

# WATER ACTION PLAN

University of California, San Diego

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UC San Diego

## Table of Contents

<u>EXECUTIVE SUMMARY.....</u>	<u>3</u>
<u>INTRODUCTION.....</u>	<u>4</u>
<u>California’s Climate</u>	
<u>Site Overview</u>	
<u>Regulatory Background</u>	
<u>Purpose of the Water Action Plan</u>	
<u>Water Action Plan Committee</u>	
<u>Boundaries of the Water Action Plan</u>	
<u>POTABLE WATER USE REDUCTION .....</u>	<u>9</u>
<u>Potable Water Use Baseline</u>	
<u>Water Action Plan Implementation Tracking and Reporting</u>	
<u>Water Use Overview</u>	
<u>Water Reduction Progress to Date</u>	
<u>Expansion of Recycled Water System</u>	
<u>Water Efficient Design Standards for New Buildings</u>	
<u>Campus Irrigation and Landscaping</u>	
<u>Smart Meters</u>	
<u>Laboratory Single Pass Cooling Retrofits</u>	
<u>Plumbing Retrofits</u>	
<u>Fire Sprinkler and Hydrant Testing Water Capture for Reuse</u>	
<u>HVAC Condensation Collection for Reuse</u>	
<u>Reporting Water Leaks</u>	
<u>EDUCATION AND OUTREACH.....</u>	<u>16</u>
<u>Outreach, Collaboration &amp; Education</u>	
<u>STORM WATER MANAGEMENT.....</u>	<u>18</u>
<u>Phase II Small MS4 General Permit</u>	
<u>Industrial Storm Water Permit</u>	
<u>NPDES Waste Discharge Permit</u>	
<u>Construction General Permit</u>	

Appendix A: UC Sustainable Water Systems Policy

Appendix B: Water Usage Graphs

Appendix C: Water Saving Project List

Appendix D: LEED Certified Buildings on Campus

Appendix E: Definitions

# UC San Diego Water Action Plan

## Executive Summary

UC San Diego, like many municipalities, operates commercial and residential buildings, a major utility plant, fueling stations, a vehicle fleet, hospitals, research laboratories, event and convention centers, public venues (aquarium, sports facilities, music hall, etc.), shipping facilities, small businesses, a pier, as well as police and transportation services. UC San Diego is responsible for the management of physical plants and all utilities associated with them, including the generation and maintenance of this infrastructure in compliance with local, state and federal regulations and codes. Functioning as a small city, UC San Diego is one of the largest water users in the City of San Diego. Therefore, it is critical that the campus commits to water conservation.



Credit: Erik Jepsen/UC San Diego Creative Services and Publications

The objective of this plan is to support, and remain in compliance with, the University of California Office of the President (UCOP) Sustainability Water Systems Policy. In doing so, this Water Action Plan (WAP) summarizes past efforts and best practices that UC San Diego has implemented to reduce potable water usage including:

- Expanding the use of recycled water to offset potable water use
- Irrigation, building, and research equipment retrofits to reduce water use
- Building standards for new construction to improve water efficiency
- Replacing turf with drought tolerant landscaping
- Collecting HVAC condensation and wastewater from Reverse Osmosis systems for reuse in irrigation.
- Smart meters

Furthermore, with consideration of UC San Diego's unique regional conditions, this plan describes future water reduction projects that have been designed and planned to best suit the University's water needs in the most efficient way possible. These projects will be implemented to reduce UC San Diego's potable water usage beyond 36% by the year 2025.

In addition to outlining UC San Diego's water usage and reduction strategies, the WAP also highlights the campus' education and outreach to students and staff on the importance of water conservation. UC San Diego has established a solid outreach platform which will grow over time that involves the staff, students and local community.

Finally, this plan describes UC San Diego's efforts to minimize the discharge of storm water pollutants in compliance with storm water regulations and permits.

# Introduction

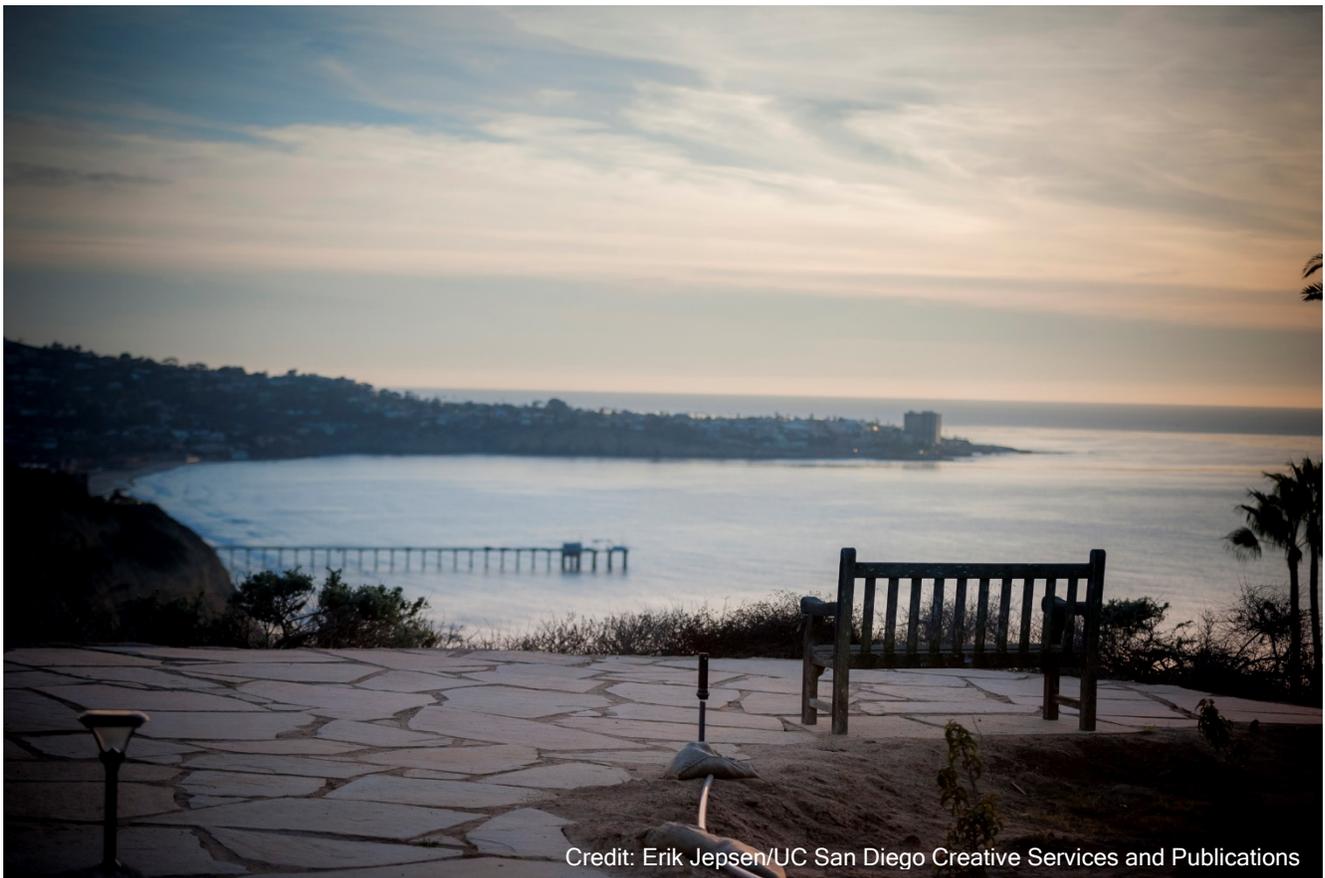


0 0.125 0.25 0.5 Miles

## CALIFORNIA'S CLIMATE

California is home to a semi-arid, Mediterranean type climate. As such, the Golden State typically experiences warm, dry summers, mild winters, and regular drought events. Furthermore, in the face of climate change, it is estimated that by the end of the 21<sup>st</sup> century, “critically dry” water years could occur more frequently. Droughts are expected to increase by 8% in the Sacramento Valley region, and a substantial 32% in the San Joaquin Valley in comparison to the recorded period between years 1951 through 2000 [<http://www.energy.ca.gov/2012publications/CEC-500-2012-007/CEC-500-2012-007.pdf>].

During critically dry periods in California, it is extremely difficult to satisfy the state’s water demands such as those necessary for important agricultural and environmental purposes. Water shortages threaten California’s economy and local ecosystems. Thus, efforts to implement and exercise water conservation practices are critical for the future of our state.



Credit: Erik Jepsen/UC San Diego Creative Services and Publications

## SITE OVERVIEW

The University of California, San Diego (UC San Diego) is located in La Jolla, a small coastal community that sits adjacent to the Pacific Ocean within the City of San Diego. UC San Diego serves as both a major economic engine and an entrepreneurial powerhouse for the San Diego region and for the State of California. The 1,158-acre campus has a daily population of over fifty thousand people, 59 acres of turf landscaping in sports fields including the perimeter landscaping, and over 700 buildings and associated infrastructure. In order to support this population, landscaping, and infrastructure, UC San Diego is one of the largest water users in the city.

UC San Diego has 6 main City water utility meters and 600 campus sub-meters to track water use.

UC San Diego, along with the city as a whole, relies primarily on imported water. San Diego's drinking water comes from three primary sources: Northern California, Colorado River and local rainwater runoff. The City also produces recycled water for non-potable uses. Regionally, San Diego lies within California's Mediterranean semi-arid climate and receives an average of only 12 inches of rain per year.

## REGULATORY BACKGROUND

In response to severe drought conditions in California, Governor Schwarzenegger wrote to leadership of the California State Senate on February 28, 2008, outlining key elements of a comprehensive solution to problems in the Sacramento-San Joaquin Delta. The first element on the Governor's list was "a plan to achieve a 20 percent reduction in per capita water use statewide by 2020." In March 2008 the 20x2020 Agency Team was convened to develop a plan to achieve a 20 percent reduction in per capita urban water use statewide by 2020. The final 20x2020 Water Conservation Plan, dated February 2010, sets forth a statewide road map to maximize the state's urban water efficiency and conservation opportunities between 2009 and 2020, and beyond.

The draft of this plan served as a basis for legislation that was enacted in November 2009 to incorporate into law (Senate Bill X7 7) the goal to achieve a 20 percent reduction in urban per capita water use in California by 2020.

In support of these regulations, the University of California, Office of the President (UCOP) issued a UC Sustainable Practices Policy (Appendix A) that requires all University of California campuses to reduce their potable water use 36% by the year 2025 and to develop a Water Action Plan that outlines how they will achieve their water reductions.



Credit: Erik Jepsen/UC San Diego Creative Services and Publications

## PURPOSE OF THE WATER ACTION PLAN

In compliance with UCOP's UC Sustainable Practices Policy, UC San Diego has developed this Water Action Plan (WAP). The purpose of UC San Diego's WAP is to (1) identify the present and future measures the university will implement to reduce potable water use by 36%, (2) develop and implement a solid education and outreach platform to encourage behavior change, and (3) establish benchmark goals to go beyond the 36% reduction in potable water use.

These benchmarks include:

- 1) Continuously look for new opportunities to implement measures that will reduce potable water use and support the overall goals of the WAP.
- 2) Develop water standards for different types of building occupancy use (e.g., research, industrial, administrative).
- 3) Research and investigate conceptual projects and new technology for potential project development. Use the university as a "living laboratory" for water conservation innovation.



Credit: Erik Jepsen/UC San Diego Creative Services and Publications

## WATER ACTION PLAN COMMITTEE

The UC San Diego WAP is a collaborative document developed by the Water Action Plan Committee (WAPC), which includes representatives from the following departments:

- Environment, Health, and Safety (EH&S)
- Facilities Management (FM)
- Housing, Dining, and Hospitality (HDH)
- Planning, Design and Construction (PD&C)
- Scripps Institution of Oceanography (SIO)
- Sports Facilities
- University Center

The WAP is a living document and will be reviewed and updated as necessary.

## BOUNDARIES OF THE WATER ACTION PLAN

The WAP boundaries are shown in Figure 1 below. The UC San Diego WAP includes the main campus, east campus, off-campus housing, and Scripps Institution of Oceanography. Leased facilities, off-site facilities, and buildings outside operational control have been excluded from this plan.

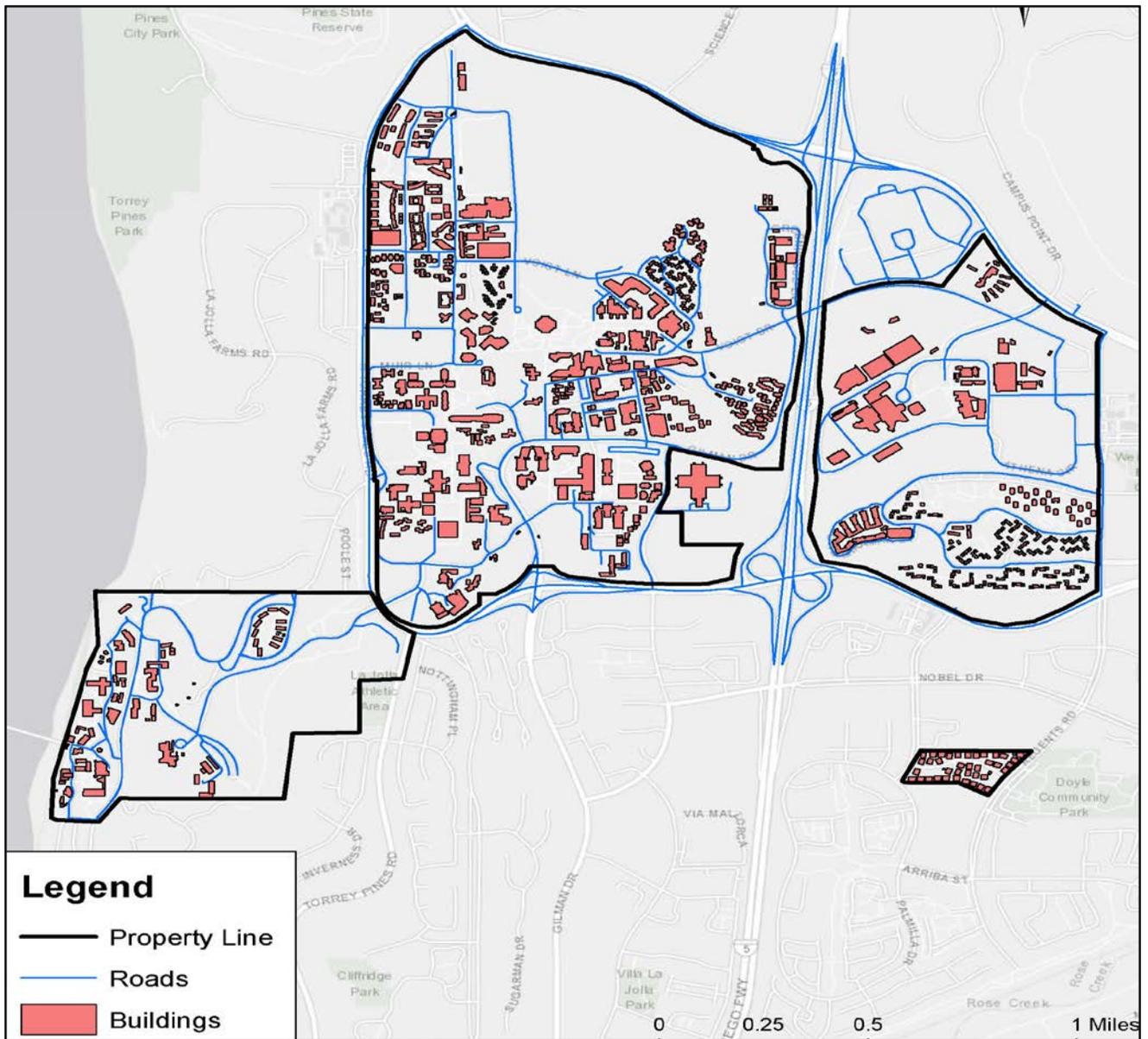
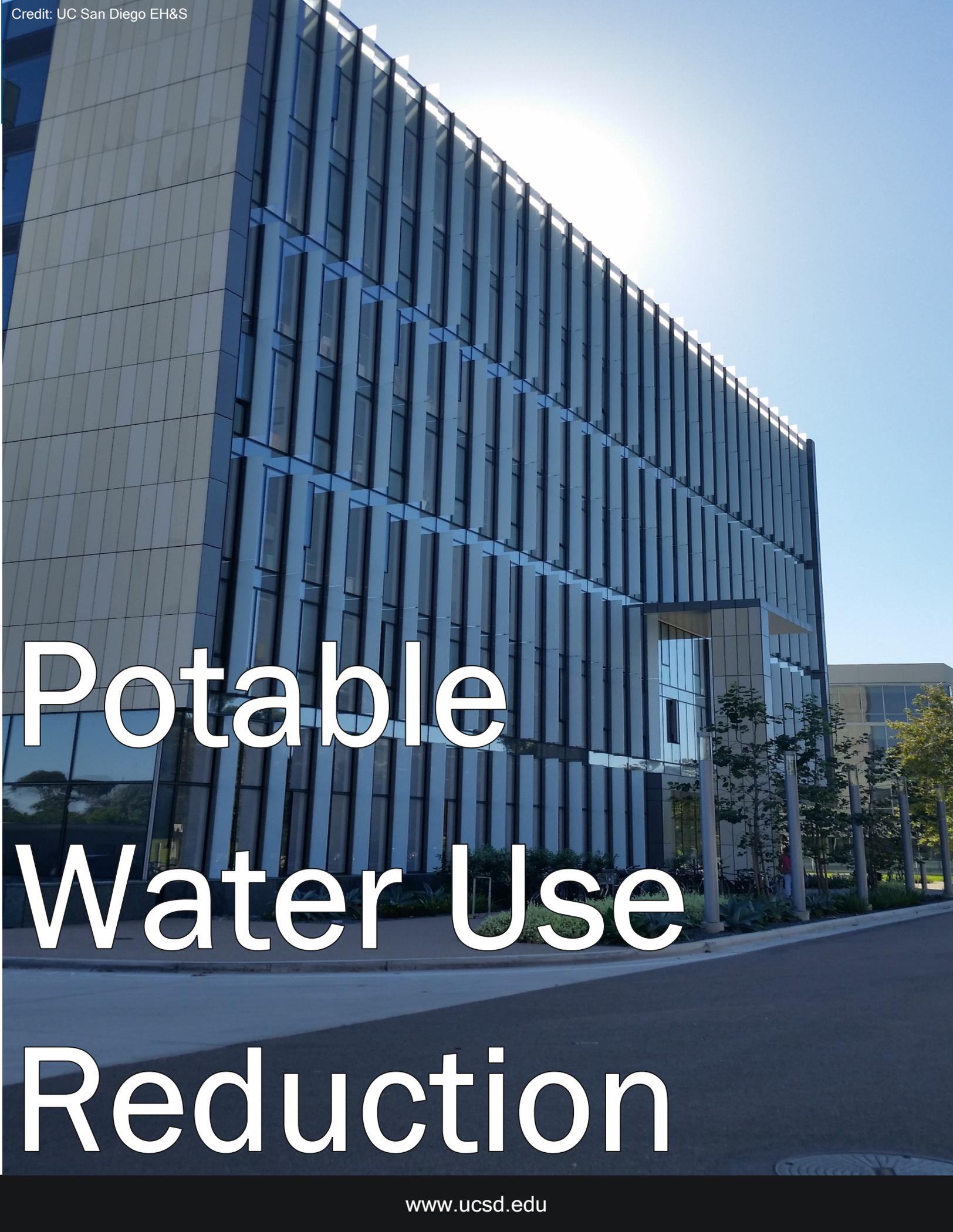


Figure 1: Water Action Plan Boundaries - Black Borders



# Potable Water Use Reduction

## POTABLE WATER USE BASELINE

In accordance with the UC Sustainable Practices Policy, UC San Diego's potable water use per capita is calculated by dividing the gallons of potable water used per fiscal year (based on City water meter billing data) by the weighted campus user (WCU).

