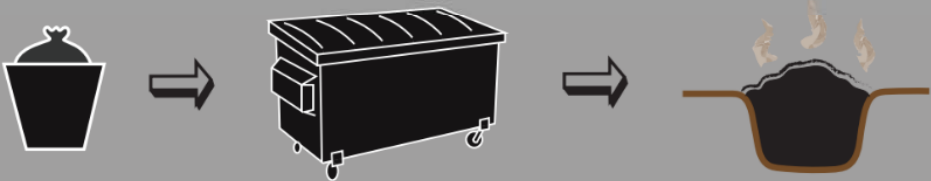
Waste Outreach

HOW IT WORKS:

CLEAR bag + BLUE bin = RECYCLABLE



BLACK bag + BLACK bin = LANDFILL



Sustainable SDSU

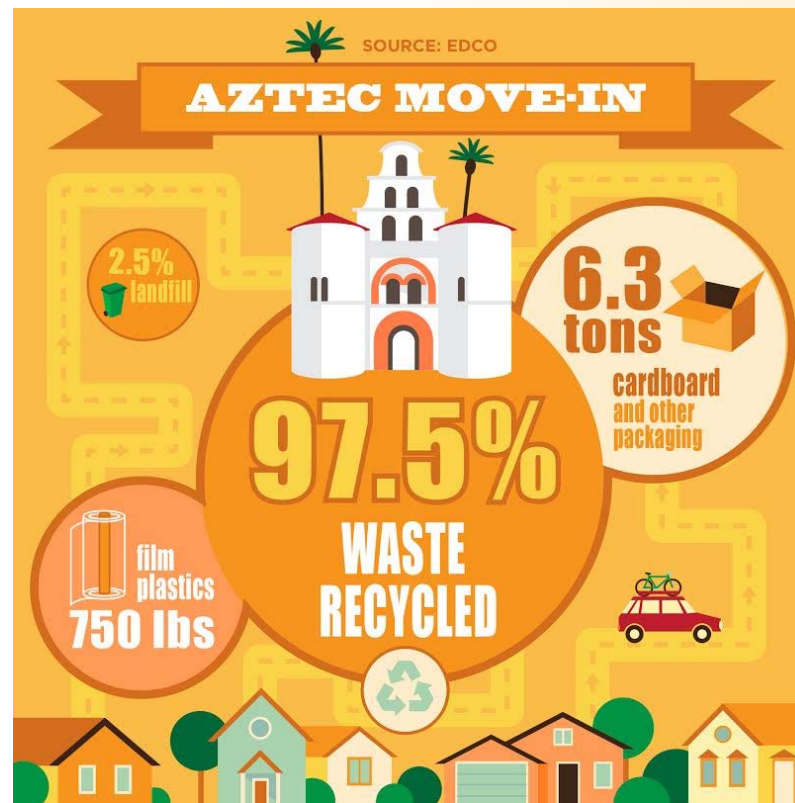
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Move In

2015



2016 – 98.5% Diversion!

