



Rancho Santiago Community College District Sustainability Plan

Produced by  sustainable rscgd

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TABLE OF CONTENTS

SECTION 1. EXECUTIVE SUMMARY	1
SECTION 2. BACKGROUND.....	2
2.1 HISTORY OF SUSTAINABILITY EFFORTS TO DATE	2
2.2 CREATION OF THE SUSTAINABILITY PLAN	2
2.3 CAMPUS SUSTAINABILITY COMMITTEE	2
2.4 THE POLICY CONTEXT OF SUSTAINABILITY PLANNING	2
SECTION 3. VISION STATEMENT, GOALS, AND PRIORITIES	6
SECTION 4. PROGRAMS AND PROJECTS FOR IMPLEMENTATION	8
4.1 MANAGEMENT AND ORGANIZATIONAL STRUCTURE	8
4.2 ENERGY EFFICIENCY	10
4.3 FACILITIES OPERATION	12
4.4 SUSTAINABLE BUILDING PRACTICES	14
4.5 ON-SITE GENERATION AND RENEWABLE ENERGY.....	16
4.6 TRANSPORTATION, COMMUTING, AND CAMPUS FLEET & TRAVEL	17
4.7 WATER, WASTEWATER, AND SUSTAINABLE LANDSCAPING	19
4.8 SOLID WASTE REDUCTION AND MANAGEMENT	21
4.9 GREEN PURCHASING	23
4.10 STUDENT AND CURRICULUM DEVELOPMENT.....	24
4.11 CAMPUS AND COMMUNITY OUTREACH & AWARENESS.....	31
4.12 CREATE A CLIMATE ACTION PLAN.....	32
SECTION 5. MEASURE AND REPORT PERFORMANCE	33
5.1 MEASURING PERFORMANCE.....	33
5.2 REPORTING PERFORMANCE	36
APPENDICES	
APPENDIX 1 – PROGRAMS AND PLANS CHECKLIST	
APPENDIX 2 – 2014 SUSTAINABILITY SURVEY RESULTS	
APPENDIX 3 – 2014 SANTA ANA COLLEGE “SUSTAIN-A-PALOOZA” STUDENT INPUT	
APPENDIX 4 – “THE CAMPUS AS A LIVING LABORATORY – USING THE BUILT ENVIRONMENT TO REVITALIZE COLLEGE EDUCATION: A GUIDE FOR COMMUNITY COLLEGES”	

SECTION 1.**EXECUTIVE SUMMARY**

As with many public sector agencies, the Rancho Santiago Community College District (RSCCD) recognizes the environmental, economic, and social benefits of resource efficiency and sustainability. The passage of the California Global Warming Solutions Act (AB-32) and the establishment of a Sustainability Policy by the California Community Colleges (CCC) Board of Governors have made it imperative for Community Colleges to develop an organized, comprehensive approach that incorporates the elements of sustainability, satisfies state regulations, takes advantage of available resources and complimentary programs, and adopts the Best Practices of others who are further along this path.

Sustainability is defined as “meeting the needs of the present without compromising the ability of future generations to meet their own needs.” The purpose of this Sustainability Plan is to prepare the Rancho Santiago Community College District for the anticipated environmental and regulatory challenges of the 21st century, to guide the District towards becoming a more sustainable institution, and to prepare students for the green economy.

Rancho Santiago Community College District is a two-campus district, comprised of Santa Ana College (SAC) and Santiago Canyon College (SCC), as well as two education centers, the Centennial Education Center and the Orange Education Center. The District has prepared this Plan to encompass the activities, goals, and priorities of each college and center. The following Sustainability Plan articulates the vision, goals, and objectives established by the District for sustainability, as well as the strategies to meet these goals. This Plan has been developed by the Sustainable RSCCD Committee (SRC). The SRC has developed this Sustainability Plan in coordination with the many different District stakeholders, including students, faculty, and staff, to ensure that the plan meets the different needs of the District.

Vision Statement

The Rancho Santiago Community College District holds sustainability to be a foundational principle in its current and future development.

As a responsible steward of natural resources and the environment, the District will endeavor to minimize its impact on the environment by implementing best practices for conserving resources, reducing waste, implementing energy reduction and alternative energy generation strategies, constructing efficient buildings, and by developing partnerships that will further these activities.

SECTION 2. BACKGROUND

2.1 HISTORY OF SUSTAINABILITY EFFORTS TO DATE

The Rancho Santiago Community College District has been proactive in the area of sustainability for the past several years. The Board of Trustees has established policies for District sustainability that have been incorporated in both the District Educational and Facilities Master Plans. The District has been active in recycling efforts, encouraging public transit use for students, faculty, and staff, and implementing energy and water saving projects and efficient new construction of campus facilities. Students have also been very active in this area through various clubs and sustainability events. While the District has made significant progress on the path to sustainability, it is poised to accomplish much more with the implementation of this Sustainability Plan. Section 4 of the Plan describes past activities and future plans in detail.