Per Capita Potable Water Use = Gallons of potable water used per fiscal year /WCU

$$WCU = (A + B + C) + 0.75 [ (D - A) + (E - B) - F ]$$

A= Number of students resident on-site

B= Number of employees resident on-site

C= Number of other individuals resident on-site and/or staffed hospital beds

D= Total full-time equivalent student enrollment

E= Full-time equivalent of employees (staff + faculty)

F= Full-time equivalent of students enrolled exclusively in distance education.



Credit: Matthew Hansen/HDH

The calculated baseline, shown in Figure 2, is the average of potable water usage per capita (as defined above) from Fiscal Years July - June 2005/06, 2006/07, and 2007/08 with the goal to reduce potable water use from the baseline by 36% by 2025.

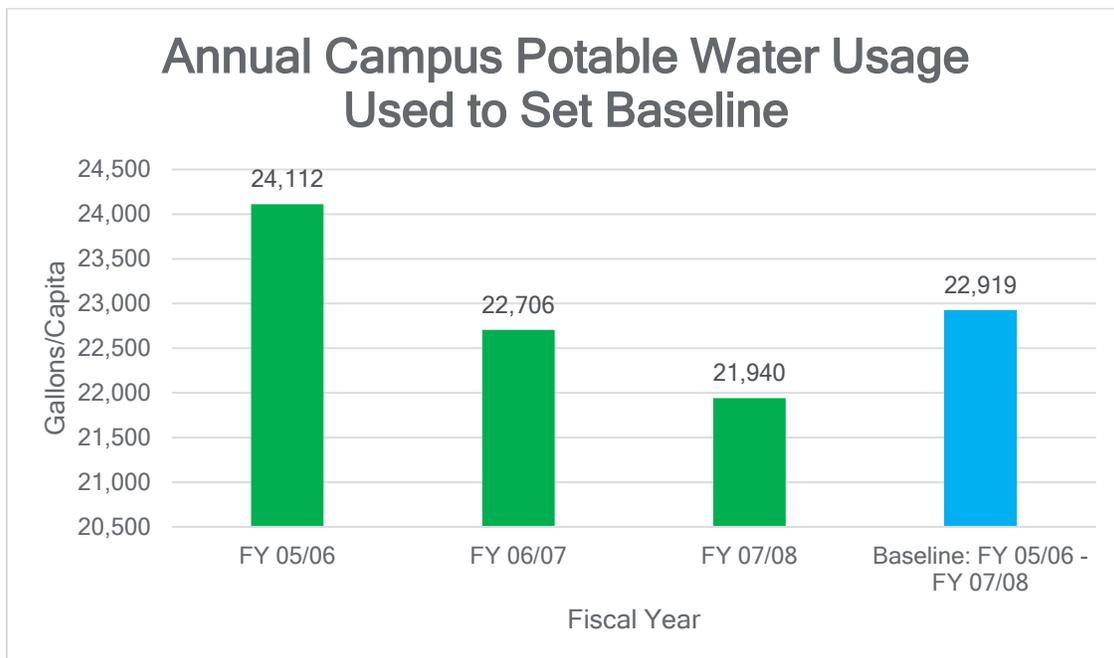


Figure 2: UC San Diego's Annual Campus Potable Water Use from 2005/2006 - 2007/2008

## WATER ACTION PLAN IMPLEMENTATION TRACKING AND REPORTING

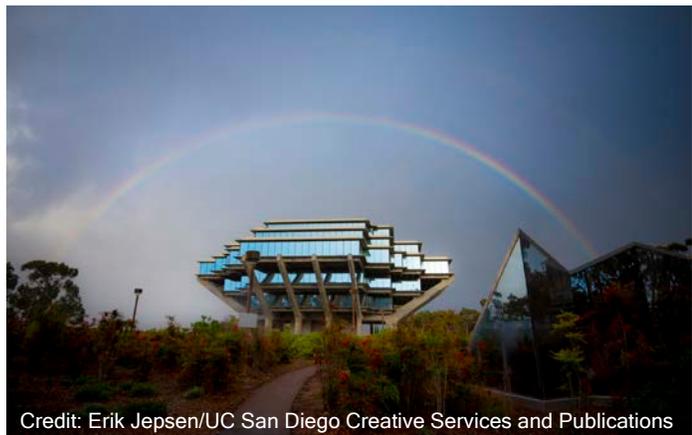
UC San Diego water use is tracked each fiscal year and reported to UCOP. The Water Action Plan is updated to reflect the status of water reduction projects and the addition of new projects.



## WATER USE OVERVIEW

UC San Diego potable water usage is broken down into eight categories which include:

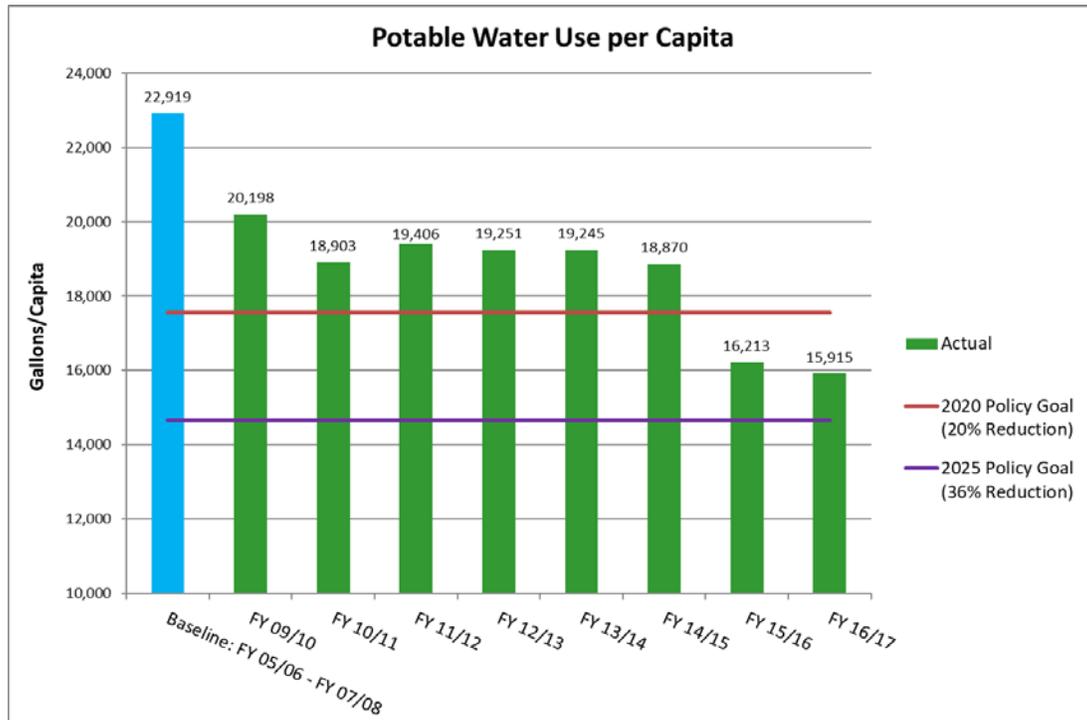
- Housing
- Industrial
- Irrigation
- Laboratories
- Office
- UC San Diego Health (La Jolla)
- Restaurants
- Other



The four largest water usage categories consist of housing, industrial, irrigation, and laboratories, while the remaining four categories (office, UC San Diego Health – La Jolla, restaurants, and other) make up less than 25% of total water use. General Water Usage graphs for each fiscal year can be found in Appendix B.

## WATER REDUCTION PROGRESS TO DATE

Figure 3 summarizes UC San Diego's potable water reductions to date.



**Figure 3: UC San Diego's Annual Campus Potable Water Use per Capita.**  
UC San Diego reached 20% reduction from the Baseline in FY 2015/16.

Appendix C lists water reduction projects that either have been completed, are ongoing, or are proposed for the future. Water reduction projects and practices that have already been implemented are described below.

### Expanding the Use of Recycled Water to Replace Potable Water Use

UC San Diego currently uses recycled water for more than 25% of campus irrigation and is continuing to expand the number of areas irrigated with recycled water rather than potable water. In addition, the use of recycled water has been expanded for industrial use in the cooling towers at the Central Utilities Plant and on east campus reducing potable water use by more than 60 million gallons per year.



Credit: UC San Diego EH&S

## Water Efficient Design Standards for New Buildings

UC San Diego requires new major construction projects to be planned, designed and built as resource efficient facilities. At a minimum, all future buildings will meet Leadership in Energy and Environmental Design (LEED) Silver or Gold Standards. LEED buildings consider the building site, water efficiency, energy efficiency and other environmental standards. An example is the Platinum rating of the new Charles David Keeling Apartments which is the first LEED Platinum student housing in the University of California system. For a full list of LEED certified buildings see Appendix D.

## Campus Irrigation and Landscaping

The campus uses electronic controllers to efficiently irrigate the landscape in periods of only 4-6 minutes per cycle. The UC San Diego landscape staff is trained to identify signs of overwatering and water leaks in the irrigation system. In addition, the irrigation system itself tracks unusually high water use, which may signal a leak. In the event of a reported water leakage, UC San Diego's Facilities Management department responds with an irrigation maintenance crew.

UC San Diego has implemented water saving strategies including the planting of low water, drought-tolerant vegetation in 75% of the irrigated campus landscape, turning off irrigation during wet winter months, and turning off irrigation to 54,000 square feet of turf to save 1.53 million gallons of water per year. The campus has retrofitted approximately 7,900 standard sprinklers with high-efficiency rotating nozzles, saving 10 million gallons of water per year. Meters that measure soil moisture that accurately target watering and a computer controlled irrigation system that tracks current weather data and adjusts watering based on temperature and humidity have been installed in select locations on campus and continue to be installed.

Since 2014, the campus has eliminated 352,000 square feet of turf saving 9 million gallons of water per year. A large recreation turf field (Muir Field), for example, was replaced with artificial turf in 2015.



Credit: UC San Diego EH&S



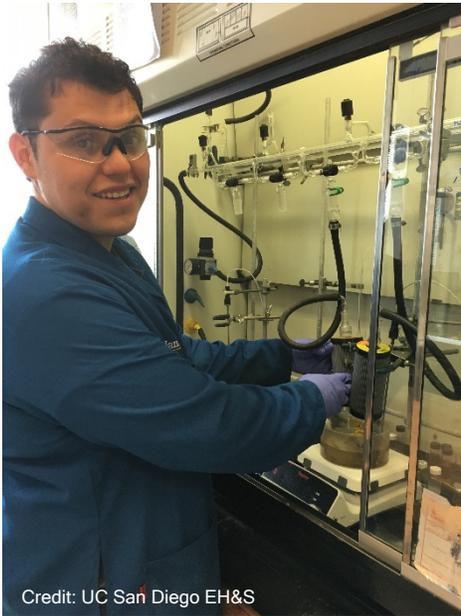
Credit: UC San Diego EH&S

## Smart Meters

UC San Diego is installing Sensus "smart" meters throughout campus that transmit water use data in real time to a central web interface. Access to water use data in real time enables the campus to identify areas that have water leaks and to identify areas where additional water conservation is needed. To date, 400 smart meters have been installed.

## Laboratory Single Pass Cooling Retrofits

As a major medical and research institution, UC San Diego houses many autoclaves. Older cold-water flow autoclaves use between 50-100 gallons of continuous cold water per hour in order to cool the discharged water before it enters the municipal sewer system. In order to reduce this impact of water usage, UC San Diego has installed over 100 WATER-MIZER autoclave retrofits. These retrofits monitor the drain temperature and apply cold water to adjust the discharge only when needed. The installation of a single WATER-MIZER saves 75%-90% of the normal water flow rate of a single cold-water flow autoclave. This averages a water savings at UC San Diego of 1,000 gallons per day, per autoclave retrofit. New autoclaves are equipped with the WATER-MIZER.



Credit: UC San Diego EH&S

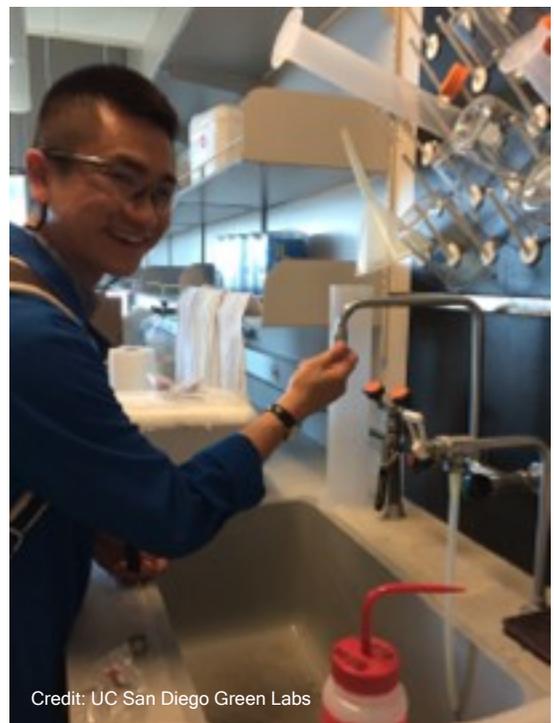
UC San Diego has also distributed more than 300 Findensers to labs, which has saved an estimated 22 million gallons of potable water per year. Instead of using flowing water from a sink to cool liquids in laboratories, a Findenser is used as a 'super air condenser.' The design includes an internal glass condenser with more surface area than traditional condensers and an external, finned (to increase surface area) aluminum jacket. Between the two layers, a small amount of water is permanently sealed. The higher surface area of both the internal and external layers allows for higher heat transfer capacity and eliminates the need for single pass cooling. Findensers also significantly reduce the risk of water leaks and flooding from this process.

## Plumbing Retrofits



UC San Diego installs water efficient plumbing fixtures in new buildings and is replacing aging infrastructure with water efficient fixtures (e.g., shower heads, faucets, low flow urinals, etc.).

Aerators have been installed on laboratory faucets to reduce the volume of water while maintaining similar water pressure (saves 7.5 gallons per minute from a lab faucet without an aerator). 476 aerators have been installed in Pacific Hall, Muir Biology, Bonner Hall, Natural Sciences Building, Urey Hall, York, CMME, CMMW and Leichtag saving more than 2 million gallons of potable water per year.



Credit: UC San Diego Green Labs

## Fire Sprinkler and Hydrant Testing Water Capture for Reuse

The campus has implemented practices to capture fire-sprinkler and hydrant testing water for reuse in the Central Utilities Plant cooling towers.