Hydration Stations

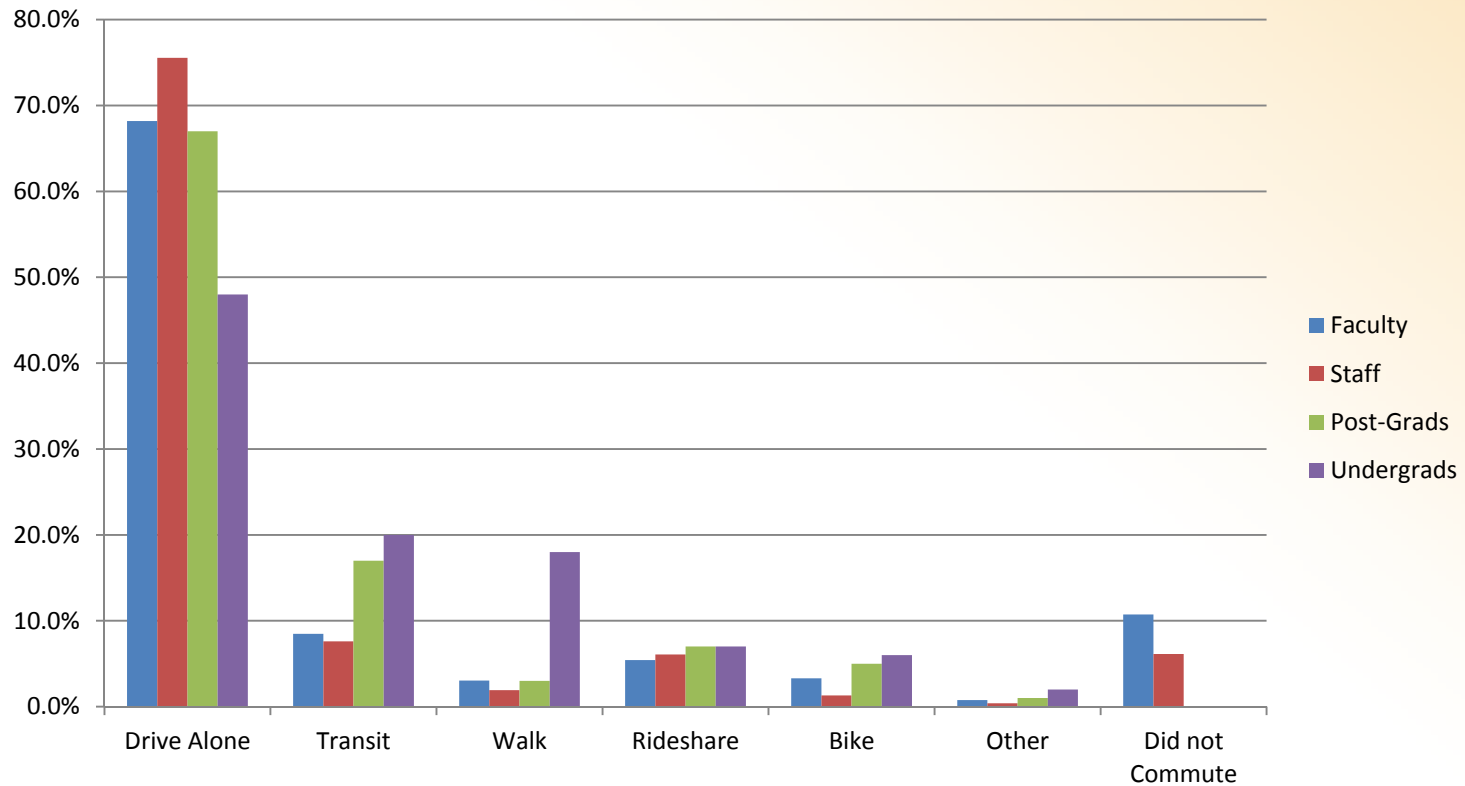


Transportation



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Mode Split Comparison



Faculty/Staff – 2015 Data