2.2 CREATION OF THE SUSTAINABILITY PLAN

To create this Sustainability Plan, RSCCD followed the process and utilized the tools provided in the California Community Colleges Sustainability Template. The process is illustrated in the flow chart at right. The implementation of the sustainability planning process and the resulting Sustainability Plan are described in the following sections.



2.3 CAMPUS SUSTAINABILITY COMMITTEE

It was decided to utilize the Sustainable RSCCD Committee (SRC), which consists of faculty, staff and students representing the different campus stakeholders, to manage the process and develop this Sustainability Plan. The Committee is responsible for developing and implementing the sustainability programs and projects described in this plan to achieve the sustainability goals.

2.4 THE POLICY CONTEXT OF SUSTAINABILITY PLANNING

Sustainability can provide environmental, economic, and social benefits to campuses. However, there are other motivations for the District to pursue these practices. The State of California has been on the forefront of efforts in establishing aggressive policies and standards for environmental protection and

reducing greenhouse gas (GHG) emissions that contribute to global warming. In 1970, the State adopted the California Environmental Quality Act (CEQA) with the goal to inform governments and the public about potential environmental impacts of projects. From 2005 onward, legislation has been passed to directly regulate GHG emissions by utilizing incentive mechanisms, cap-and-trade programs, and mandatory reporting while encouraging voluntary activities such as purchasing emissions offsets and offering renewable energy certificates (RECs). Compliance with state policies and regulations regarding these issues is an important factor for consideration by the Rancho Santiago Community College District.

The following outlines the numerous policy and regulatory drivers that contributed to the creation of this Plan.

2.4.1 CCC BOARD OF GOVERNORS ENERGY AND SUSTAINABILITY POLICY

To encourage the CCCs to a more sustainable future, the CCC Board of Governors approved the Energy and Sustainability Policy in January 2008, which puts forth goals for each campus to reduce their energy consumption from its 2001-02 baseline by 15 percent by 2011-12. It also sets goals for minimum efficiency standards of new construction and renovation projects and provides an incentive of 2 percent of construction cost for new construction projects and 3 percent of construction cost for modernization projects. The policy also sets goals for energy independence through the purchase and generation of renewable power and energy conservation through the pursuit of energy-efficiency projects, sustainable building practices, and physical plant management.

The CCC Board of Governors Energy and Sustainability Policy can be found here:

http://www.cccco.edu/Portals/4/Executive/Board/2008_agendas/january/3-1_Attachment_CCC%20Energy%20and%20Sustainability%20Policy%2011-9-07%20FINAL.pdf

2.4.2 CALIFORNIA STATE CLIMATE REGULATIONS

2.4.2.1 *State of California Executive Order S-3-05*

Executive Order S-3-05 was signed by the Governor of California in 2005, thereby identifying the California Environmental Protection Agency (Cal/EPA) as the primary state agency responsible for establishing climate change emission reduction targets throughout the state. The Climate Action Team, a multi-agency group comprised of various state agencies, was formed to implement the Executive Order S-3-05. Shortly thereafter in 2006, the team introduced GHG emission reduction strategies and practices to reduce global warming. These measures are aimed at meeting the Executive Order's long term goal of reducing GHG emission to 80 percent below 1990 levels by 2050.

2.4.2.2 *Global Warming Solutions Act of 2006 (AB-32)*

The Global Warming Solutions Act, or Assembly Bill 32 (AB-32), was adopted in 2006 by the California legislature, establishing two key requirements in regard to climate change reduction measures. The first requires that California GHG emissions be capped at 1990 levels by 2020, and the second establishes an enforcement mechanism for the GHG emissions reduction program with monitoring and reporting implemented by the California Air Resources Board (CARB).

In 2008, the Assembly Bill 32 Scoping Plan was released by CARB which describes measures to implement the requirements set by AB-32. In addition to partnering with local governments to encourage the establishment of regional emission reduction goals and community regulations, the Scoping Plan uses various mechanisms to reduce emissions state-wide, including incentives, direct regulation, and compliance mechanisms.

2.4.2.3 Assembly Bill 1493 (The Pavley Bill)

Assembly Bill 1493, widely known as “The Pavley Bill”, was passed in 2002 and authorizes CARB to establish regulations to reduce the GHG emissions from passenger cars and light trucks by 18 percent by 2020 and 27 percent by 2030 from 2002 levels. This aggressive bill was temporarily blocked by the US EPA in March 2008 and later received a waiver of approval for implementation throughout California in June 2009.

2.4.2.4 Low Carbon Fuel Standard (LCFS)

The Low Carbon Fuel Standard (LCFS) was established in January 2007 by Executive Order S-01-07 and requires California fuel providers to decrease lifecycle fuel carbon intensity of transportation fuels by 10 percent from 2007 levels by 2020.