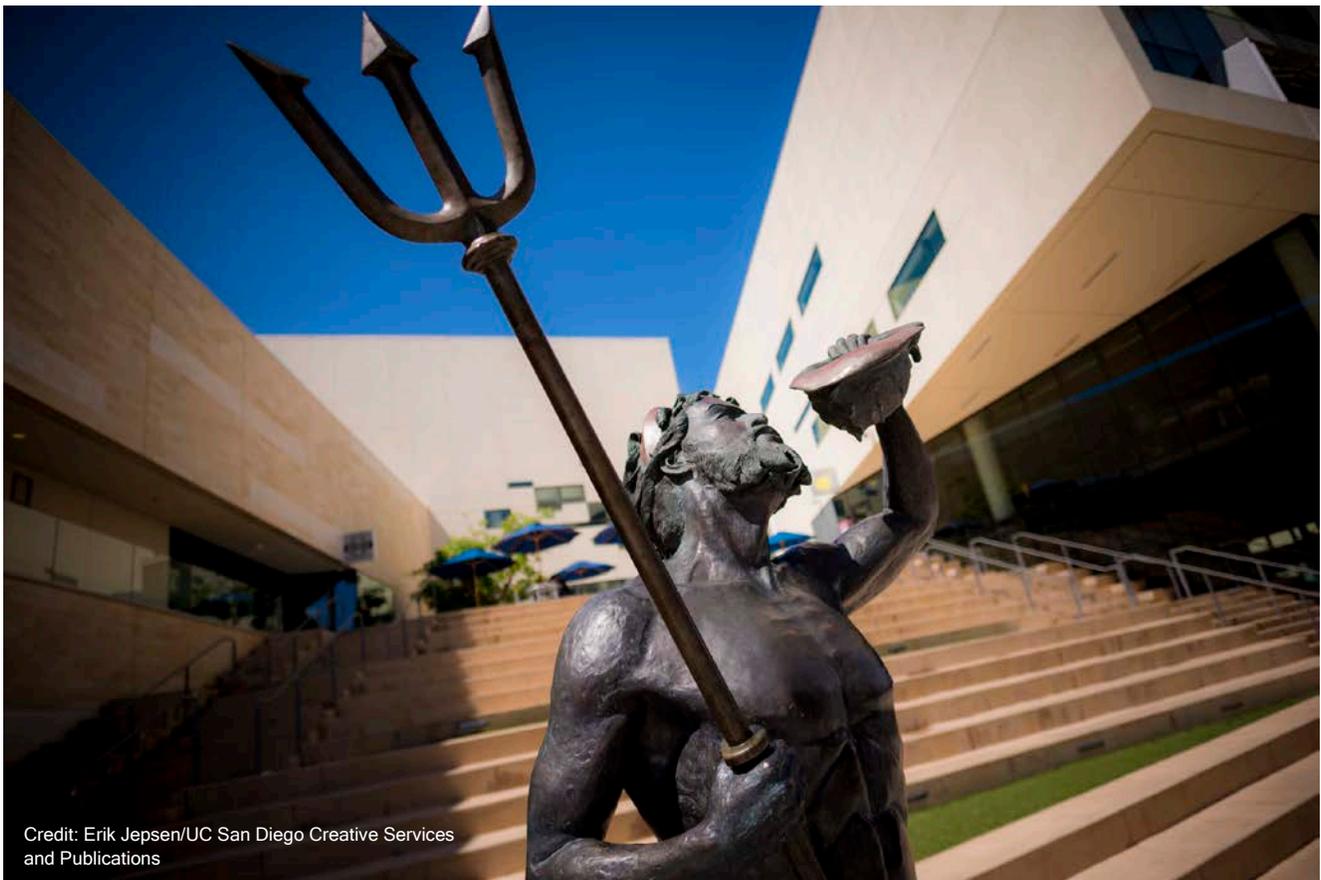
## HVAC Condensation Collection for Reuse

Currently, UC San Diego has three buildings on campus that collect condensation from heating and air conditioning units, reverse osmosis system wastewater, and cooling tower blow down for reuse in toilet flushing and irrigation. The collected water is treated with ozone, gravity settling, and ultra violet before being reused. One building alone (Biomedical Research Facility II) generates 11,000 gallons of collected water for reuse a day.

The campus is currently working on a project to collect and reuse HVAC condensation for irrigation in additional buildings.

## Reporting Water Leaks

Campus staff are trained to report water leaks to the UC San Diego Facilities Management Help Desk: (858) 534-2930 or email [wsc@ucsd.edu](mailto:wsc@ucsd.edu). Leaks in housing areas are reported to the HDH Service Center: (858) 534-2600.



Credit: Erik Jepsen/UC San Diego Creative Services and Publications



# EDUCATION AND OUTREACH

Credit: Erik Jepsen/UC San Diego Creative Services and Publications

[www.ucsd.edu](http://www.ucsd.edu)

## OUTREACH, COLLABORATION & EDUCATION

UC San Diego continuously involves the campus community in conserving water. Campus organizations such as AQUAholics Anonymous, the EcoNauts and the Sustainability Resource Center on campus contribute to day to day educational outreach to UC San Diego students and staff. Through these organizations, students, staff, and faculty are directly involved in campus outreach and education.



Credit: Erik Jepsen/UC San Diego Creative Services and Publications



Credit: UC San Diego EH&S

The AQUAholics Anonymous group distributes educational materials regarding water conservation at outreach events on campus, such as Earth Day, and has organized and implemented water conservation activities and programs, including Residence Hall Water Savings Competitions and a Combat AQUAholism Film and Art Competition.

UC San Diego AQUAholics Anonymous website: <http://aquaholics.ucsd.edu/>

Educational signs are posted throughout campus to inform the campus community of landscaped areas that are using recycled water for irrigation and areas that have been re-

landscaped to conserve water.



Credit: UC San Diego EH&S



Community collaborations include the following:

- Water management through campus planning: UC San Diego promotes water conservation by replacing higher water demand landscapes with lower water demand landscapes, and planning projects using drought tolerant vegetation and native plants to aid in water reduction.
- Partnerships with local water agencies: UC San Diego partners with the San Diego County Municipal Water Authority and the City of San Diego Public Utilities Department Long Range Planning and Water Resources Division to expand the campus recycled water system and to collaborate with on campus outreach events.

A photograph of a blue house at night. The house has several windows that are lit from within, casting a warm glow. A large, bright full moon is visible in the dark blue night sky to the right of the house. The house is partially obscured by dark, silhouetted trees in the foreground.

# Storm Water Management

Credit: Erik Jepsen/UC San Diego Creative Services and Publications

[www.ucsd.edu](http://www.ucsd.edu)



Credit: UC San Diego EH&S

UC San Diego does not currently capture and reuse rainwater to offset potable water use. Opportunities to do so will be explored in the future. UC San Diego is collaborating with the City of San Diego on a Storm Water Capture Feasibility Study for the region.

UC San Diego manages storm water in accordance with the following permits: (1) the National Pollutant Discharge Elimination System (NPDES) Phase II Small MS4 General Permit; (2) the NPDES General Permit for Industrial Storm Water Discharges (IGP); (3) the NPDES Wastewater Discharge Permit for seawater and storm water discharges at Scripps Institution of Oceanography (SIO); and (4) the NPDES General Permit for Storm Water Discharges Associated with Construction Activity. All of these permits have been developed and adopted by the California State Water Resources Control Board (SWRCB) and are regulated by the San Diego Regional Water Quality Control Board (RWQCB). Each of these is described below.

### **PHASE II SMALL MS4 GENERAL PERMIT, NON-TRADITIONAL (ORDER NO. 2013-0001-DWQ):**

UC San Diego's implements a comprehensive storm water management program that includes public education/ outreach and participation; illicit discharge detection and elimination; pollution prevention for daily campus operations; construction site storm water runoff control; and post-construction storm water management in new development and re-development.

The Phase II program includes water quality objectives pertaining to campus operations and all construction. In addition, post construction guidelines are required to maintain the quality of storm water emanating from project sites after completion and occupancy. Opportunities for capturing and re-using storm water will be evaluated to meet post construction design requirements.

UC San Diego's Storm Water Management Plan, source control best management practices, and an inventory of the treatment controls that have been installed throughout campus to prevent storm water pollution are included on UC San Diego's Storm Water Management Program web page: <http://stormwater.ucsd.edu>

## INDUSTRIAL GENERAL PERMIT (ORDER NO. 2014-0057-DWQ):

The UC San Diego Nimitz Marine Facility in Point Loma and Fleet Services at the Campus Services Complex on main campus are each regulated by an NPDES industrial storm water permit. Each facility has developed and implements a Storm Water Pollution Prevention Plan (SWPPP) that identifies pollutants of concern associated with activities at that facility and the best management practices (BMPs) that will reduce or eliminate these pollutants from storm water runoff. Source control BMPs that target pollutants of concern are implemented such as good housekeeping, preventive maintenance, spill and leak prevention and response, material handling and waste management, erosion and sediment controls, and employee training. In addition, storm water treatment controls have been installed at both sites that target pollutants of concern. For Fleet

Services, for example, a water polishing treatment system was installed that removes oil and grease, petroleum hydrocarbons, and sediment. At the Nimitz Marine Facility, two modular wetland treatment systems were installed that remove metals, sediment, and oil and grease from runoff.

Storm water management activities include: weekly inspections of outdoor material storage areas and fueling areas; monthly inspections to look for evidence of dry weather flows or other storm water pollutants and to evaluate BMP implementation; and an annual comprehensive evaluation of the SWPPP and BMPs. UC San Diego collects storm water samples from these sites to verify that the source control and treatment control management measures are effective.



### NPDES PERMIT NO. CA0107239:

The western portion of the UC San Diego, SIO campus discharges into a marine area that has been designated by the SWRCB as an “Area of Special Biological Significance.” There are 34 of these special areas along the coastline in California (2 of which are in San Diego). The California Ocean Plan prohibits the discharge of waste into an ASBS. UC San Diego has obtained an Ocean Plan Exception from the SWRCB to discharge return seawater from SIO and storm water into ASBS 31. The Ocean Plan Exception includes conditions to ensure that discharges into the ASBS do not (1) alter “natural water quality,” (2) adversely impact the biological communities, or (3) compromise protection of ocean waters for beneficial uses. These conditions have been incorporated into an NPDES permit developed by the San Diego Regional Water Quality Control Board.

UC San Diego has implemented source control BMPs and installed structural treatment control BMPs to prevent pollutants from reaching the ASBS. For example, four urban runoff media filters have been along the coastline to divert and treat urban runoff before it discharges onto the beach. UC San Diego monitors storm water run-off as well as the receiving water to evaluate the effectiveness of these BMPs.



### CONSTRUCTION STORM WATER PERMIT (ORDER 2009-0009-DWQ, AS AMENDED BY 2010-0014-DWQ AND 2012-0006-DWQ):

Construction projects on campus that disturb one acre or larger are managed in accordance with the Construction Storm water Program Requirements identified in the General Permit including developing and implementing a site specific Storm Water Pollution Prevention Plan (SWPPP) which emphasizes the use of appropriately selected, correctly installed and maintained pollution reduction BMPs that will prevent construction pollutants from contacting storm water and leaving the project site. The SWPPP must:

- A. Identify pollutant sources associated with construction activities that may affect the quality of storm water discharges.
- B. Identify and prevent non-storm water discharges.
- C. Identify, construct, and implement storm water pollution prevention measures (BMPs) to reduce or eliminate pollutants in storm water discharges from the construction site, both during construction and after construction is completed.

Storm water runoff from the construction site is monitored and analyzed based on the calculated risk level of project.

Throughout the construction period, a qualified SWPPP Practitioner (QSP) conducts and documents inspections and evaluations as detailed in the SWPPP, including but not limited to: weekly site inspections, quarterly site inspections, pre-rain event inspections within 24 hours prior to a rain event, post-rain event inspections within 24 hours after a rain event, every 24 hours during an extended rain event (lasting longer than one day), and maintenance inspections.

Opportunities to capture and reuse storm water to off-set potable water use and meet post-construction design requirements will be evaluated for projects subject to the Construction General Permit.



Cover photo credit: UC San Diego EH&S

# Appendix A

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## **University of California Sustainable Practices Policy**



# Sustainable Practices

<b>Responsible Officer:</b>	EVP – Chief Operating Officer
<b>Responsible Office:</b>	ES – Energy & Sustainability
<b>Issuance Date:</b>	7/1/2004
<b>Effective Date:</b>	6/2/2017
<b>Last Review Date:</b>	9/23/2016
<b>Scope:</b>	All Campuses, Medical Centers, and the Lawrence Berkeley National Laboratory

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## TABLE OF CONTENTS

<b>I. POLICY SUMMARY .....</b>	<b>2</b>
<b>II. DEFINITIONS .....</b>	<b>2</b>
<b>III. POLICY TEXT.....</b>	<b>6</b>
A. Green Building Design .....	6
B. Clean Energy .....	7
C. Climate Protection.....	7
D. Sustainable Transportation .....	8
E. Sustainable Building Operations for Campuses.....	9
F. Recycling and Waste Management .....	10
G. Environmentally Preferable Purchasing .....	10
H. Sustainable Foodservices.....	11
I. Sustainable Water Systems.....	12
<b>IV. COMPLIANCE / RESPONSIBILITIES .....</b>	<b>13</b>
<b>V. PROCEDURES .....</b>	<b>14</b>
<b>VI. RELATED INFORMATION .....</b>	<b>30</b>
<b>VII. FREQUENTLY ASKED QUESTIONS .....</b>	<b>30</b>
<b>VIII. REVISION HISTORY .....</b>	<b>30</b>

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## I. POLICY SUMMARY

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The Sustainable Practices Policy (“Policy”) establishes goals in nine areas of sustainable practices: green building, clean energy, transportation, climate protection, sustainable operations, waste reduction and recycling, environmentally preferable purchasing, sustainable foodservice, sustainable water systems.

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## II. DEFINITIONS

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**Adjusted Patient Day:** Inpatient Days x (Gross Patient Revenue/Inpatient Revenue) where Gross Patient Revenue is Outpatient Revenue + Newborn Revenue + Inpatient Revenue.

**Average Vehicle Ridership (AVR):** Calculated by dividing the number of all person trip arrivals by the number of private vehicle trips, with adjustments for telecommuting, compressed work weeks and zero emission vehicles (based on the South Coast Air Quality Management District method).

**Climate Neutrality:** Climate neutrality means that the University will have net zero climate impacts from greenhouse gas (GHG) emissions attributed to scope 1 direct emission sources and scope 2 indirect emission sources as defined by The Climate Registry, and specific scope 3 emissions as defined by the American College and University Presidents’ Climate Commitment (ACUPCC). This neutrality will be achieved by minimizing GHG emissions from these sources as much as possible and using carbon offsets or other measures to mitigate the remaining GHG emissions.

**CBC:** California Building Code, Title 24 portion of the California Code of Regulations

**Domestic Water:** Potable and non-potable water provided for domestic indoor (e.g., toilets, urinals, showers, and faucets) and outdoor (e.g., landscape irrigation) use.

**Environmentally preferable products:** Designation for those products whose manufacture, use, and disposal results in relatively less environmental harm than comparable products.

**Fleet:** University-owned or operated vehicles and mobility equipment (e.g., passenger vehicles, trucks, vans, shuttles, agricultural vehicles, marine equipment, etc.) including vehicles operated under contract with the University **and for which the University/Campus maintains operational control.**

**Gross Square Foot:** Pursuant to the definition in the Facilities Inventory Guide<sup>1</sup>, gross square footage is the Outside Gross Area, or OGSF50, and equals the sum of Basic

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<sup>1</sup> Facilities Inventory Guide, Attachment 8, Appendix C, pages 13-15.

Gross Area (the sum of all areas, finished and unfinished, on all floors of an enclosed structure, for all stories or areas which have floor surfaces) + 50% Covered Unenclosed Gross Area (the sum of all covered or roofed areas of a building located outside of the enclosed structure). OGSF50 is also known as “California Gross.”

**Green Lab Assessment Programs:** A program that works with individual laboratories and researchers to inform, collect best practices, and assess areas for improvement in research efficiency, including engagement, and targeted initiatives around efficiency in natural resources and other environmental issues. This assessment program could be based on the My Green Labs (MGL) Systemwide Checklist or another similar tool. The MGL checklist was developed based on best practices from several UC campuses as well as the expertise of My Green Lab.

**Industrial Water:** Water provided for specific industrial applications such as heating, cooling, or lubricating equipment.

**LEED™:** Leadership in Energy and Environmental Design. LEED is a registered trademark of the U.S. Green Building Council (USGBC). This trademark applies to all occurrences of LEED in this document. LEED is a green building rating system developed and administered by the non-profit U.S. Green Building Council. The four levels of LEED certification, from lowest to highest, are Certified, Silver, Gold, and Platinum. LEED has several rating systems. This Policy refers to the following rating systems:

**LEED for Interior Design and Construction (LEED-ID+C)** for renovation projects;

**LEED for Building Operations and Maintenance (LEED-O+M)** for the ongoing operational and maintenance practices in buildings; and,

**LEED for Building Design and Construction (LEED-BD+C)** for new buildings and major renovations of existing buildings.

**Location:** As used in this Policy, means any or all campuses, medical centers, and the Lawrence Berkeley National Laboratory as referred to in the “Scope” above.

**Low-emissions vehicle (LEV):** As defined by the current California Air Resources Board (CARB) LEV program standards, a vehicle that emits relatively low levels of GHG emissions from the onboard source of power and may include subcategories as defined by CARB.

**Municipal Solid Waste:** Garbage, refuse, sludges, and other discarded solid materials resulting from residential activities, and industrial and commercial operations which are legally accepted in CalRecycle permitted landfills. Municipal Solid Waste does not include any regulated hazardous/universal waste or medical waste.

**Post-Consumer Waste (PCW):** Waste produced by the end-user of a product. Post-consumer waste is differentiated from pre-consumer waste, which refers to waste produced in the manufacture of a product.

**Potable Water:** Water that meets state water quality standards for human consumption.

**Reclaimed or Recycled Water:** Wastewater treated with the intention of reuse, including:

- Direct Potable Reuse: Treated wastewater reused for human consumption.
- Indirect Potable Reuse: Treated wastewater blended with groundwater or other water sources reused as potable or non-potable water.
- Non-Potable Reuse: Treated wastewater reused for purposes other than human consumption, such as irrigation, fire suppression, and industrial processes.

**Renewable power:** Energy generated from inexhaustible sources, such as the sun or wind, or from sources that can quickly be replenished, such as biomass. For the purposes of this Policy, an energy source is renewable if it has been designated as such by the California Energy Commission ([Renewables Portfolio Standard Eligibility](#)).

**Research Group:** When counting the number of laboratories assessed via a green lab assessment program, a laboratory will be counted as a research group rather than by physical rooms. As defined in the Laboratory Hazard Assessment Tool, (LHAT) a group includes the workers that report to one Principal Investigator (PI) or Responsible Person. While some PI's may have multiple groups, one assessment for the purposes of this Policy will include all the people working under one PI or Responsible Person, and all of the rooms they occupy or share, and field sites, if any. Total number of PI's and Responsible People will be tracked according to LHAT or similar tracking method at campuses not using LHAT. LHAT includes research and teaching laboratories.

**Savings by Design:** An energy efficiency program offered by California's four investor-owned utility companies and the Sacramento Municipal Utility District. Savings By Design provides design assistance, energy analysis, life-cycle costing, and financial incentives for new construction and major renovation projects. The Savings By Design program is also known as the Non-Residential New Construction Program.