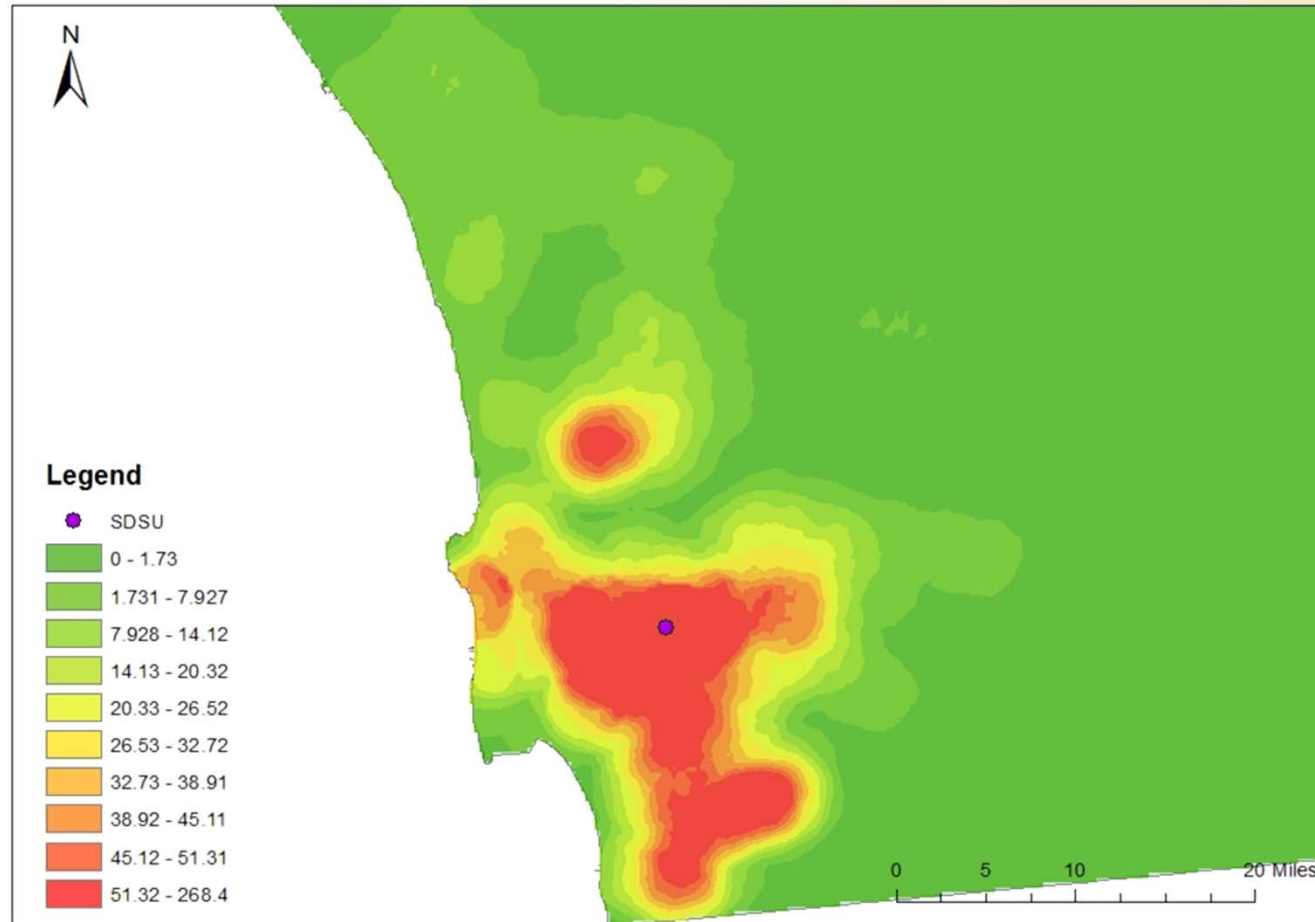
Students – 2012 Data



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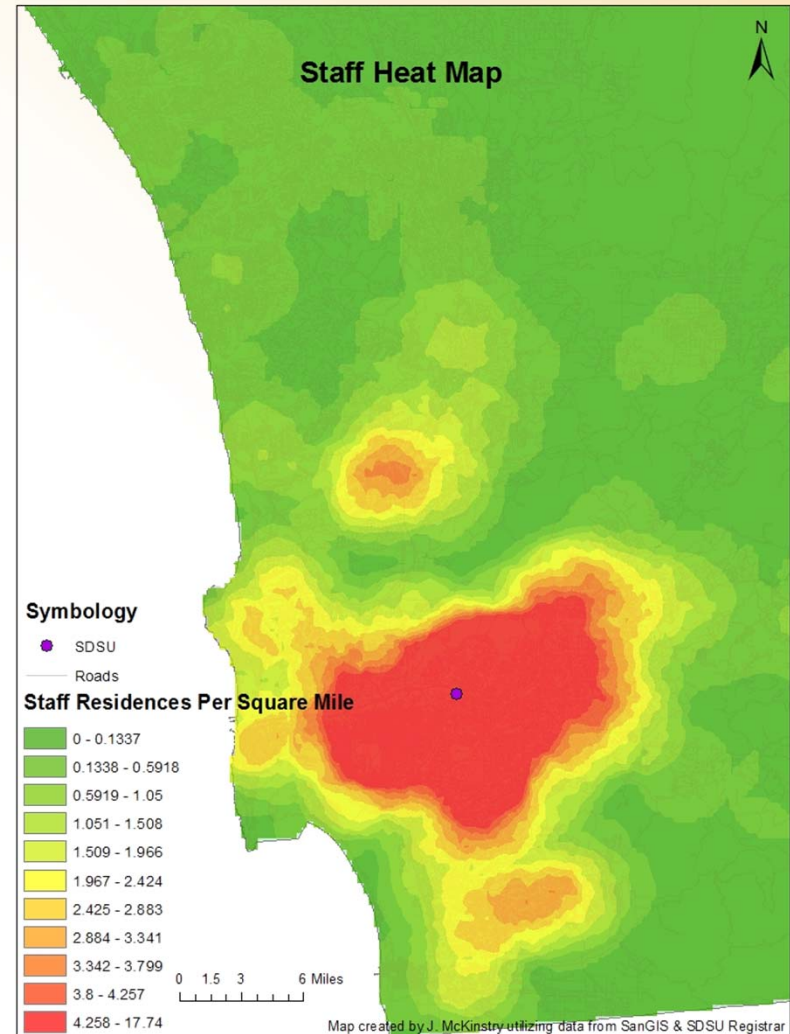
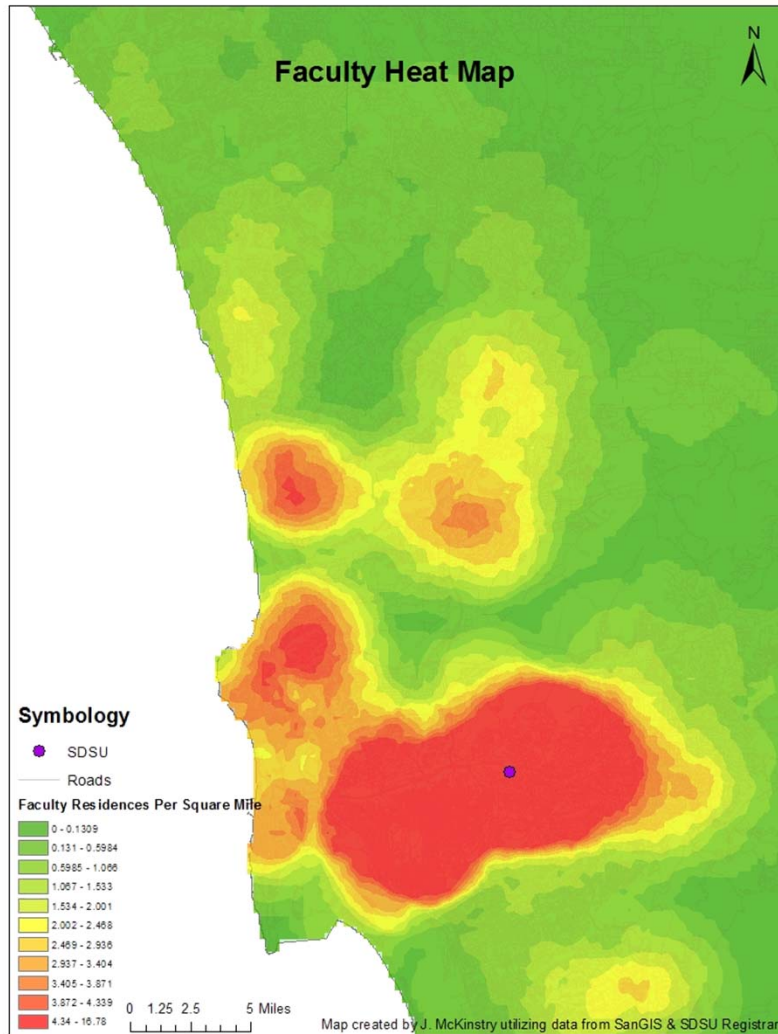
Student Residence Density

Student Density in San Diego County

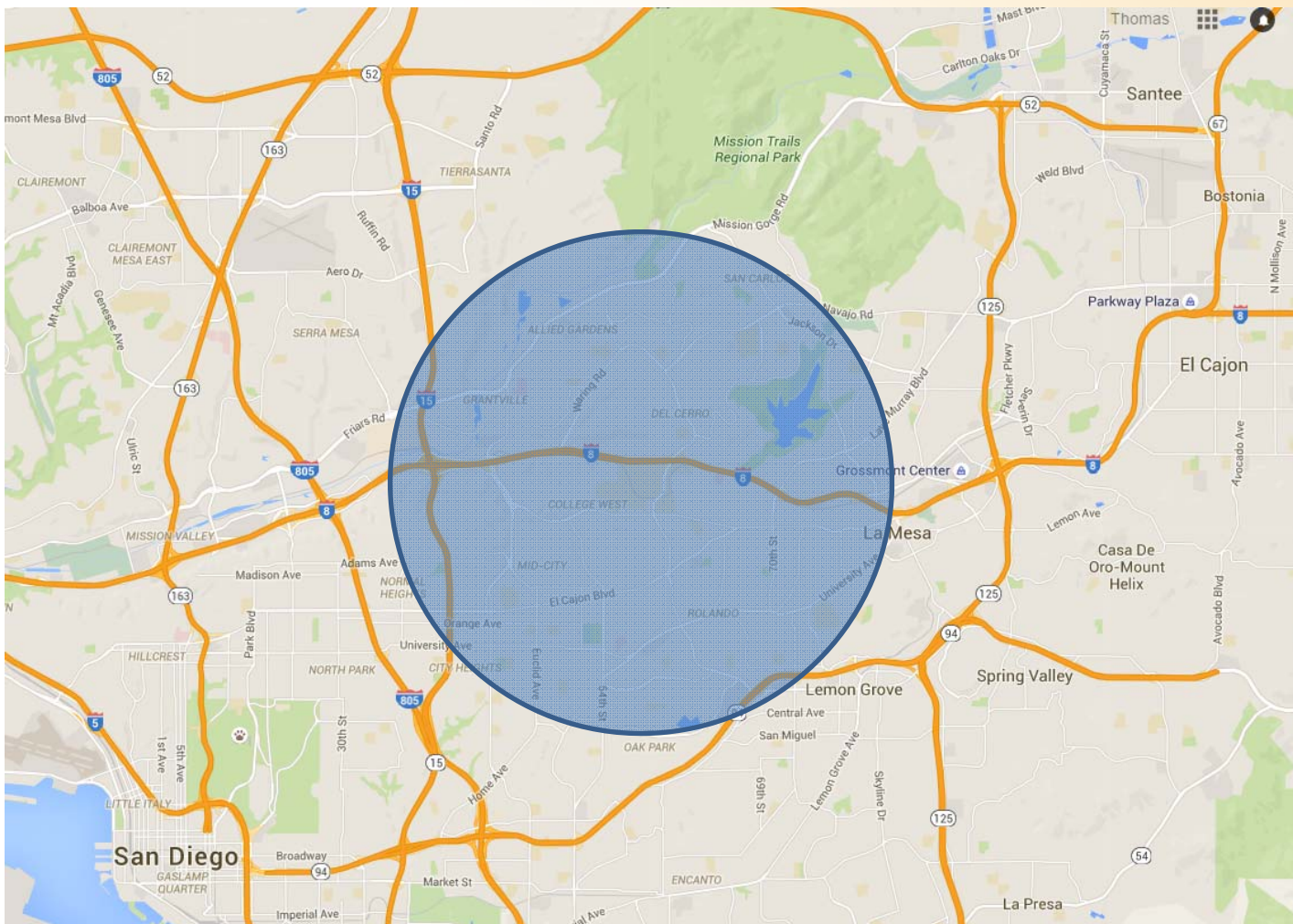


Geocoded students in San Diego County. Units represent student residences per square mile.