**Single Pass Cooling:** Single Pass or Once Through cooling systems flow water through a piece of equipment to absorb heat and dispose the water down the drain without recirculation. Replacing and managing these types of systems is a recommended best practice by the International Institute for Sustainable Laboratories (formerly Labs 21), US Office of Energy Efficiency & Renewable Energy, and the EPA. Equipment typically using this type of cooling includes hydraulic equipment, distillation condensers, refrigeration condensers, air compressors, vacuum pumps, electron microscopes, mass spectrometers, lasers, helium recovery, and electro magnets.

**Single-Occupancy Vehicle (SOV):** Vehicle driven by a single driver with no passengers. SOV percentages may separate the percentage of vehicle trips occurring in zero- or low-emission vehicles from carbon-fuel vehicles (e.g., SOV-standard fuel and SOV-alternative fuel).

**Sterilized Water:** Water that has been cleaned to remove, deactivate, or kill microorganisms present that may be harmful to humans; primarily used in medical facilities and research.

**Stormwater:** Water that originates during precipitation events.

**Strategic sourcing:** A process designed to maximize the purchasing power of large, decentralized organizations, such as the University of California, by consolidating and leveraging common purchases.

**Sustainable Water Systems:** Water systems or processes that maximize water use conservation or efficiency, optimize water resource management, protect resources in the context of the local watershed, and enhance economic, social and environmental sustainability while meeting operational objectives.

**TDM:** Transportation Demand Management. TDM is the application of strategies and policies to reduce travel demand (specifically that of single-occupancy private vehicles). TDM programs may include: car sharing (car share), carpools (rideshare), vanpools, bus pools, shuttles, transit, bicycle circulation systems, pedestrian circulation systems, emergency rides home, telecommuting, flexible schedules, parking management (amount, access, fees), etc.

**Vehicle Miles Traveled (VMT):** Number of miles driven by a given vehicle(s) over a given period of time.

**UC Green Laboratories Action Plan:** A document created with the goal of setting campus specific targets; documenting the strengths and areas for improvement within sustainable operations of research laboratories via a gap analysis; and outlining actions that can be implemented to further targets.

**USGBC:** U.S. Green Building Council. The USGBC is a membership-based non-profit organization dedicated to sustainable building design and construction, and is the developer of the LEED building rating system.

**Wastewater:** Water that is discharged from domestic, industrial, or other use.

**Weighted Campus User:**  $(1 \times \text{number of on-campus residents}) + (0.75 \times \text{number of non-residential or commuter full-time students, faculty, and staff members}) + (0.5 \times \text{number of non-residential or commuter part-time students, faculty, and staff members})$  as defined by Association for the Advancement of Sustainability in Higher Education (AASHE). When using Weighted Campus User, state whether fall-quarter/semester headcount, three quarter/two semester average headcount, or another measure was used in the Weighted Campus User calculation. This calculation applies only to campuses and not to medical centers or LBNL.

**Watershed:** In the context of this Policy, a watershed is the area of land that drains to a common waterway, such as a stream, lake, estuary, wetland, aquifer, bay, or ocean.

**Water systems:** Natural and/or human made systems that provide water to and support the functions of watersheds and/or human communities.

**Zero waste:** For the purposes of measuring compliance with UC’s zero waste goal, locations need to meet or exceed 95% diversion of municipal solid waste. Ultimately, UC’s zero waste goal strives for the elimination of all materials sent to the landfill by 2020.

**Zero-emissions vehicle (ZEV):** As defined by the current California Air Resources Board (CARB) ZEV program standards, a vehicle that emits no tailpipe pollutants from the onboard source of power and may include subcategories as defined by CARB.

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### III. POLICY TEXT

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*The University of California (“University”) is committed to responsible stewardship of resources and to demonstrating leadership in sustainable business practices. The University’s locations should be living laboratories for sustainability, contributing to the research and educational mission of the University, consistent with available funding and safe operational practices. Policy goals are presented below in nine areas of sustainable practices.*

#### A. Green Building Design

##### New Buildings

1. All new building projects, other than acute care facilities, shall be designed, constructed, and commissioned to outperform the CBC energy-efficiency standards by at least 20% or meet the whole-building energy performance targets listed in Table 1 of Section V.A.3. The University will strive to design, construct, and commission buildings that outperform CBC energy efficiency standards by 30% or more, or meet the stretch whole-building energy performance targets listed in Table 1 of Section V.A.3, whenever possible within the constraints of program needs and standard budget parameters.
2. Standards for energy efficiency for acute care facilities will be developed in consultation with campuses and medical centers.
3. All new buildings will achieve a USGBC LEED “Silver” certification at a minimum. All new buildings will strive to achieve certification at a USGBC LEED “Gold” rating or higher, whenever possible within the constraints of program needs and standard budget parameters.
4. The University of California will design, construct, and commission new laboratory buildings to achieve a minimum of LEED “Silver” certification as well as meeting at least the prerequisites of the Laboratories for the 21st Century (Labs21) Environmental Performance Criteria (EPC)<sup>2</sup>. Laboratory

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<sup>2</sup> Labs21 is a voluntary partnership program that offers training and resources to support the design and operation of high-performance laboratories. Labs21 is co-sponsored by the Department of Energy and the Environmental Protection Agency. The Labs21 Environmental Performance Criteria (EPC) is a rating system that consists of

spaces in new buildings also shall meet at least the prerequisites of Labs21 EPC. Design, construction, and commissioning processes shall strive to optimize the energy efficiency of systems not addressed by the CBC energy efficiency standards.

5. All new building projects will achieve at least two points within the available credits in LEED-BD+C's Water Efficiency category.

### **Building Renovations**

6. Major Renovations of buildings are defined as projects that require 100% replacement of mechanical, electrical and plumbing systems and replacement of over 50% of all non-shell areas (interior walls, doors, floor coverings and ceiling systems) shall at a minimum comply with III.A.3 or III.A.4, above. Such projects shall outperform CBC Title 24, Part 6, currently in effect, by 20%. This does not apply to acute care facilities.
7. Renovation projects with a project cost of \$5 million or greater (CCCI 5000) that do not constitute a Major Renovation as defined in item III.A.6. shall at a minimum achieve a LEED-ID+C Certified rating and register with the utilities' Savings by Design program, if eligible. This does not apply to acute care facilities.

### **B. Clean Energy**

1. The University will reduce consumption of non-renewable energy by using a portfolio approach that includes a combination of energy efficiency projects, the incorporation of local renewable power measures for existing and new facilities, green power purchases from the electrical grid, and other energy measures with equivalent demonstrable effect on the environment and reduction in fossil fuel usage.
2. The University will provide up to 10 megawatts of on-site renewable power as of 2014.
3. The University will use energy efficiency retrofit projects to reduce system-wide growth-adjusted energy consumption by 10% or more as of 2014 from the year 2000 base consumption level.

### **C. Climate Protection**

Each campus and the UC Office of the President will develop strategies for meeting the following UC goals:

1. Climate neutrality from scope 1 and 2 sources by 2025

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prerequisites and credits in several laboratory-specific areas, including laboratory equipment water use, chemical management, and ventilation. Labs21 EPC is designed as a complement to LEED.

2. Climate neutrality from specific scope 3 sources (as defined by the American College and University Presidents' Climate Commitment (ACUPCC)) by 2050 or sooner

And at minimum, meet the following intermediate goal in pursuit of climate neutrality:

3. Reduce greenhouse gas (GHG) emissions to 1990 levels by 2020, pursuant to the California Global Warming Solutions Act of 2006.

For purposes of this section, campuses shall include their medical centers for all goals. GHG emissions reduction goals pertain to emissions of the six Kyoto greenhouse gasses<sup>3</sup> originating from all scope 1 and scope 2 sources as specified by the Climate Registry, and from scope 3 emissions as specified by the ACUPCC, which include air travel paid for by or through the institution; and commuting to and from campus on a day-to-day basis by students, faculty, and staff. These goals will be pursued while maintaining the research and education mission of the University.

Campuses subject to the United States Environmental Protection Agency (USEPA) Greenhouse Gas Reporting Program, California Air Resources Board (CARB) Mandatory Greenhouse Gas Emissions Reporting, and participation in the CARB Cap-and-Trade Program shall perform to those regulatory requirements.

#### **D. Sustainable Transportation**

The University will implement transportation programs and GHG emission reduction strategies that reduce the environmental impacts from commuting, fleet and business air travel related to achieving the Climate Protection section of this Policy (see Section III.C.).

1. Each location will reduce GHG emissions from its fleet and report annually on its progress. Locations shall implement strategies to reduce fleet emissions and improve fuel efficiency of all university-owned or operated fleet vehicles and equipment where practical options exist through acquisition and fleet operation protocols.
  - A. By 2025, zero emission vehicles or hybrid vehicles shall account for at least 50 percent of all new light-duty vehicle acquisitions.
2. The University recognizes that single-occupant vehicle (SOV) commuting is a primary contributor to commute GHG emissions and localized transportation impacts.

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<sup>3</sup> The six greenhouse gasses identified in the Kyoto Protocol are carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, hydrofluorocarbons, and perfluorocarbons.

- A. By 2025, each location shall strive to reduce its percentage of employees and students commuting by SOV by 10% relative to its 2015 SOV commute rates;
  - B. By 2050, each location shall strive to have no more 40% of its employees and no more than 30% of all employees and students commuting to the location by SOV.
3. Consistent with the State of California goal of increasing alternative fuel – specifically electric – vehicle usage, the University shall promote purchases and support investment in alternative fuel infrastructure at each location.
    - A. By 2025, each location shall strive to have at least 4.5% of commuter vehicles be ZEV.
    - B. By 2050, each location shall strive to have at least 30% of commuter vehicles be ZEV.
  4. Each location will develop a business-case analysis for any proposed parking structures serving University affiliates or visitors to campus to document how a capital investment in parking aligns with each campus' Climate Action Plans and/or sustainable transportation policies.

**E. Sustainable Building Operations for Campuses**

1. Each campus will submit for certification one pilot building at a LEED-O+M “Certified” level or higher.
2. Each campus shall register a master site to certify campus-wide LEED-O+M credits and prerequisites to streamline the certification of multiple buildings through the LEED-O+M rating system by July 1, 2015. Each campus shall certify their campus-wide credits as soon as possible after the master site has been registered.
3. Each campus shall seek to certify as many buildings as possible through the LEED-O+M rating system, within budgetary constraints and eligibility limitations.
4. All locations shall implement an ongoing Green Lab Assessment Program supported by a department on campus to assess operational sustainability of research groups and the laboratories and other research spaces they use by Summer 2018.
  - a. At least one staff or faculty member from the location must have the role of managing the Green Lab Assessment Program.
  - b. Any green lab assessment programs and related efforts will adhere to all relevant UC, state and national policies and laws. Safety will never be compromised to accommodate sustainability goals.

- c. All locations shall submit a UC Green Laboratories Action Plan by Summer 2018.

**F. Recycling and Waste Management**

1. The University prioritizes waste reduction in the following order: reduce, reuse, and then recycle.
2. The University's goal for diverting municipal solid waste from landfills is as follows:
  - 50% as of June 30, 2008
  - 75% as of June 30, 2012
  - Ultimate goal of zero waste by 2020

**G. Environmentally Preferable Purchasing**

1. Environmentally preferable purchasing underlies and enables all other areas of sustainable practice in this Policy. Therefore, the University will maximize its procurement of environmentally preferable products and services.
2. The University will use its purchasing power to target environmentally preferable products and services for volume-discounted pricing to make them cost-competitive with conventional products and services.
3. For products and services without available environmentally preferable alternatives, the University will work with its existing and potential suppliers and leverage the University's purchasing power and market presence to develop sustainable choices.
4. The University will integrate sustainability requirements into its practices for competitive bidding in material and services procurement, allowing for suppliers that meet these requirements to earn additional evaluation points.
5. Packaging for all products procured by the University should be designed, produced, and managed in an environmentally sustainable manner. The University shall seek products that have take-back programs, as appropriate.
6. When requested, suppliers citing environmentally preferable purchasing claims shall provide proper certification or detailed information on environmental claims, including benefits, durability, and take-back, reuse, and recyclable properties. Additionally, suppliers are responsible for providing proof of University of California-accepted third-party certification based upon the requirements of the University's Procurement Services Department located in the Office of the President.
7. The goal of this section G shall be applied within the constraints of research needs and budgetary requirements and in compliance with applicable rules, regulations and laws.

## **H. Sustainable Foodservices**

### **1. Campus and Medical Center Foodservice Operations**

Campuses and Medical Centers shall develop sustainability goals and initiatives in each of the four categories of sustainable foodservice practices listed below.

#### **a. Food Procurement**

Each campus and Medical Center foodservice operation shall strive to procure 20% sustainable food products by the year 2020, while maintaining accessibility and affordability for all students and Medical Center foodservice patrons.

#### **b. Education**

Each campus and Medical Center shall provide patrons with access to educational materials that will help support their food choices.

#### **c. Engagement With External Stakeholders**

Campus and Medical Center departments, organizations, groups, and individuals shall engage in activities with their surrounding communities that support common goals regarding sustainable food systems.

#### **d. Sustainable Operations**

Campus and Medical Center foodservice operations shall strive to earn third-party “green business” certifications for sustainable dining operations.

### **2. Retail Foodservice Operations:**

a. Retail foodservice tenants will strive to meet the policies in III.H.1.a-d. above. Given the constraints faced by nationally-branded franchises that must purchase food through corporate contracts, location departments managing retail foodservice tenants will have the option of meeting III.H.1.a. (procuring 20% of all sustainable food products by the year 2020) by aggregating the purchases of all retail entities under the jurisdiction of a single operational unit on location.

b. Locations will include Section H of this Policy in lease language as new leases and contracts are negotiated or existing leases are renewed. However, locations will also work with tenants to advance sustainable foodservice practices as much as possible within the timeframe of current leases.

## I. Sustainable Water Systems<sup>4</sup>

With the overall intent of achieving sustainable water systems and demonstrating leadership in the area of sustainable water systems, the University has set the following goals applicable to all locations:

1. In line with the Federal Government's Executive Order<sup>5</sup>, locations will reduce growth-adjusted potable water consumption 20% by 2020 and 36% by 2025, when compared to a three-year average baseline of FY2005/06, FY2006/07, and FY2007/08. Locations that achieve this target early are encouraged to set more stringent goals to further reduce potable water consumption. Medical Centers shall also strive to reduce potable water use and will identify a separate reduction target by June 2016. Each Campus shall strive to reduce potable water used for irrigation by converting to recycled water, implementing efficient irrigation systems, drought tolerant planting selections, and/or by removing turf.
2. Each location will develop and maintain a Water Action Plan that identifies long term strategies for achieving sustainable water systems. The next update of the plan shall be completed in December 2016.
  - A. Campuses will include in this update quantification of total square feet of used turf and under-used turf areas on campus as well as a plan for phasing out un-used turf irrigated with potable water.
3. Each Campus shall identify existing single pass cooling systems and constant flow sterilizers and autoclaves in laboratories and develop a plan for replacement.
4. New equipment requiring liquid cooling shall be connected to an existing recirculated building cooling water system, new local chiller vented to building exhaust or outdoors, or to the campus chilled water system through an intervening heat exchange system if available.
  - A. Once through or single pass cooling systems shall not be allowed for soft-plumbed systems using flexible tubing and quick connect fittings for short term research settings.
  - B. If no alternative to single pass cooling exists, water flow must be automated and controlled to avoid water waste.

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<sup>4</sup> Related sections: Green Building Design policy III.A. 5, Green Building Design procedure V.A.4, and Sustainable Purchasing procedures V.G.10.e, V.G.15, V.G.16, and V.G.17.

<sup>5</sup> For more information on this goal, see [Executive Order -- Planning for Federal Sustainability in the Next Decade](#)

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## IV. COMPLIANCE / RESPONSIBILITIES

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### A. Implementation of the Policy

The Executive Vice President-Chief Operating Officer is the Responsible Officer for this Policy. The UC Sustainability Steering Committee, which is chaired by the Executive Vice President-Chief Operating Officer, provides oversight for all aspects of the Policy.

### B. Revisions to the Policy

The President is the approver of this Policy and has the authority to approve or delegate the approval of revisions to the Policy.

The systemwide Working Group corresponding to each section of the Policy recommends Policy revisions to the UC Sustainability Steering Committee and Executive Vice President-Chief Operating Officer. Proposed provisions accepted by the UC Sustainability Steering Committee and the Executive Vice President-Chief Operating Officer shall then be recommended to the President for approval or to the appropriate delegated authority, as stated above.

The Sustainable Practices Policy will be reviewed, at a minimum, once every three years with the intent of developing and strengthening implementation provisions and assessing the influence of the Policy on existing facilities and operations, new capital projects, plant operating costs, fleet and transportation services, and accessibility, mobility, and livability. The University will provide for ongoing active participation of students, faculty, administrators, and external representatives in further development and implementation of this *Policy*.

### C. Compliance with the Policy

Chancellors and the Lawrence Berkeley National Laboratory Director are responsible for implementation of the Policy in the context of individual building projects, facilities operations, etc. An assessment of location achievements with regard to the *Policy* is detailed in an annual report to the Regents. The internal audit department may conduct periodic audits to assess compliance with this Policy. ([Annual Report on Sustainable Practices](#)).

### D. Reporting

On an annual basis, the President will report to the Regents' Committee on Grounds and Buildings on the University's sustainability efforts in each area of the *Policy*.

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## V. PROCEDURES

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### A. Green Building Design

#### New Buildings and Major Renovations

1. Projects will utilize the versions of the CBC energy efficiency standards and of LEED-BD+C that are in effect at the time of first submittal of "Preliminary Plans" (design development drawings and outline specifications) as defined in the *State Administrative Manual*.<sup>6</sup>
2. If eligible, all new buildings and major renovations (as defined in III.A.1) will register with the Savings By Design program in order to document compliance with the requirement to outperform CBC energy efficiency standards by at least 20%.
3. Projects opting to use energy performance targets for compliance with III.A.1 will at a minimum use the whole-building energy performance target listed below that corresponds to the year of the project's budget approval. The whole-building energy performance target is expressed as a percentage of the sum of the Annual Electricity and Annual Thermal targets (converted to kBtu/gsf-yr) published as Table 1, UC Building 1999 Energy Benchmarks by Campus, in Sahai, et al. 2014.<sup>7</sup>

Calendar Years	Compliance Target	Stretch Target
2015-16	65%	50%
2017-18	60%	45%
2019-20	55%	40%
2021-22	50%	35%
2023-24	45%	30%
2025 or after	40%	25%

Locations will demonstrate compliance based on the results of energy modeling that represents a best estimate of as-operated, whole-building energy use, before accounting for on-site energy generation. Targets are intended to be verifiable in actual operation following building occupancy.