Faculty/Staff Residence Density



Buffer Analyses

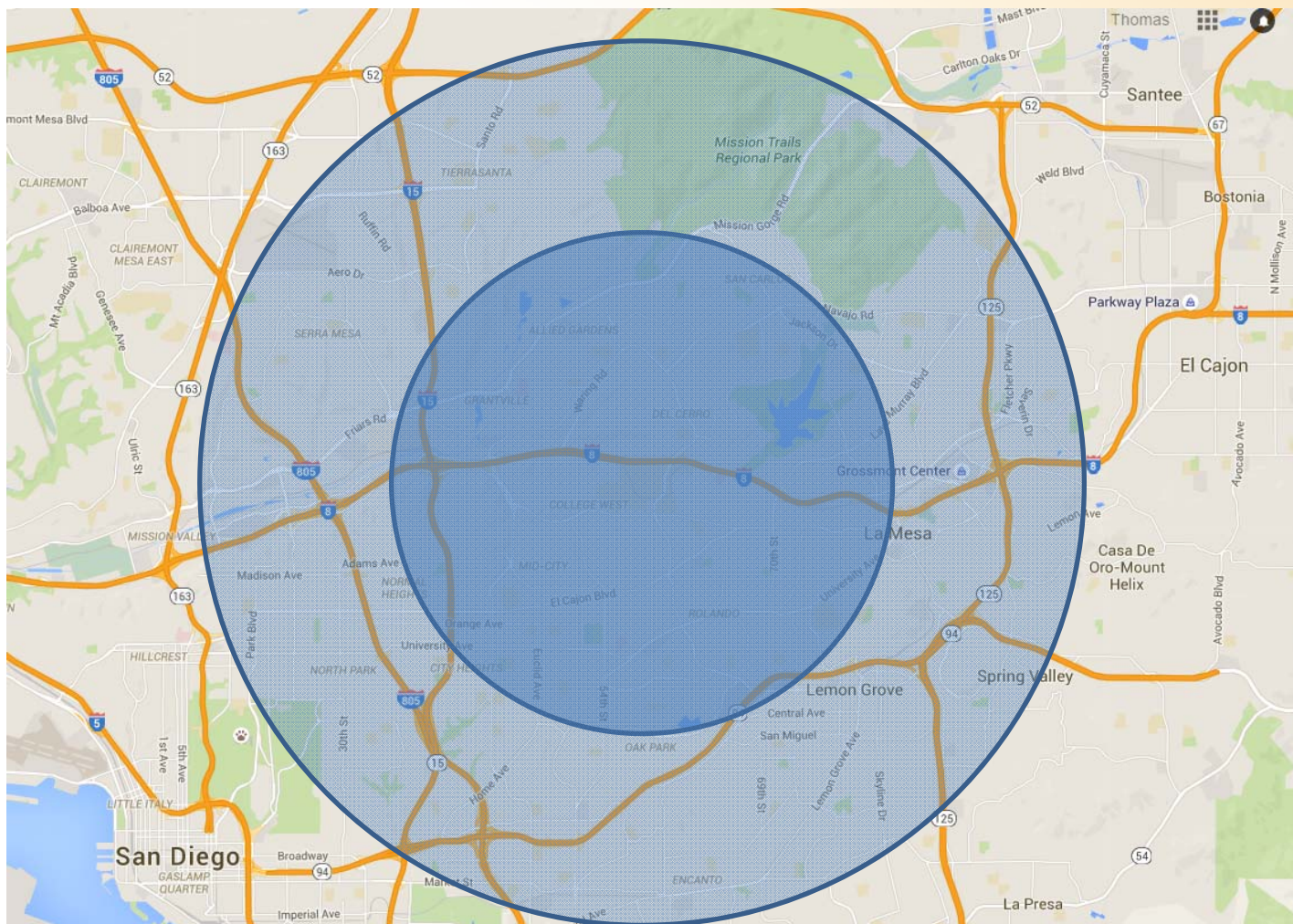


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- Faculty: 18% live within 3 miles of campus
- Staff: 20% live within 3 miles of campus
- Students: 23% live within 3 miles of campus

Created by Dr. Bruce Appleyard and Jeremy McKinstry

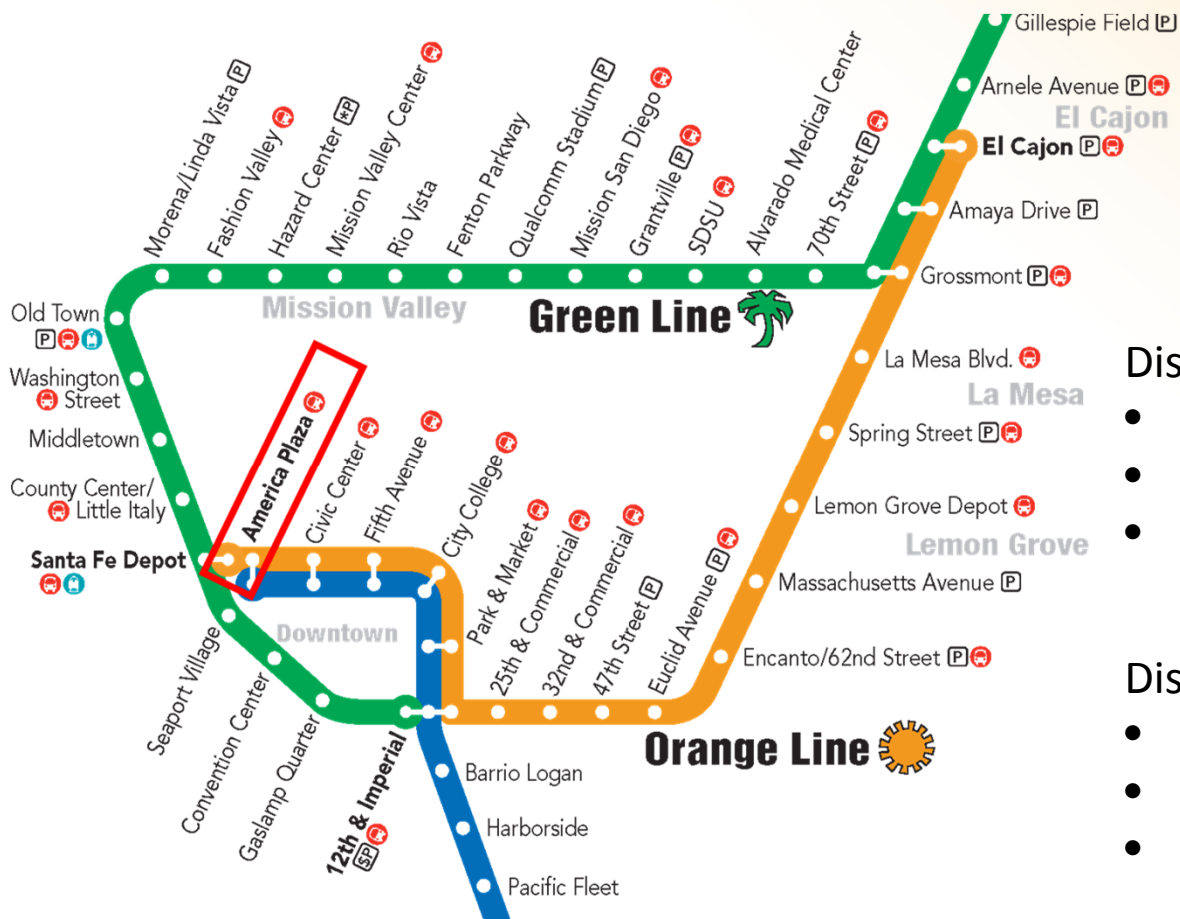
Buffer Analyses



- Faculty: 33% live within 5 miles of campus
- Staff: 37% live within 5 miles of campus
- Students: 36% live within 5 miles of campus

Created by Dr. Bruce Appleyard and Jeremy McKinstry

Buffer Analyses



Distance to main transit routes

- Faculty: 24% live within 0.5 miles
- Staff: 22% live within 0.5 miles
- Students: 30% live within 0.5 miles

Distance to main transit routes

- Faculty: 39% live within 1 mile
- Staff: 38% live within 1 mile of
- Students: 45% live within 1 mile



Sustainable Commuting



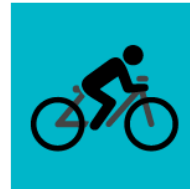
Trolley

SDSU is located on the Green Line of the MTS Trolley system, connecting campus to Downtown San Diego and Santee.



Bus

There are several MTS bus lines that directly service campus. Check out the MTS site for up to date information. All SDSU routes are "bike buses" and provide wheelchair lift service.



Bike & Skateboard

Biking, skateboarding, or walking to campus is as green as you can get! Campus has a network of bike lanes and streets that allow for easy bike and skateboard access.



Rideshare

Have a car? Split the costs by driving fellow SDSU student, faculty, and staff. Don't have a car? Find a ride where you need to go.



Carshare

Get access to a car without the hassle or cost of ownership. SDSU has partnerships with Car2Go and Zipcar.

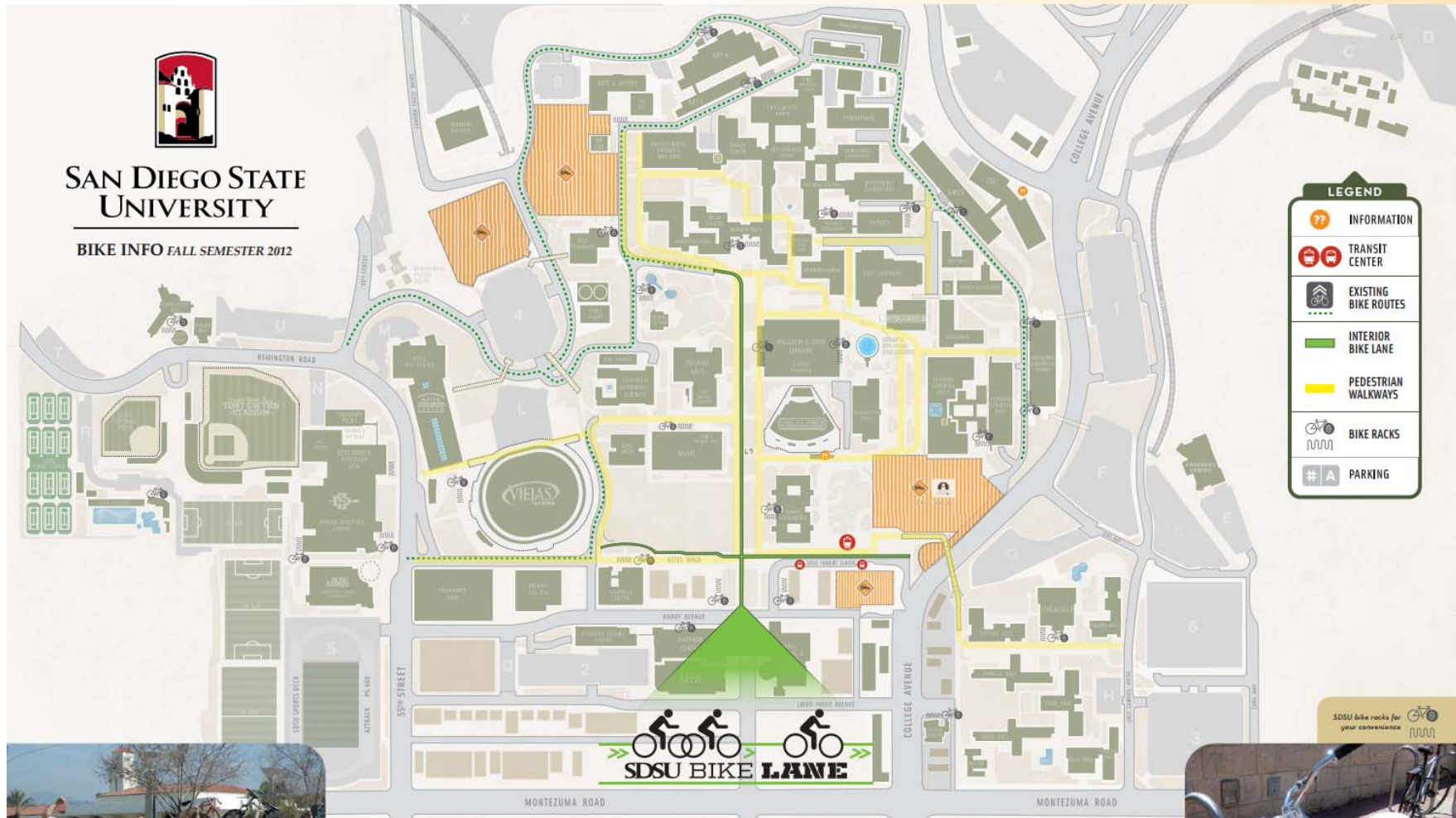


Charging Stations

SDSU has a partnership with Blink Networks offering electric charging stations across campus: Parking Structures 4, 5, 6, and 8, Children's Center, and fast chargers in Lot G.