Projects are also required to model and report on the following metrics:

- annual electricity consumption (kWh/gsf/yr)

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<sup>6</sup> The [State Administrative Manual](#) (SAM) is a reference source for statewide policies, procedures, regulations and information developed and issued by authoring agencies such as the Governor's Office, Department of General Services (DGS), Department of Finance (DOF), and Department of Personnel Administration.

<sup>7</sup> Sahai, R., Kniazewycz, C., Brown, K, 2014. [Benchmark-based, Whole-Building Energy Performance Targets for UC Buildings](#). University of California Office of the President and California Institute of Energy and Environment.

- annual thermal consumption (therms/gsf/yr)
- peak electricity (W/gsf)
- peak chilled water (tons/kgf) (if applicable)
- peak thermal (therms/hr/kgf)

The following very high-intensity process loads may be subtracted out of the total building energy use intensity if they can be metered separately.

- Clean room
  - Data center
  - Micro-chip fabrication
  - Accelerator (e.g. laser, light source)
  - Bio-safety level III Laboratory
4. Locations are encouraged to coordinate with local water districts in efforts to conserve water and to meet reduced water use goals of the local districts.

### **Privatized Development**

5. All privatized development of New Buildings or Major Renovations on University-owned land, that are constructed in whole or in substantial part for University-related purposes (i.e. in furtherance of the University's mission, both programmatic and auxiliary uses), and build-to-suit projects not on University-owned land constructed for University-related purposes, shall comply with section III.A. of this *Policy*. The provisions of this subsection apply regardless of the business relationship between the parties (i.e., whether a gift, acquisition, ground lease and/or lease).

### **Building Renovations**

6. At budget approval, all renovation projects should include a listing of sustainable measures under consideration.
7. For all improvement projects in spaces leased or licensed by the Regents to be used for University-related purposes for a term of greater than 12 months, locations shall strive to comply with the Policy requirements in III.A.6 and III.A.7, as appropriate.

### **Waiver Conditions Applicable to all Projects**

8. Waivers will only be granted in exceptional circumstances and will not be considered if the project negatively impacts the ability to comply with the goals of this Policy, in particular the goal of achieving carbon neutrality by 2025.
9. Any proposed waiver from section III.A of the Policy may be requested administratively from the UCOP Executive Director of Capital Programs prior to first project approval.

10. New Building and Major Renovation projects applying for an exception from section III.A.3 of this Policy should strive to achieve a USGBC LEED “Certified” rating. New building and renovation projects that are unable to achieve a USGBC LEED “Certified” rating shall submit a request for an exception with a LEED scorecard and supporting documentation to the UCOP Executive Director of Capital Programs, showing the credits that the project would achieve.
11. Such waiver requests shall indicate the applicable section of the Policy and/or Procedures; the proposed solution; and demonstrate equivalency with Policy intent.

### **General/Miscellaneous**

12. The University will develop a program for sharing best practices.
13. The University will incorporate the requirements of sections III.A. and V.A. into existing training programs, with the aim of promoting and maintaining the goals of the Policy.
14. The University planning and design process will include explicit consideration of lifecycle cost along with other factors in the project planning and design process, recognizing the importance of long-term operations and maintenance in the performance of University facilities.
15. The University will work closely with the USGBC, Labs21, the Department of Energy, the U.S. Environmental Protection Agency, state government, and other organizations to facilitate the improvement of evaluation methodologies to address University requirements.

### **B. Clean Energy**

1. Each location will determine the appropriate mix of measures to be adopted within its clean energy portfolio. The capacity to adopt these measures is driven by technological and economic factors and each location will need to reevaluate its mix of energy measures on a regular basis.
2. To achieve its renewable power goal, the University will continuously evaluate energy technology improvements for cost and technical efficiency.
3. The University will develop and implement a strategic plan for implementing energy efficiency projects for existing buildings and infrastructure.
4. The University will research possible funding sources and financing alternatives for energy efficiency, renewable energy, and clean energy projects that will enable locations to most economically address their energy needs consistent with Policy goals.
5. If available, the University will evaluate the marketing of emissions credits as a means to bridge the cost-feasibility gap for renewable power projects.

### C. Climate Protection

1. Each campus will maintain individual membership with The Climate Registry (TCR)<sup>8</sup>. Campuses shall include their medical centers in their membership.
2. Each campus will complete a GHG emissions inventory annually. Campuses shall include their medical centers in the annual inventory. To comply with TCR and American College and University Presidents Climate Commitment (ACUPCC) requirements<sup>9</sup>, inventories should contain emissions of the six Kyoto greenhouse gasses from: scope 1 and 2 emissions sources outlined in the TCR General Reporting Protocol; and scope 3 emissions sources outlined by the ACUPCC Implementation Guide. All UC campuses will report their updated emissions inventories through the ACUPCC on-line reporting tool at least biennially. Campuses must verify all emissions inventories through TCR, but campuses may either pursue verification annually (for the previous year's emissions inventory) or biennially (for the emissions inventories from the previous two years). Campuses subject to the United States Environmental Protection Agency (USEPA) Greenhouse Gas Reporting Program, California Air Resources Board (CARB) Mandatory Greenhouse Gas Emissions Reporting, and participation in the CARB Cap-and-Trade Program shall complete the relevant emissions inventories outlined in the USEPA and CARB reporting protocols.
3. Each campus will complete an update of its climate action plan for reducing GHG emissions to 1990 levels by calendar year 2020 (annual 2020 emissions to be reported in 2021); achieving climate neutrality for scope 1 and 2 sources by calendar year 2025 (annual 2025 emissions reported in 2026); and achieving climate neutrality for ACUPCC-specified scope 3 sources for calendar year 2050 (annual 2050 emissions reported in 2051). Campuses shall include their medical centers in the action plan.
4. The Climate Change Working Group (CCWG), under the UC Sustainability Steering Committee and represented on the President's Global Climate Leadership Council, will monitor progress toward reaching the stated goals for GHG reduction, and will evaluate suggestions for strategies and programs to reach these goals. The CCWG will develop protocols to allow for growth adjustment, normalization of data, and accurate reporting procedures among the UC campuses, as required and applicable.

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<sup>8</sup> [The Climate Registry](#) is a nonprofit collaboration among North American states, provinces, territories and Native Sovereign Nations that sets consistent and transparent standards to calculate, verify and publicly report greenhouse gas emissions into a single registry.

<sup>9</sup> ACUPCC requirements are outlined at [Second Nature: The Presidents' Climate Leadership Commitments](#).

#### **D. Sustainable Transportation**

1. The Sustainable Transportation Working Group, with input from the Climate Change Working Group, will develop normalized data reporting protocols to track progress on the implementation of sustainable transportation programs. Annually, each location will collect and report:
  - a. Fleet efficiency metrics: fleet fuel consumption, total vehicle inventory, and total number and percent of new ZEV fleet acquisitions.
  - b. Commute data: employee and campus-wide mode split, average vehicle ridership (AVR), and percent of commuter alternative fuel vehicles.
  - c. Number and type of alternative fuel infrastructure (e.g. electric vehicle charging stations, natural gas, etc).
2. Due to the unique characteristics of each campus' fleet management protocols, each location shall develop a Fleet Sustainability Implementation Plan by January 1, 2018 to document the infrastructure and financial needs to implement a low-carbon fleet program and lower campus fleet carbon emissions through 2025. Location fleets shall implement practical measures to improve fleet emissions including, but not necessarily limited to, managing vehicle fleet size, eliminating non-essential vehicles, purchasing the cleanest and most efficient vehicles and fuels, and investing in clean shuttle operations.
3. To amplify the impact of campus programs, each location is encouraged to partner with local agencies on opportunities to improve sustainable transportation access to and around university facilities in addition to developing its own transportation programs.
4. Each location shall implement parking management and pricing strategies to support emissions reduction and sustainable transportation goals, including variable pricing and unbundling parking and housing costs.
5. The University will pursue strategic programs and data collection to offset greenhouse gas emissions related to business-related campus air travel.
6. This Policy shall be consulted for all new campus development – including acquisitions and leases – to evaluate how the development or acquisition would meet the transportation policies and goals of the campus and University.
7. Sustainable Transportation Working Group will coordinate the development of a system wide best practices guide for campus units implementing this Policy. Mechanisms for reducing transportation emissions include, but are not limited to:
  - a. Constructing additional on-campus housing (e.g., student housing and temporary housing for new faculty)

- b. Expanding TDM programs: car share, carpool/rideshare, vanpool, shuttles, transit, bicycle circulation system, pedestrian circulation system, emergency rides home, parking management and pricing, employee service and retail amenities, etc.
- c. Expanding intra-campus transportation programs such as shuttles, car share, bike share, bicycle and pedestrian infrastructure, etc.
- d. Encourage opportunities for employees to participate in flexible work schedules and/or telecommuting programs to provide alternative commute flexibility and options.
- e. Replacing fleet vehicles with newer, more fuel-efficient vehicles when ZEV are not available
- f. Rightsizing fleets (determining the appropriate fleet size, revising business practices to reduce need for travel)
- g. Reducing fleet vehicle miles traveled
- h. Increasing use of fuels with lower GHG emissions
- i. Installation of telematics and GPS to measure and help reduce fuel consumption by monitoring and reducing excessive idling and speeding.

**E. Sustainable Building Operations for Campuses**

1. The University will incorporate the Sustainable Building Operations policy requirements into existing facilities-related training programs, with the aim of promoting and maintaining the goals of the Policy.
2. The University will work closely with the USGBC to address the needs and concerns of campuses in the further development of USGBC programs, including the LEED-O+M rating system and the USGBC's "Application Guide for Multiple Buildings and On-Campus Buildings."
3. Locations will use the LEED-O+M certification process to advance the University's educational and research mission by using the buildings as living, learning laboratories.
4. Each location will assess at least three new research groups through their Green Lab Assessment Program by Summer 2018.
5. All locations shall complete a UC Green Laboratories Action Plan by summer 2018 to determine strengths and areas for improvement within the operations of research laboratories in respect to sustainability and carbon neutrality. A standard template for this with required sections will be maintained and updated by the Sustainable Operations Working Group and this plan will be updated on a four-year cycle (2018, 2022, 2026 and so on).

6. Each location will report annually on their Green Labs program progress including the number of researchers directly and indirectly engaged by the program each year.

**F. Recycling and Waste Management**

1. The University will voluntarily comply with Chapter 18.5, the “State Agency Integrated Waste Management Plan,” in California Public Resources Code Section 40196.3.
2. Waste reduction and recycling shall be prioritized in seeking LEED credits for LEED-BD+C, LEED-ID+C, and LEED-O+M projects.
3. The University will seek to research funding sources for financing waste reduction projects.
4. Locations updated their waste diversion plans (formerly called integrated waste management plans) as of 2012 to evaluate their progress towards the 2020 targets, their waste reduction and regional recycling options, campus and medical center specific challenges and articulate their plan to reach the 2020 zero waste target. Campuses with medical centers are to include chapters or otherwise include their medical centers in the waste diversion plan.
5. Exceptions will be considered for entities which represent less than 1% of the overall campus solid waste tonnage.
6. Reduction, reuse, recycling and composting are the primary methods to be counted toward the municipal solid waste diversion from landfill goals. The goal is to strive for the highest form of resource recovery methods and the best use of the materials. The hierarchy for resource recovery is as follows:
  - a. Source reduction: The reduction of waste is the highest form of resource recovery as it eliminates the products from being manufactured or transported in the first place.
  - b. Reuse: Reuse materials in their original form (e.g. use lumber for lumber, mugs instead of single use cups, reuse course readers in subsequent classes. These methods maintain the embodied energy in each material.)
  - c. Composting and recycling: Composting is the recycling of organics such as animal waste, bedding, greenwaste and foodwaste into compost and mulch. Recycling refers to the conversion of waste into basic materials so they can be made back into new products.
  - d. The methods of reusing and recycling waste vary and will evolve over time as technologies improve. The Solid Waste and Recycling Working Group – comprising waste and recycling professionals from each location – will continue to evaluate recycling methods and recommend their appropriateness for counting toward diversion goals.

## **G. Environmentally Preferable Purchasing (EPP)**

### **Sustainable Economy**

1. The University seeks to compare the total cost of ownership when evaluating the cost of goods and services for the selection of suppliers. The total cost of ownership includes the initial purchase price and all other initial costs, including installation, freight, taxes and fees where applicable, operating cost, maintenance cost, warranty cost, collection, and end-of-life disposal or recycling costs.
2. “Cradle to cradle” is the University’s preferred purchasing standard. It is defined as accountable, responsible, and environmentally preferable supply chain management from material extraction, production, marketing, sale, use, disposal, collection, re-use and the web of closed loop cycles and processes.
3. The University will complete the transition of all locations toward electronic and paperless e-procurement systems, and will use web-based catalogs, punch-out, and other electronic programs.
4. The University will incorporate the credit requirements set forth by LEED-BD+C, LEED-ID+C, and LEED-O+M into product and service sourcing and procurement when applicable.
5. The University will use its purchasing power and prominence to advance the development of sustainable technologies and products by pressing markets to continually lower resource use in the manufacturing and distribution processes and increase productivity of their plants, warehouses, and distribution methods.
6. Each Commodity Team working on a specific RFI, RFQ, or RFP for products will determine the appropriate sustainability requirements to be included in these documents. Additionally, the Commodity Team will decide if and how many Quality Points utilized in the Total Cost per Quality Point bid evaluation methodology will be allocated to sustainability requirements.

### **Sustainability and the Supply Chain**

7. The University will require all strategically sourced suppliers to present their organization’s continuous improvement with the development of sustainable products and operational practices in the Procurement Services/Strategic Sourcing Quarterly Business Reviews.
8. The University will require all strategically sourced suppliers, and eventually all suppliers, to report annually on the qualitative aspects of their business operations and to report quarterly on the sales of products, which will result in the quantitative measurement of their EPP business with UC.
9. When requested, suppliers citing EPP claims shall provide proper certification or detailed information on environmental claims, including benefits, durability, and recyclability properties.

10. The University will recognize recycled content and the following third-party certifications and ratings for the purpose of calculating the percentage of sustainable products that the University purchases:
  - a. ENERGY STAR<sup>®</sup> - Energy Star is a standard for energy efficient consumer products administered by the U.S. Environmental Protection Agency and the U.S. Department of Energy.
  - b. EPEAT<sup>®</sup> - The Electronic Product Environmental Assessment Tool is a method for consumers to evaluate the effect of a product on the environment. It ranks products as gold, silver or bronze based on a set of environmental performance criteria. It is managed by the Green Electronics Council.
  - c. GREENGUARD<sup>®</sup> - The GREENGUARD Environmental Institute certifies products and materials for low chemical emissions.
  - d. Green Seal<sup>®</sup> - A Green Seal Certification Mark on a product means that it has gone through a stringent process to show that it has less impact on the environment and human health.
  - e. WaterSense<sup>®</sup> - WaterSense is a U.S. Environmental Protection Agency program designed to encourage water efficiency in the United States through the use of a special label on consumer products.
11. Standards for packaging materials and their appropriate reuse or disposal will be outlined in all RFIs, RFQs, and RFPs requiring potential bidders to document their standards and practices for packaging materials, including materials contained in the boxes of shipped products to protect goods, as well as the boxes and cartons themselves. Suppliers who have reusable tote programs should make these programs available to the University.
12. The University will specify that all packing materials abide by at least one, and preferably all, of the criteria listed below:
  - a. Made from 100% post-consumer recycled materials and be recyclable or reusable
  - b. Non-toxic
  - c. Biodegradable
  - d. Produced with the minimum amount of resources and sized as small as possible, while still maintaining product protection during shipping; where feasible, packaging materials should be eliminated.
13. The University will use established programs or work with its suppliers to establish end-of-life reuse, recycling, or “take-back” programs at no extra cost to the University, and in compliance with federal, state, and local laws, and University environmental standards regarding waste disposal. The University

may use other disposition methods, consistent with University Policy BUS-38, Disposition of Excess Property and Transfer of University-Owned Property<sup>10</sup>, or other appropriate University policies. When documentation is required to comply with federal, state, and local laws or University policy, this shall be incorporated into the end-of-life program.

14. In the case of usable products for which there is neither a need to redeploy on the location, nor a supplier take-back program, the University will use other disposal methods, including sale through the Excess and Salvage units, donation (if allowed under BUS-38, Disposition of Excess Material and Transfer of University-owned Material), or existing location-designated programs.

### **Energy and Water**

15. For product categories where ENERGY STAR<sup>®</sup>-rated or WaterSense<sup>®</sup> certified products are available, the University will focus its procurement efforts only on products with an ENERGY STAR<sup>®</sup> rating or WaterSense<sup>®</sup> certification, consistent with the needs of University researchers, faculty, and staff.
16. The University will use its Strategic Sourcing Program to negotiate better pricing and inclusion in the University's market basket for products that are certified through the US EPA's ENERGY STAR<sup>®</sup> and WaterSense<sup>®</sup> programs.
17. The University will engage with the ENERGY STAR<sup>®</sup> and WaterSense<sup>®</sup> programs to continually press the market for greater energy and water efficiency for the products and services regularly purchased by the University.
18. For all electronic equipment, the supplier will deliver the items to the University with energy efficiency and conservation features enabled and locations will work to ensure that features remain enabled.