Sustainable Commuting



Green Building



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LEED



CERTIFIED
40 - 49 POINTS



SILVER
50 - 59 POINTS



GOLD
60 - 79 POINTS



PLATINUM
80+ POINTS

LEED Certified Buildings

Student Union



Storm-Nasatir Complex



ARC



Zura Hall



MBAC



Children's Center



Storm-Nasatir

0010295748, San Diego, CA

Storm & Nasatir Expansion Project

LEED BD+C: New Construction (v2.2)

GOLD, AWARDED JUN 2016

SUSTAINABLE SITES		AWARDED: 9 / 14
SSc1	Site selection	1/1
SSc2	Development density and community connectivity	1/1
SSc3	Brownfield redevelopment	1/1
SSc4.1	Alternative transportation - public transportation access	1/1
SSc4.2	Alternative transportation - bicycle storage and changing rooms	0/1
SSc4.3	Alternative transportation - low emitting and fuel efficient vehicles	0/1
SSc4.4	Alternative transportation - parking capacity	1/1
SSc5.1	Site development - protect or restore habitat	0/1
SSc5.2	Site development - maximize open space	1/1
SSc6.1	Stormwater design - quantity control	0/1
SSc6.2	Stormwater design - quality control	1/1
SSc7.1	Heat island effect - non-roof	1/1
SSc7.2	Heat island effect - roof	1/1
SSc8	Light pollution reduction	0/1

WATER EFFICIENCY		AWARDED: 3 / 5
WEc1.1	Water efficient landscaping - reduce by 50%	1/1
WEc1.2	Water efficient landscaping - no potable water use or no irrigation	0/1
WEc2	Innovative wastewater technologies	0/1
WEc3.1	Water use reduction - 20% reduction	1/1
WEc3.2	Water use reduction - 30% reduction	1/1

ENERGY & ATMOSPHERE		AWARDED: 10 / 17
EAc1	Optimize energy performance	5/10
EAc2	On-site renewable energy	2/3
EAc3	Enhanced commissioning	1/1
EAc4	Enhanced refrigerant Mgmt	1/1
EAc5	Measurement and verification	1/1
EAc6	Green power	0/1

MATERIAL & RESOURCES		AWARDED: 5 / 13
MRc1.1	Building reuse - maintain 75% of existing walls, floors & roof	0/1
MRc1.2	Building reuse - maintain 95% of existing walls, floors & roof	0/1
MRc1.3	Building reuse - maintain 50% of interior non-structural elements	0/1
MRc2.1	Construction waste Mgmt - divert 50% from disposal	1/1
MRc2.2	Construction waste Mgmt - divert 75% from disposal	1/1
MRc3.1	Materials reuse - 5%	0/1

MATERIAL & RESOURCES		CONTINUED
MRc3.2	Materials reuse - 10%	0/1
MRc4.1	Recycled content - 10% (post-consumer + 1/2 pre-consumer)	2/1
MRc4.2	Recycled content - 20% (post-consumer + 1/2 pre-consumer)	0/1
MRc5.1	Regional materials - 10% extracted, processed and manufactured regionally	0/1
MRc5.2	Regional materials - 20% extracted, processed and manufactured regionally	0/1
MRc6	Rapidly renewable materials	0/1
MRc7	Certified wood	1/1

INDOOR ENVIRONMENTAL QUALITY		AWARDED: 14 / 15
EQc1	Outdoor air delivery monitoring	1/1
EQc2	Increased ventilation	1/1
EQc3.1	Construction IAQ Mgmt plan - during construction	1/1
EQc3.2	Construction IAQ Mgmt plan - before occupancy	1/1
EQc4.1	Low-emitting materials - adhesives and sealants	1/1
EQc4.2	Low-emitting materials - paints and coatings	1/1
EQc4.3	Low-emitting materials - carpet systems	1/1
EQc4.4	Low-emitting materials - composite wood and agrifiber products	1/1
EQc5	Indoor chemical and pollutant source control	1/1
EQc6.1	Controllability of systems - lighting	1/1
EQc6.2	Controllability of systems - thermal comfort	1/1
EQc7.1	Thermal comfort - design	1/1
EQc7.2	Thermal comfort - verification	1/1
EQc8.1	Daylight and views - daylight 75% of spaces	0/1
EQc8.2	Daylight and views - views for 90% of spaces	1/1

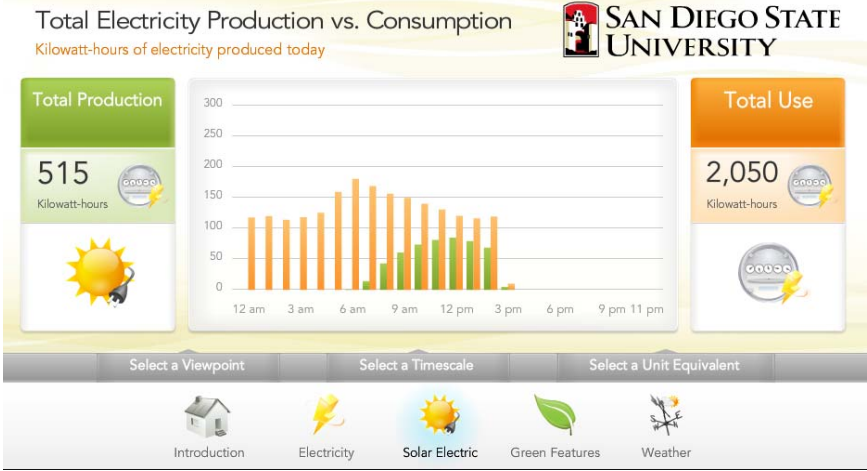
INNOVATION		AWARDED: 4 / 5
IDc1	Innovation in design	3/4
IDc2	LEED Accredited Professional	1/1

TOTAL **45 / 69**



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Storm-Nasatir



50% lower irrigation need
 50% lower interior water use

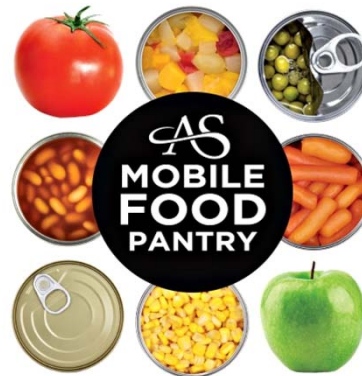


77% of Waste Recycled
 23% recycled content
 90% of spaces have views



Food

- In 2015, SDSU Dining became the first campus to require all of its tenants to meet the GRA's Certified Green Restaurant® environmental standards
- Nearly two dozen entities on campus have received this certification.
- SDSU organizations have over twenty plots at the College Area Community Garden
- Associated Students leads a campaign against food insecurity
 - Mobile food pantry
 - Twitter alerts to students when extra catered food is available



<http://www.aztecshops.com/sustainability>

<https://as.sdsu.edu/foodinsecurity/>

Academics

- Sustainability Major and Minor
- Many other programs offer classes related to sustainability



Sustainability MAJOR

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- Sage Project connects nearby communities with student classes to solve real world issues, with a focus on sustainability



THE **sage** PROJECT

Community Engagement for Sustainable Cities



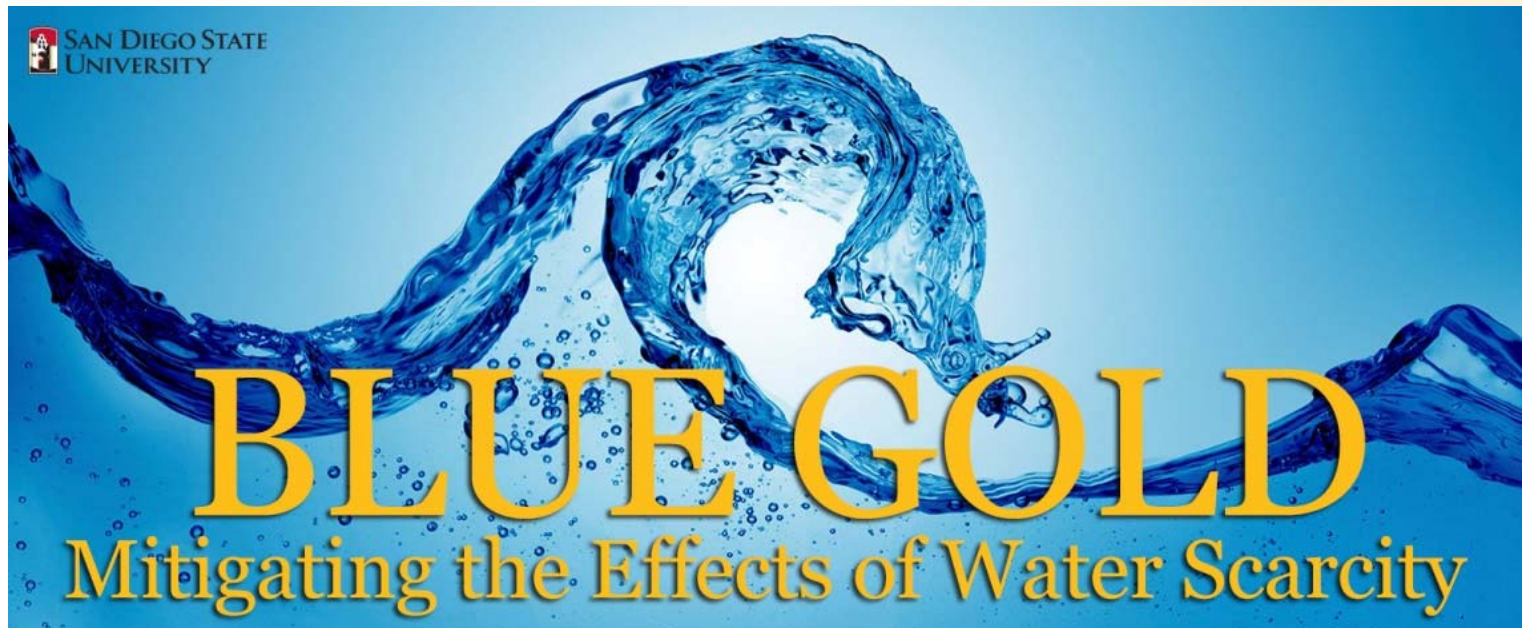
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<http://sustainability.sdsu.edu/>

<http://sage.sdsu.edu/>

Research

- Several research efforts including:
 - Industrial Assessment Center
 - Center for Sustainable Energy
 - Blue Gold
- Research on Climate and Sustainability part of campus Strategic Plan



What can you do to pitch in on campus?

- Recycle
- Turn off lights
- Use responsible temperature setpoints
- Commute to campus by biking, carpooling, trolley, or bus
- Eat more plants
- Use hydration stations instead of bottled water
- Report issues to Facilities Services Center
(leaks, excessive flushing, daytime exterior lighting, etc)
- Spread the word



How YOU can GET INVOLVED

Student Organizations

- Green Love
- Enviro-Business Society (E3)
- GreenFest Committee
- Association of Environmental Professionals (SD Student Chapter)



Campus Committees

- Environment & Safety Committee
- Sustainability Committee



Internships

- Look for local and on-campus internships related to sustainability



ENGINEERS WITHOUT BORDERS-USA
SAN DIEGO STATE UNIVERSITY
STUDENT CHAPTER

How YOU can GET INVOLVED

Recycling outreach – classroom talks, office walks, tabling

Count bins for new containers

Reduce bottled water usage

Advocate for recycling changes

Lobby for composting facilities

Food service recycling program

Reduce, Reuse, Recycle – in that order

Potential internships



Tom Abram

tabram@mail.sdsu.edu



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