### **Paper**

19. The University will phase out the use of virgin paper and adopt a minimum standard of 30% Post-Consumer Waste (PCW) recycled content paper to be used in all office equipment (e.g., multi-function devices, copiers, printers, and fax machines).
20. University Procurement Services will use its Strategic Sourcing Program to negotiate better pricing for commodities with recycled content compared to commodities without recycled content, where such opportunities exist.
21. Through the Strategic Sourcing Program, University Procurement Services will develop language and specifications for RFIs, RFQs, and RFPs stating that recycled content product offerings be required where they exist.

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<sup>10</sup> [Presidential Policies](#)

22. Suppliers are discouraged from bringing hard copies of presentations to Quarterly Business Reviews. Suppliers are encouraged to present all information in electronic format that is easily transferable to University staff.
23. Suppliers and consultants are encouraged to print RFIs, RFQs, RFPs, Price Schedule Agreements, and required reports on a minimum of 30% PCW recycled content paper, using narrow margins and both sides of the page. These documents shall be clearly marked to indicate that they are printed on recycled content paper.

### **Electronics Equipment**

24. All desktop computers, laptops, and computer monitors purchased by the University are required to have achieved a minimum Bronze-level registration or higher under the Electronic Products Environmental Assessment Tool (EPEAT<sup>®</sup>), where applicable.
25. Preference will be given for electronics products that have achieved EPEAT<sup>®</sup> Silver or EPEAT<sup>®</sup> Gold registration. The registration criteria and a list of all registered equipment are provided at [EPEAT](#).
26. All recyclers of the University's electronic equipment must be e-Steward certified by the Basel Action Network (BAN) ([www.ban.org](http://www.ban.org)). In cases where the University has established take-back programs with a manufacturer, the University will encourage the manufacturer to become a BAN-certified e-Steward Enterprise ([e-Stewards for Enterprises](#))

## **H. Sustainable Foodservices**

### **Campuses and Medical Centers**

1. Campus and Medical Center foodservice operations subject to this Policy shall include both self-operated and contract-operated foodservices.
2. In the context of this Policy, sustainable food is defined as food and beverage purchases that meet one or more of the criteria listed below, which are reviewed annually by the UC Sustainable Foodservices Working Group (under the UC Sustainability Steering Committee).
  - i. Locally Grown<sup>11</sup>
  - ii. Locally Raised, Handled, and Distributed
  - iii. Fair Trade Certified<sup>12</sup>

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<sup>11</sup> Resulting from regional constraints, campus definitions of "Locally Grown" and "Locally Raised, Handled, and Distributed" may vary; however, "Locally Grown" and "Locally Raised, Handled, and Distributed" distances shall not exceed 500 miles.

<sup>12</sup> Fair Trade Certified products must be third party certified by one of the following: IMO Fair For Life,

**University of California Policy**  
**Sustainable Practices**

- iv. Domestic Fair Trade Certified
  - v. Shade-Grown or Bird Friendly Coffee
  - vi. Rainforest Alliance Certified
  - vii. Food Alliance Certified
  - viii. USDA Organic
  - ix. AGA Grassfed
    - x. Grass-finished/100% Grassfed
  - xi. Certified Humane Raised & Handled
  - xii. American Humane Certified
  - xiii. Animal Welfare Approved
  - xiv. Global Animal Partnership (steps III, IV, V)
    - xv. Cage-free
    - xvi. Protected Harvest Certified
  - xvii. Marine Stewardship Council
  - xviii. Seafood Watch Guide “Best Choices” or “Good Alternatives”
  - xix. Farm/business is a cooperative or has profit sharing with all employees
  - xx. Farm/business social responsibility policy includes (1) union or prevailing wages, (2) transportation and/or housing support, and (3) health care benefits
  - xxi. Other practices or certified processes as determined by the location and brought to the Sustainable Foodservices Working Group for review and possible addition in future Policy updates.
3. With the goal of achieving 20% sustainable food purchases, all Food Service Operations should track and report annually the percentage of total annual food budget spent on sustainable food.
  4. If cost effective, each campus and Medical Center will certify one facility through a third-party green business certification program through one of the following: (1) city or county’s “green business” program, (2) Green Seal’s Restaurants and Food Services Operations certification program, or (3) the Green Restaurant Association certification program.
  5. Campuses, Medical Centers, and retail foodservice operations will provide an annual progress report on these goals. Annual reports should include the

- individual campus and Medical Center's goals as well as the progress and timelines for the programs being implemented to reach those goals.
6. Campuses and Medical Centers are encouraged to form a campus-level foodservices sustainability working group to facilitate the campus goal setting and implementation process.
  7. The stakeholders who are involved with the implementation of the Sustainable Foodservice section of this Policy will participate in a system-wide working group to meet, network and to discuss their goals, best practices, and impediments to implementation.
  8. Campuses and Medical Centers are encouraged to implement training programs for all foodservice staff on sustainable foodservice operations, as well as, where applicable, on sustainable food products being served to patrons, so that staff can effectively communicate with the patrons about the sustainable food options.
  9. Campuses and Medical Centers are encouraged to participate in intercollegiate and national programs that raise awareness on dietary health, wellness and sustainability (e.g. the MyPyramid.gov Corporate Challenge and the Real Food Challenge).
  10. Campuses and Medical Centers are encouraged to develop health and wellness standards for food service operators, including eliminating the use of trans-fat oils or products made with trans-fat.
  11. Campuses and Medical Centers are encouraged to undertake additional initiatives that encourage healthy and sustainable food services operations. Examples include tray-less dining, beef-less or meat-less days, and preservative minimization programs.

## **I. Sustainable Water Systems**

### **Reporting Methods**

1. Explicitly identify the geographic and operational areas comprising the scope of location water usage (e.g., the campus as defined by its Long Range Development Plan boundary, excluding third-party operated facilities).
2. Locations with medical centers may choose to report medical center data and progress toward the target separately from the main campus.
3. All locations shall report water usage in a tabular format using the following methods:
  - a. Measure per capita water consumption by Weighted Campus User (WCU) for main campuses and Adjusted Patient Day (APD) for medical centers. If necessary, WCU and APD may be combined using the following calculation:  $[(APD/360) * 1.5] + WCU$ ;

- b. Potable water usage for a baseline period that is three consecutive fiscal years including FY 2005/06, 2006/07, and FY 2007/08:
  - i. Total location potable water usage, in gallons, for each of the three years comprising the baseline period,
  - ii. WCU, or APD, for each of the three years comprising the baseline period,
  - iii. Baseline Potable Water Usage: calculate the baseline metric as follows: Step 1: Divide each year's total water use in gallons by that year's WCU or APD population. Step 2: Average the three gallons/population calculations to derive the Baseline Potable Water Usage for the location,
  - iv. Multiply the Baseline Potable Water Usage figure by 0.64 to derive the location's 2025 Potable Water Usage Target, and
  - v. Unless impracticable, provide average gallons of potable water usage per baseline year per gross square foot of location built space for which potable water consumption is being reported, mirroring (c) above;
- c. Potable water usage for the most recent fiscal year<sup>13</sup>:
  - i. If using only the most recent fiscal year, and not an average, list in the table the following:
    - 1. Total location potable water usage, in gallons, for the most recent fiscal year,
    - 2. WCU or APD for the most recent fiscal year,
    - 3. Divide the gallons by the WCU or APD to derive the Current Potable Water Usage, and
  - ii. If feasible, provide average gallons of potable water usage per gross square feet for either the three most current fiscal years, if that is the method adopted, or for the single most current fiscal year, again using the methodology described above;
- d. Total location non-potable water usage, in gallons, for the most recent fiscal year.
- e. Report, or estimate if metered data is not available, water usage in the following use categories at a minimum: buildings, landscape, and central plant including cooling towers, identifying the quantities of potable and non-potable used for these purposes.

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<sup>13</sup> An average of the three most current fiscal years is allowed but not required.

### Reporting Schedule

4. Each location prepared a Water Action Plan as specified below and submitted it to the Office of the President by December 2013.
5. Beginning the following year, each location will provide an annual progress report on implementing its Water Action Plan to include progress on its water usage reduction.

### Water Action Plans

6. Each Water Action Plan and the water conservation and water efficiency strategies it contains will take into account relevant regional conditions and regulatory requirements, will recognize historical progress, and will acknowledge current location best practices being implemented.
7. Each Water Action Plan will include a section on Water Usage and Reduction Strategies that:
  - a. Describes the applicable types of water comprising water systems, including but not limited to potable water, non-potable water, industrial water, sterilized water, reclaimed water, stormwater, and wastewater;
  - b. Reports water usage in accordance with the methods set forth in these procedures;
  - c. Considers setting more stringent potable water reduction goals if the location has already achieved a 36% below baseline reduction in per capital potable water consumption;
  - d. Outlines location-specific strategies for achieving the target for reduced potable water consumption;
  - e. Encourages implementation of innovative water-efficient technologies as part of capital projects and renovations (e.g., installation of WaterSense certified fixtures and appliances, graywater reuse, rainwater harvesting, and watershed restoration);
  - f. Addresses use of non-potable water sources, and how those sources factor into overall sustainable water systems strategy;
  - g. Analyzes the identified water use reduction strategies using a full cost approach by considering:
    - i. Projected costs and savings of the identified water use strategies,
    - ii. Indirect costs and savings associated with reduced energy consumption due to the energy use embodied in water use,
    - iii. Savings associated with reduced or avoided infrastructure costs, and
    - iv. Other avoided costs; and



- b. A description and plan to reduce irrigation with potable water.

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## VI. RELATED INFORMATION

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- [UC Sustainability Website](#)
- Annual progress reports to The Regents: [Annual Report on Sustainable Practices](#)
- UC Code of Conduct for Trademark Licensees: [Trademark Licensing Code of Conduct](#)

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## VII. FREQUENTLY ASKED QUESTIONS

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Not applicable.

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## VIII. REVISION HISTORY

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### **June 2017:**

Policy remediated for accessibility according to Web Content Accessibility Guidelines (WCAG) 2.0

Policy revised to reflect the University Carbon Neutrality Initiative, adding definitions of green lab assessment programs, “research group” as defined by the Laboratory Hazard Assessment Tool (LHAT), and the inclusion of the UC Green Laboratories Action Plan. Changes were also made to the sections for Sustainable Building Operations for Campuses.

### **June 2016:**

Policy revised to update the following sections with new goals and clarifying language: definitions, green building design, sustainable transportation, and sustainable water systems.

### **June 2015:**

Policy revised to update the following sections: sustainable building operations, sustainable foodservices practices, green building design, and clean energy.

### **July 2011:**

Policy revised to update the following sections: green building design, climate protection practices, sustainable operations, environmentally preferable purchasing, and sustainable foodservice practices.

### **September 2009:**

Policy expanded to include sustainable foodservice

**University of California Policy**  
**Sustainable Practices**

**March 2007:**

Policy expanded to include sustainable operations, waste reduction, and environmentally preferable purchasing; renovations guidelines added to green building section, climate protection section refined

**January 2006:**

Policy expanded to include transportation and climate protection

**June 2004:**

President formally issued the “Presidential Policy on Green Building Design and Clean Energy Standards.” This Policy was subsequently renamed the Policy on Sustainable Practices

**July 2003:**

The Regents approved sustainability policy principles ([UCOP Sustainability](#))

# Appendix B

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## **Water Use Graphs**

# General Water Usage

## General Water Usage

The following charts display the breakdown of potable water use by end category for the fiscal years 2009/10 through 2016/17.

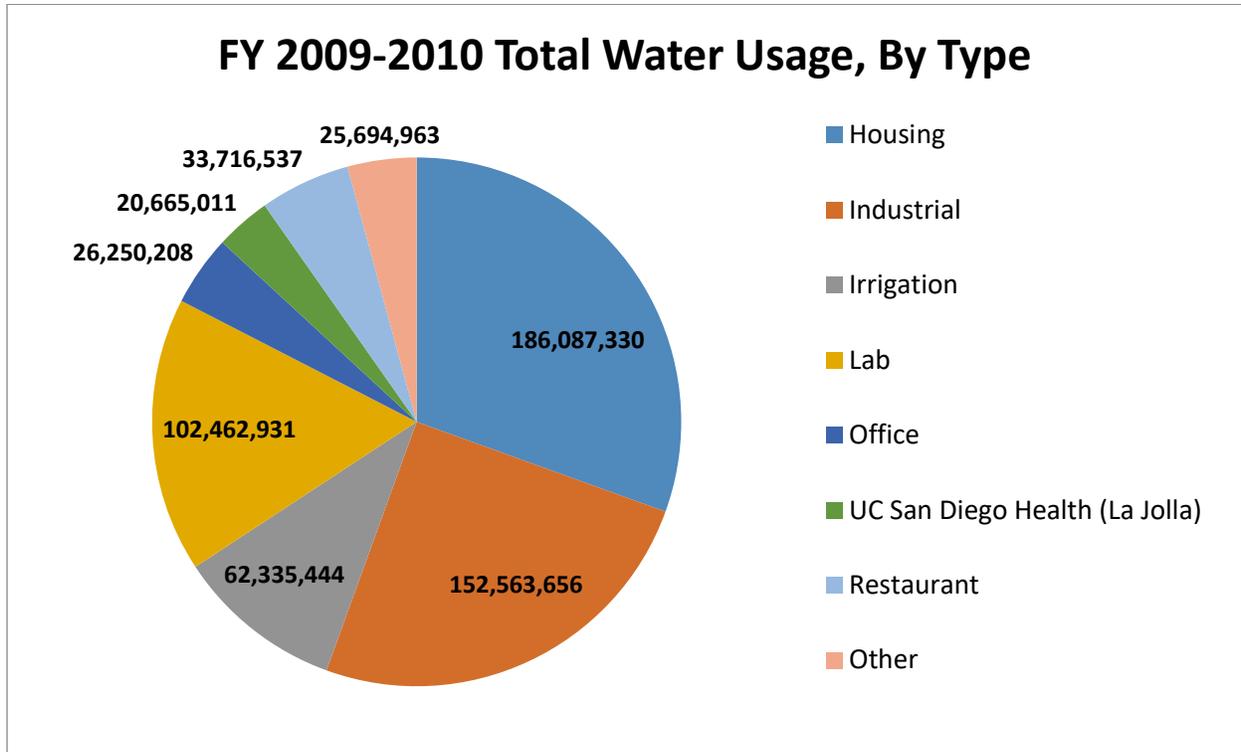


Figure 1: 2009-2010 Water Usage Breakdown for UC San Diego

## FY 2010-2011 Total Water Usage, By Type

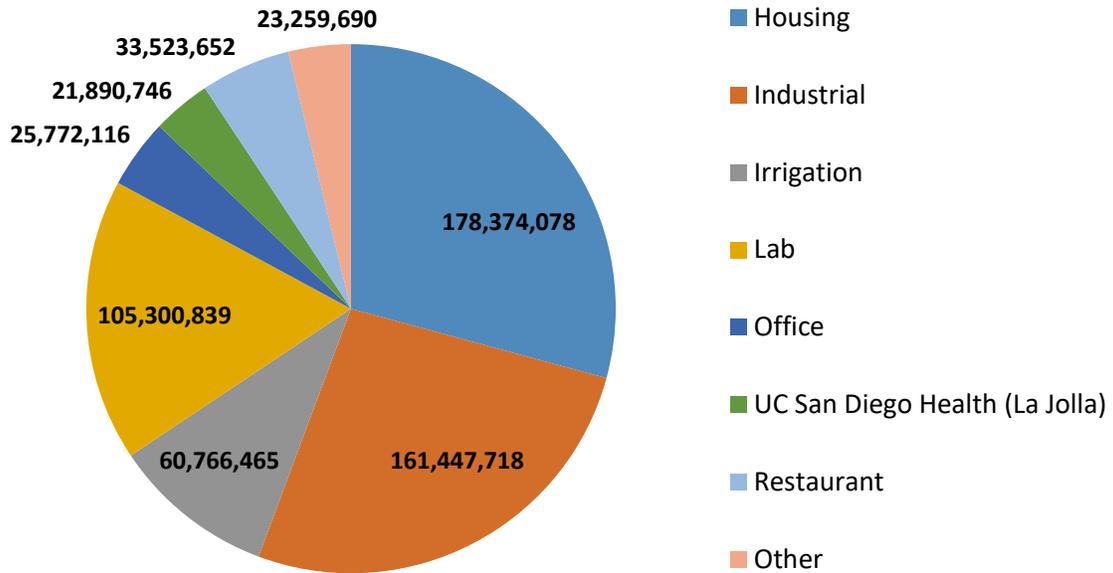


Figure 2: 2010-2011 Water Usage Breakdown for UC San Diego

## FY 2011-2012 Total Water Usage, By Type

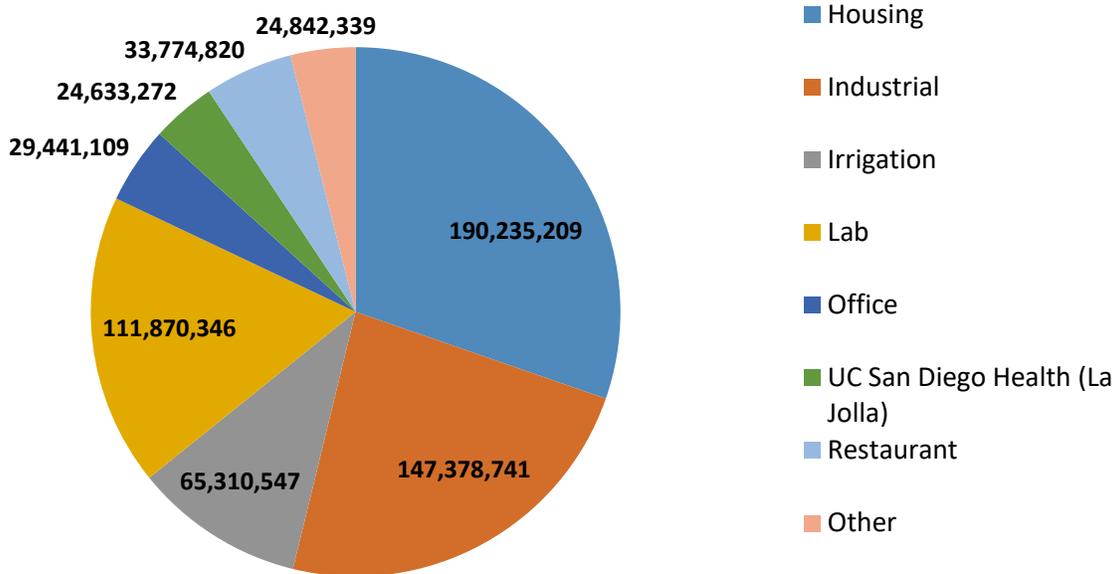


Figure 3: 2011-2012 Water Usage Breakdown for UC San Diego

### FY 2012-2013 Total Water Usage, By Type

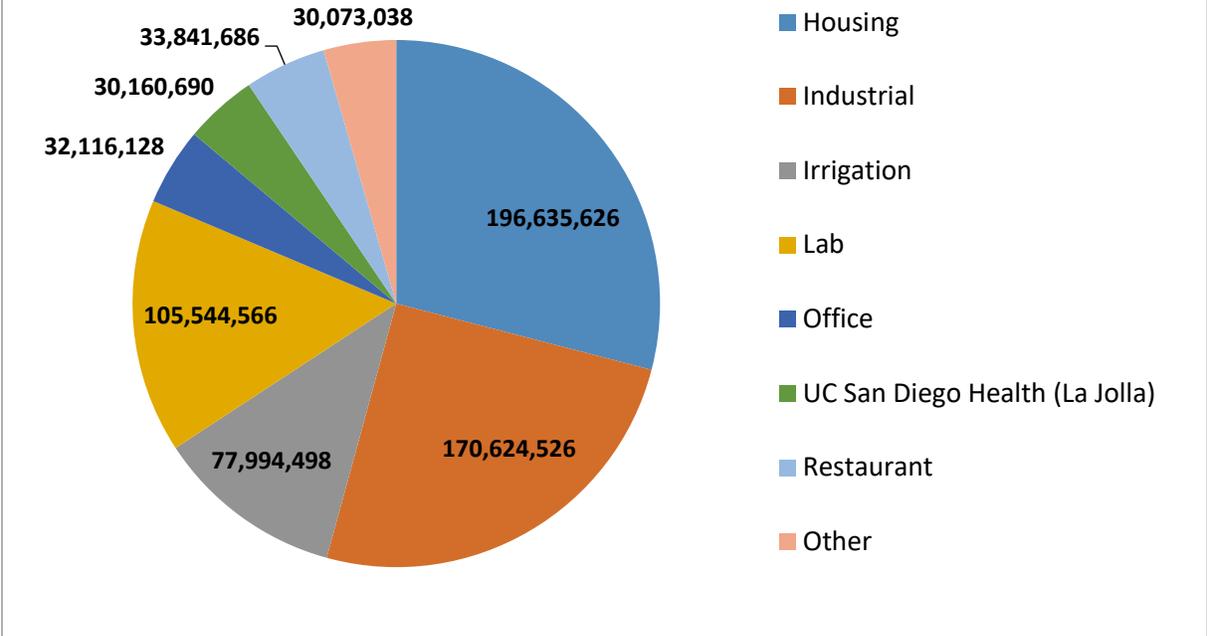


Figure 4: 2012-2013 Water Usage Breakdown for UC San Diego

### FY 2013-2014 Total Water Usage, By Type

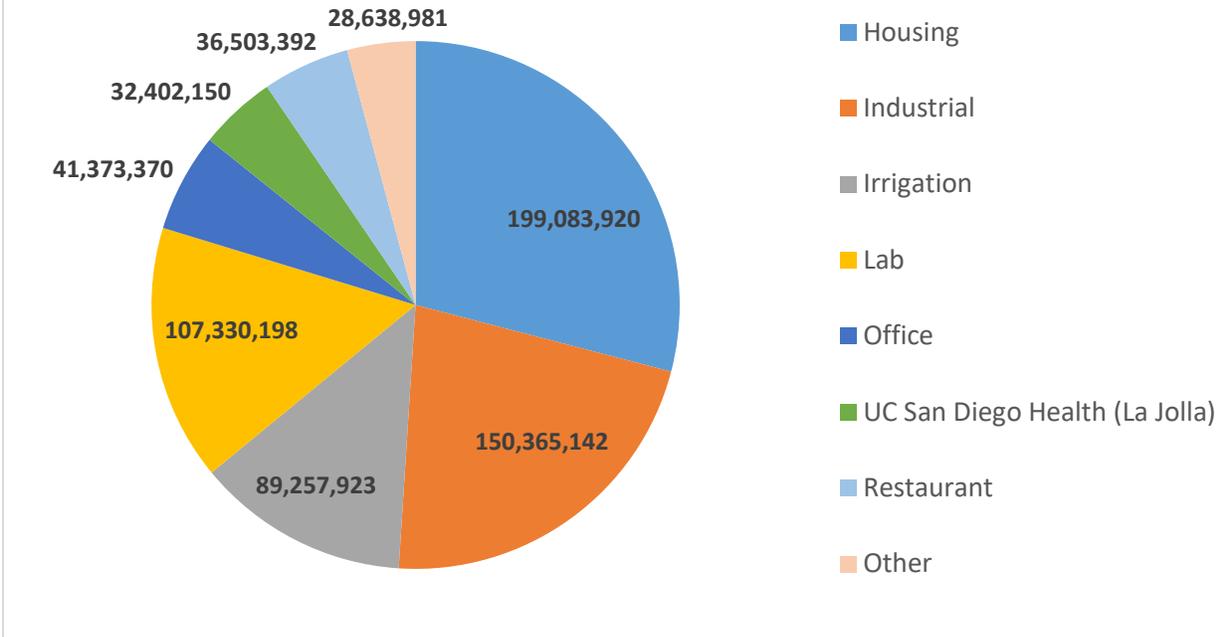


Figure 5: 2013-2014 Water Usage Breakdown for UC San Diego

## FY 2014-2015 Total Water Usage, By Type

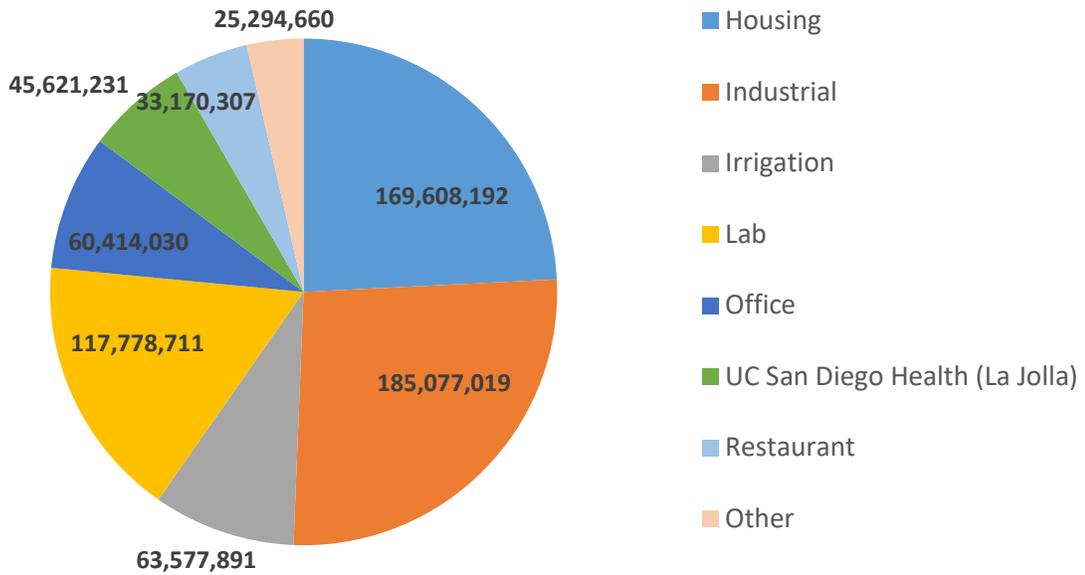


Figure 6: 2014-2015 Water Usage Breakdown for UC San Diego

## FY 2015-2016 Total Water Usage, By Type

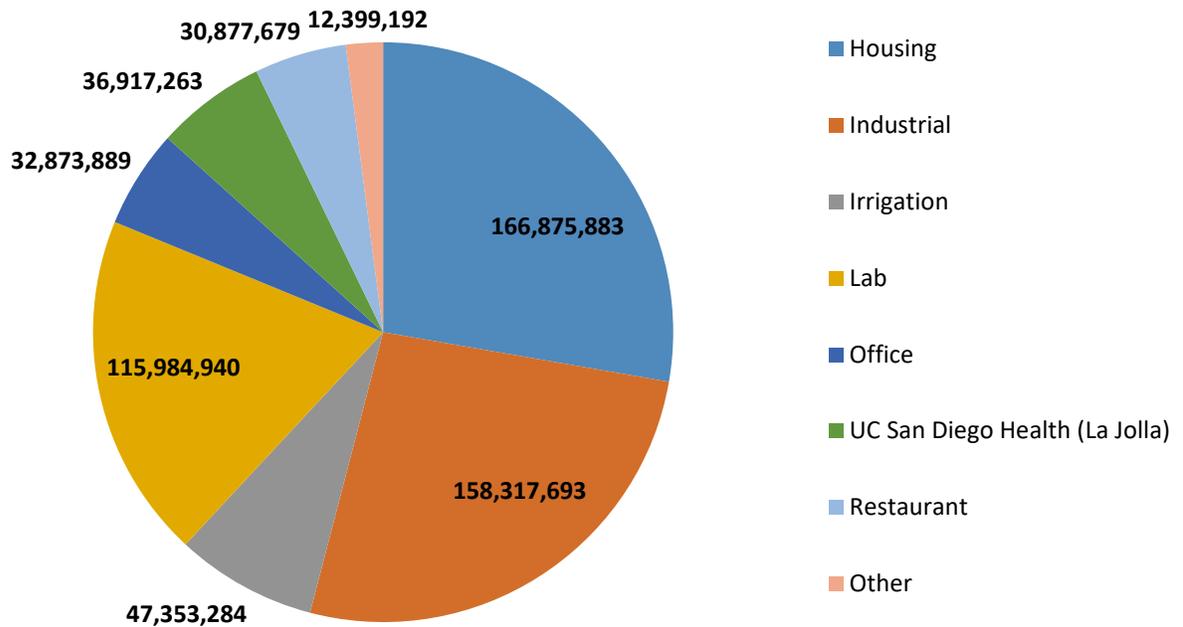


Figure 7: 2015-2016 Water Usage Breakdown for UC San Diego

## FY 2016-2017 Total Water Usage, By Type

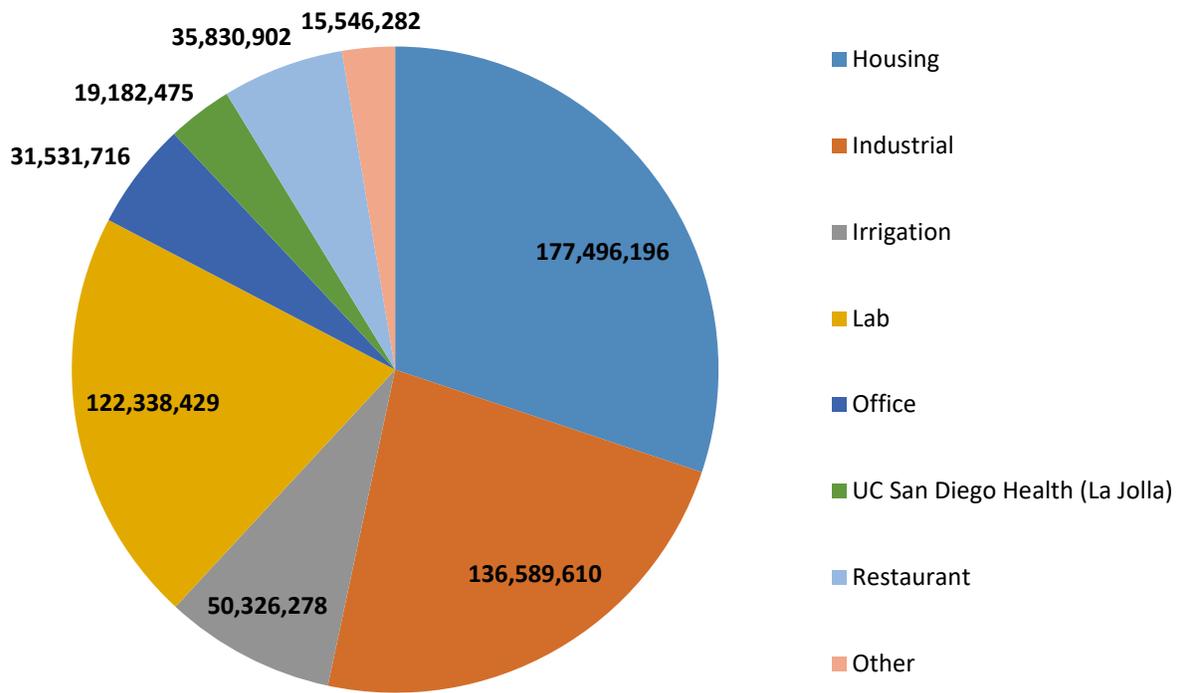


Figure 8: 2016-2017 Water Usage Breakdown for UC San Diego

# Appendix C

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## **Water Savings Project List**

## Water Saving Project List

\*Cost: Low = <\$100,000; Medium = \$100,000 - \$1,000,000; High = >\$1,000,000

\*\*Water: Low = <10,000 gallons/year; Medium = 10,000 - 1,000,000 gallons/year; High = >1,000,000 gallons/year

\*\*\*Savings: Low = <\$3,333.33/year; Medium = \$3,333.33 - \$33,333.33/year; High = >\$33,333.33/year

\*\*\*\*Indirect Energy Savings: Low = <1,300 kWh; Medium = 1,300 - 13,000 kWh; High = >13,000 kWh

Project Title	Location	Lead	Lead Person	Project Cost (\$)*	Water Savings (gallons/yr)**	Water Savings (\$)¹****	Indirect Energy Savings (kWh)²****	Project Start Date	Project Completion Date	Notes
In Progress										
Capture condensate from air handlers and RO waste at Bonner, Mayer, York, Urey, and Galbraith Halls. Use mixed condensate & RO waste for irrigation.	Main Campus	FM	Ashkan Mozaffarian	Est. \$559,000	4,500,000	\$45,000	49,950	2018	2020	Portions of this project will be funded with Prop. 84 Grant funding
Extension of Recycled Water on Main Campus to Irrigation	Main Campus	CPM	Laura Moore	\$4,500,000	20,000,000	\$200,000	260,000	Jul-15	Nov-18	Extend 12" reclaimed water line main from SOM and connect to existing RCW main at Voigt Drive & Gilman Drive. campus for use in irrigation. Currently in design. Project expected to be completed by end of 2016.
State funded Turf Replacement and irrigation retrofit Projects	Main Campus	CPM	Ross Kunishige	\$900,000	Medium	Medium	Medium	Jul-17	Sep-18	Removal of existing turf and replacement with drought tolerant and low maintenance landscaping in 5 areas on campus. In addition, this project includes irrigation controller retrofits throughout the campus.
State funded Revelle Storm Water Project	Main Campus	CPM	Ross Kunishige	\$2,000,000	Low	Low	Low	Jul-17	Dec-18	Removal of existing turf and replacement with drought tolerant and low maintenance landscaping that serves as a storm water treatment system.
Campus Irrigation Retrofits and Scheduling / Monitoring Changes	Main Campus	FM	Chuck Morgan & Greg Snelling	High	7,000,000	\$70,000	77,700	Dec-14	Ongoing	The campus has replaced approximately 6,650 irrigation heads to water efficient, low volume irrigation heads that will save 7.2 million gallons of potable water a year (a 8% reduction in irrigation water use). The Campus has stopped watering 54,000 square feet of turf to save 1.53 million gallons of water per year. Irrigation on the Campus was shut off from December 2014 through January 2015 to save water.

## Water Saving Project List

\*Cost: Low = <\$100,000; Medium = \$100,000 - \$1,000,000; High = >\$1,000,000

\*\*Water: Low = <10,000 gallons/year; Medium = 10,000 - 1,000,000 gallons/year; High = >1,000,000 gallons/year

\*\*\*Savings: Low = <\$3,333.33/year; Medium = \$3,333.33 - \$33,333.33/year; High = >\$33,333.33/year

\*\*\*\*Indirect Energy Savings: Low = <1,300 kWh; Medium = 1,300 - 13,000 kWh; High = >13,000 kWh

Project Title	Location	Lead	Lead Person	Project Cost (\$)*	Water Savings (gallons/yr)**	Water Savings (\$)¹****	Indirect Energy Savings (kWh)²****	Project Start Date	Project Completion Date	Notes
Meter Installations	Campus Wide	FM	John Dilliot	\$1,150,000	Low	Low	Low	Jul-15	Ongoing	144 water meter replacements have been completed. Currently have 494 meters. Installation of metering throughout the campus in order to automate readings and have real-time remote monitoring of water consumption. * Estimates of water leakage in typical municipal systems is as high as 25%.
Turf Removal at 6th & Marshall Colleges, Mesa Housing, and Coast Apartments (4.01 acres)	Campus	HDH & FM	Steve Horner	\$17,000	750,555	\$7,506	8,331	Jan-13	Jan-19	Work ongoing to redevelop to low water landscape. 6th, Marshall, and Coast Apartments have been completed. Mesa is a WIP as construction continues.
Installing low flow lavatory aerators	Campus	FM	Richard Cota	Low	Low	Low	Low	Jul-05	Ongoing	Install lower flow aerators as faucets are replaced or renovations are performed in labs and restrooms.
Installing low flow laboratory aerators	Campus	EH&S	Valerie Fanning	\$1,862	2,218,000	\$22,180	7,665	Jul-05	Ongoing	476 aerators installed in Pac Hall, Muir Biology, Bonner Hall, NSB, Urey Hall, York Hall, CMME, CMMW, and Leichtag.
At the Medical Center, changing irrigation from every day to every other day	Medical Center	TFE	Mike Dayton	None	Low	Low	Low	Apr-15	Ongoing	Ongoing
Repairing leaks at the medical center	Medical Center	TFE	Mike Dayton	Medium-High	Low	Low	Low	Jul-05	Ongoing	Ongoing

Completed

## Water Saving Project List

\*Cost: Low = <\$100,000; Medium = \$100,000 - \$1,000,000; High = >\$1,000,000

\*\*Water: Low = <10,000 gallons/year; Medium = 10,000 - 1,000,000 gallons/year; High = >1,000,000 gallons/year

\*\*\*Savings: Low = <\$3,333.33/year; Medium = \$3,333.33 - \$33,333.33/year; High = >\$33,333.33/year

\*\*\*\*Indirect Energy Savings: Low = <1,300 kWh; Medium = 1,300 - 13,000 kWh; High = >13,000 kWh

Project Title	Location	Lead	Lead Person	Project Cost (\$)*	Water Savings (gallons/yr)**	Water Savings (\$)¹***	Indirect Energy Savings (kWh)²****	Project Start Date	Project Completion Date	Notes
Extension of Recycled Water on Main Campus to Central Utilities Plant	Main Campus Central Utilities Plant (CUP)	CPM	Laura Moore	\$6,000,000	100,000,000	\$1,000,000	1,300,000	Apr-15	Feb-16	Extend 12" reclaimed water main line across campus to CUP for use in cooling towers. Provide RCW source for existing irrigation systems nearby. Retrofit CUP to use reclaimed water. Project is saving more than 60 million gallons of potable water per year.
At medical center, converting to recycled water in cooling towers in June 2014	Medical Center	TFE	Mike Dayton	Medium	46,633,315	\$466,333	1,906,233	Dec-15	Jun-16	Project completed. The cooling towers are using 80% recycled water and 20% potable water.
Consolidating existing animal cage wash services	Cage Wash	OAR	Keith Jenne	\$15,000,000	18,000,000	\$180,000	High	Jun-15	Dec-16	Centralized cage wash facility will begin operation in summer of 2015. Consolidation of other cage washing facilities will be done in 2016.
Installing tempering devices in autoclaves to reduce the use of water to cool discharge water	Labs on Campus	FM	Richard Cota	Medium	Medium	Medium	Medium	2014	2017	Installed tempering devices autoclaves were repaired/replaced.
Meter installations for HDH	Housing	HDH	Aaron Mahn	\$285,000	Low	Low	Low	Jun-15	Sep-16	Installation of meters to track and record consumption values daily for all utilities. Phase II. This project has no quantifiable water savings because it is a leak-prevention measure.
Extension of Recycled Water Line on East Campus	East Campus	CPM & FM	Ross Kunishige & John Dilliot	\$500,000	14,663,315	\$146,633	190,623	Oct-14	May-15	Project has been completed. Recycled water is being used in the cooling towers (80% recycled water and 20% potable water) saving 20 million gallons of potable water per year.
Irrigation Retrofits at Scripps Institution of Oceanography	SIO	EH&S	Kimberly O'Connell	\$80,000	908,820	\$9,088	10,088	2012	2013	Replaced irrigation controllers with weather based central controllers and replace standard spray heads with low water use heads.

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Irrigation Retrofits at Mesa Graduate Housing/OMS	Mesa Graduate Housing	HDH	Steve Horner	\$57,254	500,000	\$5,000	5,550	2014	2015	Capping of Hunter I-20s and institutional sprays and conversion of 31,185square feet of turf to mulch.
ERC Water Conservation - ERC Resident Hall Bathrooms. Installing flow control valve in Eleanor Roosevelt College residential bathrooms.	ERC	HDH	Steve Horner	\$16,300	2,000,000	\$20,000	26,000	2014	2015	Installed bathroom Flow Control Valve (FCV) under each bathroom sink
Capture condensation from building air handlers and use for irrigation. HRBF2	Campus	FM	John Dilliot		890,000	\$8,900	1,157	2013	Mar-16	
Installing artificial turf in Muir Field	Muir	CPM	Roland Bartsch	\$2,150,000	2,000,000	\$20,000	22,200	Jan-15	Jun-15	Project completed. Removed 100,000 SF of natural turf and replaced with artificial turf.
Retrofitting urinal flush valves in the remaining Sports Facilities buildings and installing low flow lavatory aerators in Sports Facilities buildings.	Sports Facilities Buildings	SF	Jeff Borden	\$725	200,000	\$2,000	Medium	Jun-15	Oct-15	38 units installed

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Installing Findensers in labs to reduce use of cooling water	Labs on Campus	EH&S	Valerie Fanning	\$60,173	17,885,140	\$178,851	232,507	Nov-14	Dec-14	217 units installed.
Installing 3 Chillers in labs to reduce use of single pass cooling systems	Labs on Campus	EH&S	Valerie Fanning	\$10,740	831,134	\$8,311	10,805	Oct-14	Nov-14	
Installing Findensers in labs to reduce use of cooling water	Labs on Campus	EH&S	Valerie Fanning	\$14,833	4,121,000	\$41,210	53,573	Jul-15	Aug-15	50 units installed.
At Hillcrest medical center, installing water-efficient faucets and shower heads.	Hillcrest	TFE	Mike Dayton	\$42,000	2,000,000	\$20,000	26,000	Oct-14	Nov-14	
At medical center, installing water-efficient faucets and shower heads.	Medical Center	TFE	Mike Dayton	\$47,567	2,838,000	\$28,380	36,894	Oct-14	Nov-14	

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HDH installation of WATER-MIZER tempering devices in order to reduce cold water flow used to cool discharge water.	Housing	HDH	Krista Mays & Steve Horner	\$150,000	23,000,000	\$230,000	299,000	Jun-13	Feb-15	Installation of WATER-MIZER tempering device in order to reduce cold water flow used to cool discharge water. *average water savings is 75%-90% of water flow when WATER-MIZER. Return of investment <1 year. Calculate savings at <a href="http://www.rpiparts.com/water-mizer/calculator.htm">http://www.rpiparts.com/water-mizer/calculator.htm</a> . In progress. Installed at Mesa, ERC, Village West, Village East.
Meter installations for HDH	Housing	HDH	Aaron Mahn	\$285,000	Low	Low	Low	June 2014	September 2015	Installation of meters to track and record consumption values daily for all utilities. Phase I
No Salt No Waste Water Softeners at Canyon Vista	Canyon Vista	HDH	Dennis Jones	\$1980 plus \$300/month maintenance	26,280	\$263	342	May-14	Sep-14	
Future Projects										
Retrofitting water fixtures with low flow devices in 24 buildings.	Campus Wide	FM	John Dilliot	\$1,600,000	20,000,000	\$200,000	260,000			SOW includes 178 urinals, 545 toilets, and 494 faucets. Toilet retrofits that require slope changes and ADA requirements have caused delays and additional funding is needed.
Meter installations for Medical Center	Medical Center	TFE	Mike Dayton	Medium	Low	Low	Low	-	-	Funding has not been secured.

¹To calculate Water Savings; water cost, sewer, and meter costs were included as a total of \$0.01/Gal.

²The factors for determining indirect energy savings (embedded energy) for the project list is 13,000 kWh/MG for Indoor water efficiencies and 11,100 kWh/MG for outdoor water efficiencies. The embedded energy reference/information for Southern California is on page 10 of the WECalc Data and Assumptions document: [http://wecalc.org/WECalc\\_data\\_and\\_assumptions.pdf](http://wecalc.org/WECalc_data_and_assumptions.pdf)

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Project Title	Location	Lead	Lead Person	Project Cost (\$)*	Water Savings (gallons/yr)**	Water Savings (\$)¹****	Indirect Energy Savings (kWh)²****	Project Start Date	Project Completion Date	Notes
In Progress										
Capture condensate from air handlers and RO waste at Bonner, Mayer, York, Urey, and Galbraith Halls. Use mixed condensate & RO waste for irrigation.	Main Campus	FM	Ashkan Mozaffarian	Est. \$559,000	4,500,000	\$45,000	49,950	2018	2020	Portions of this project will be funded with Prop. 84 Grant funding
Extension of Recycled Water on Main Campus to Irrigation	Main Campus	CPM	Laura Moore	\$4,500,000	20,000,000	\$200,000	260,000	Jul-15	Nov-18	Extend 12" reclaimed water line main from SOM and connect to existing RCW main at Voigt Drive & Gilman Drive. campus for use in irrigation. Currently in design. Project expected to be completed by end of 2016.
State funded Turf Replacement and irrigation retrofit Projects	Main Campus	CPM	Ross Kunishige	\$900,000	Medium	Medium	Medium	Jul-17	Sep-18	Removal of existing turf and replacement with drought tolerant and low maintenance landscaping in 5 areas on campus. In addition, this project includes irrigation controller retrofits throughout the campus.
State funded Revelle Storm Water Project	Main Campus	CPM	Ross Kunishige	\$2,000,000	Low	Low	Low	Jul-17	Dec-18	Removal of existing turf and replacement with drought tolerant and low maintenance landscaping that serves as a storm water treatment system.
Campus Irrigation Retrofits and Scheduling / Monitoring Changes	Main Campus	FM	Chuck Morgan & Greg Snelling	High	7,000,000	\$70,000	77,700	Dec-14	Ongoing	The campus has replaced approximately 6,650 irrigation heads to water efficient, low volume irrigation heads that will save 7.2 million gallons of potable water a year (a 8% reduction in irrigation water use). The Campus has stopped watering 54,000 square feet of turf to save 1.53 million gallons of water per year. Irrigation on the Campus was shut off from December 2014 through January 2015 to save water.

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Project Title	Location	Lead	Lead Person	Project Cost (\$)*	Water Savings (gallons/yr)**	Water Savings (\$) <sup>1</sup> ***	Indirect Energy Savings (kWh) <sup>2</sup> ****	Project Start Date	Project Completion Date	Notes
Meter Installations	Campus Wide	FM	John Dilliot	\$1,150,000	Low	Low	Low	Jul-15	Ongoing	144 water meter replacements have been completed. Currently have 494 meters. Installation of metering throughout the campus in order to automate readings and have real-time remote monitoring of water consumption. * Estimates of water leakage in typical municipal systems is as high as 25%.
Turf Removal at 6th & Marshall Colleges, Mesa Housing, and Coast Apartments (4.01 acres)	Campus	HDH & FM	Steve Horner	\$17,000	750,555	\$7,506	8,331	Jan-13	Jan-19	Work ongoing to redevelop to low water landscape. 6th, Marshall, and Coast Apartments have been completed. Mesa is a WIP as construction continues.
Installing low flow lavatory aerators	Campus	FM	Richard Cota	Low	Low	Low	Low	Jul-05	Ongoing	Install lower flow aerators as faucets are replaced or renovations are performed in labs and restrooms.
Installing low flow laboratory aerators	Campus	EH&S	Valerie Fanning	\$1,862	2,218,000	\$22,180	7,665	Jul-05	Ongoing	476 aerators installed in Pac Hall, Muir Biology, Bonner Hall, NSB, Urey Hall, York Hall, CMME, CMMW, and Leichtag.
At the Medical Center, changing irrigation from every day to every other day	Medical Center	TFE	Mike Dayton	None	Low	Low	Low	Apr-15	Ongoing	Ongoing
Repairing leaks at the medical center	Medical Center	TFE	Mike Dayton	Medium-High	Low	Low	Low	Jul-05	Ongoing	Ongoing

Completed

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At medical center, converting to recycled water in cooling towers in June 2014	Medical Center	TFE	Mike Dayton	Medium	46,633,315	\$466,333	1,906,233	Dec-15	Jun-16	Project completed. The cooling towers are using 80% recycled water and 20% potable water.
Consolidating existing animal cage wash services	Cage Wash	OAR	Keith Jenne	\$15,000,000	18,000,000	\$180,000	High	Jun-15	Dec-16	Centralized cage wash facility will begin operation in summer of 2015. Consolidation of other cage washing facilities will be done in 2016.
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Installing artificial turf in Muir Field	Muir	CPM	Roland Bartsch	\$2,150,000	2,000,000	\$20,000	22,200	Jan-15	Jun-15	Project completed. Removed 100,000 SF of natural turf and replaced with artificial turf.
Retrofitting urinal flush valves in the remaining Sports Facilities buildings and installing low flow lavatory aerators in Sports Facilities buildings.	Sports Facilities Buildings	SF	Jeff Borden	\$725	200,000	\$2,000	Medium	Jun-15	Oct-15	38 units installed

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Future Projects										
Retrofitting water fixtures with low flow devices in 24 buildings.	Campus Wide	FM	John Dilliot	\$1,600,000	20,000,000	\$200,000	260,000			SOW includes 178 urinals, 545 toilets, and 494 faucets. Toilet retrofits that require slope changes and ADA requirements have caused delays and additional funding is needed.
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## Appendix D

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# **LEED Certified Buildings on Campus**

# LEED Certified Buildings on Campus

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<b>Project Name</b>	<b>Rating System</b>	<b>Achieved Rating</b>
Revelle College Housing	NC	LEED Platinum
MESOM Facility	NC	LEED Platinum
Biomedical Research Facility 2	NC	LEED Platinum
Muir College Housing	NC	LEED Gold
Jacobs Medical Center Central Plant	NC	LEED Gold
Rady School of Management School Phase 2	NC	LEED Gold
North Campus Housing, Phase 2	NC	LEED Gold
Telemedicine & PRIME-Heg	NC	LEED Gold
Health Sciences Graduate Housing	NC	LEED Gold
Sulpizio Family Cardiovascular Center	NC	LEED Gold
Structural & Materials Engineering	NC	LEED Gold
Sanford Consortium of Regenerative Medicine	NC	LEED Gold
Biomedical Research Facility 2	NC	LEED Gold
Spanos Athletic Performance Center	NC	LEED Gold
Central Research Services Facility	NC	LEED Gold
Revelle Plaza Café	NC	LEED Gold
East Campus Parking Structure	NC	LEED Silver
Torrey Pines Center North	NC	LEED Silver
Housing and Dining Administration Building	NC	LEED Silver
East Campus Office Building	NC	LEED Silver
SIO Research Support Facility	NC	LEED Silver
Triton Ballpark Improvement	NC	LEED Silver
SIO Seaside Forum	NC	LEED Certified
East Campus Graduate Housing	NC	LEED Certified
North Campus Housing Phase I	NC	LEED Certified
RIMAC Annex	NC	LEED Certified
Price Center Expansion	NC	LEED Certified
Goody's Place and Market	CI	LEED Silver
Geisel Teaching & Learning Commons	CI	LEED Silver
Stewart Commons	CI	LEED Gold
Student Health Services	CI	LEED Gold
Blake Hall	CI	LEED Gold
Sustainability Resource Center	CI	LEED Gold
Mesa Childhood Center	CI	LEED Gold

Galbraith Lecture Hall	CI	LEED Gold
The Zone	CI	LEED Certified
Mission Bay Aquatic Center	EBOM	LEED Platinum
San Diego Supercomputer East Expansion	EBOM	LEED Gold
SDSC East Expansion	EBOM	LEED Gold
Campus Services Complex	EBOM	LEED Silver

Rating System Key:

NC - New Construction

CI - Commercial Interiors

EBOM - Existing Buildings Operations and Maintenance

# Appendix E

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## **Definitions**

# Definitions

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**Gross Square Foot:** Pursuant to the definition in the Facilities Inventory Guide<sup>1</sup>, gross square footage is the Outside Gross Area, or OGSF50, and equals the sum of Basic Gross Area (the sum of all areas, finished and unfinished, on all floors of an enclosed structure, for all stories or areas which have floor surfaces) + 50% Covered Unenclosed Gross Area (the sum of all covered or roofed areas of a building located outside of the enclosed structure). OGSF50 is also known as “California Gross.”

**Industrial Water:** Water provided for specific industrial applications such as heating, cooling, or lubricating equipment.

**Purified Water:** Water that is free of impurities such as microorganisms, particulate matter, and trace elements and chemical compounds responsible for electrical conductivity; primarily used in biological and engineering labs for research purposes.

**Non-Potable Water:** Water not suitable for human consumption because it contains objectionable pollution, contamination minerals or infective agents, including:

**Wastewater:** A blend of graywater and blackwater.

**Graywater:** Wastewater originating from clothes washers, bathtubs, showers, bathroom sinks, or any other source that has a low likelihood of fecal contamination. Graywater may be treated or untreated prior to reuse.

**Blackwater:** Wastewater originating from sources that have a high likelihood of fecal contamination (e.g., toilets).

**Potable Water:** Water that meets state water quality standards for human consumption.

**Reclaimed or Recycled Water:** Wastewater treated with the intention of reuse, including:

**Direct Potable Reuse:** Treated wastewater reused for human consumption

**Indirect Potable Reuse:** Treated wastewater blended with natural water sources reused as potable or non-potable water.

**Non-Potable Reuse:** Treated wastewater reused for purposes other than human consumption, such as irrigation, fire suppression, and industrial processes.

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<sup>1</sup> Facilities Inventory Guide, Attachment 8, Appendix C, pages 13-15.

**Storm Water:** Water that originates during precipitation events.

**Sterilized Water:** Water that has been cleaned to remove, deactivate, or kill microorganisms present that may be harmful to humans; primarily used in medical facilities.

**Sustainable Water Systems:** Water systems or processes that maximize water use conservation or efficiency, optimize water resource management, protect resources in the context of the local watershed, and enhance economic, social and environmental sustainability while meeting operational objectives.

**Weighted Campus User:**  $\text{Weighted Campus User} = (A + B + C) + 0.75 [(D - A) + (E - B) - F]$

A= Number of students resident on-site

B= Number of employees resident on-site

C= Number of other individuals resident on-site and/or staffed hospital beds

D= Total full-time equivalent student enrollment

E= Full-time equivalent of employees (staff + faculty)

F= Full-time equivalent of students enrolled exclusively in distance education.

**Watershed:** In the context of this policy, a watershed is the area of land that drains to a common waterway, such as a stream, lake, estuary, wetland, aquifer, bay, or ocean.