2.4.2.5 California Renewables Portfolio Standard

The California Renewables Portfolio Standard (RPS) was established in 2002 under Senate Bill 1078 and mandated that electrical corporations increase its total procurement of eligible renewable resources by at least 1 percent a year to reach a goal of 20 percent electricity generation from renewable resources. These goals were accelerated in 2006 under Senate Bill 107, which mandated that at least 20 percent of the total electricity sold be generated from renewable resources by the end of 2010. The RPS was further extended in 2008 by Executive Order S-14-08, which required that 33 percent of total electricity sales be generated from renewable resources by 2020. In April of 2011, this RPS standard of 33% renewable by 2020 was enacted into law through final passage of Senate Bill X 1-2 (Simitian) and extended to apply to both public and investor owned utilities.

2.4.2.6 Senate Bill 97

Senate Bill 97, passed in 2007, required the Governor’s Office of Planning and Research (OPR) to develop and recommend amendments to CEQA Guidelines for addressing GHG emissions related to land use planning. The amendments to CEQA were approved and became effective in March 2010, thereafter requiring all CEQA documentation to include and comply with the new amendments established for addressing greenhouse gas emissions.

2.4.2.7 Senate Bill 375

Senate Bill 375 was passed in 2008 to reduce GHG emissions caused indirectly by urban sprawl throughout California. The bill offers incentives for local governments to execute planned growth and development patterns around public transportation in addition to revitalizing existing communities.

Metropolitan Planning Organizations (MPOs) work with CARB to reduce vehicle miles traveled by creating sustainable urban plans with a comprehensive focus on housing, transportation, and land use. Urban projects consistent with the MPO's Sustainable Community Strategy (SCS) can bypass the CEQA's GHG emission environmental review. This provides developers with an incentive to comply with local planning strategies which support the State's greater effort for overall emission reduction in the land use and transportation sector.

2.4.2.8 Assembly Bill 341

Starting July 1, 2012, businesses and public entities, including schools and school districts that generate four cubic yards or more of waste per week and multifamily units of five or more will be required to recycle, if they are not already doing so. AB 341 also establishes a statewide goal of 75% diversion of solid waste to landfills. The purpose of this new law is to reduce greenhouse gas emissions by diverting commercial solid waste to recycling efforts and expand opportunities for additional recycling services and recycling manufacturing facilities in California.

2.4.2.9 Regional Air Pollution Control Districts (APCD) and Air Quality Management Districts (AQMD)

In 1947, the California Air Pollution Control Act was passed and authorized the creation of Air Pollution Control Districts (APCDs) and Air Quality Management Districts (AQMDs) in every county. APCDs and AQMDs are tasked with meeting federal and state air pollution requirements set by the Clean Air Act and can develop regulations to achieve the necessary public health standards, though these regulations need approval from CARB and the US EPA. APCDs and AQMDs have jurisdiction over businesses and stationary sources of emissions and can offer varying levels of outreach, grants, and CEQA review and technical assistance to interested public and private parties. The APCDs and AQMDs do not have the authority to regulate mobile air pollution sources, which is the responsibility of CARB, and must defer to state or federal regulations provided by the California Air Resources Board and the U.S. Environmental Protection Agency.

SECTION 3.

VISION STATEMENT, GOALS, AND PRIORITIES

The Sustainable RSCCD Committee has developed the following Vision Statement to guide the District in its Sustainability Planning efforts.

The Rancho Santiago Community College District holds sustainability to be a foundational principle in its current and future development.

As a responsible steward of natural resources and the environment, the District will endeavor to minimize its impact on the environment by implementing best practices for conserving resources, reducing waste, implementing energy reduction and alternative energy generation strategies, constructing efficient buildings, and by developing partnerships that will further these activities.

To realize this Vision Statement, the SRC has defined the following sustainability goals and priorities. The goals and priorities for the Sustainability Plan reflect campus needs, interests, and available resources.

Goal No.	Area of Sustainability	Established Goal
1	Campus & Community Engagement	Encourage participation in and awareness of sustainability issues through effective education and engagement. Integrate sustainability into all facets of student life, including student government, clubs, and organizations.
2	Curriculum Development	Facilitate the inclusion of environmental sustainability and social responsibility into existing curriculum and develop new curricula and career-oriented certificate and training courses with an emphasis on sustainability.
3	Energy	Utilize 2012-2013 benchmark study to establish annual energy use and demand reduction goals (target 5% reduction). Plan appropriate energy efficiency, demand reduction, or clean self-generation measures by mid-2015 to meet reduction goals.
4	Facilities Design & Operation	Design and construct all major capital projects and renovations to meet LEED Silver “equivalent” standard and operate facilities to meet solid waste, energy, and water use reduction goals. Employ sustainable landscaping practices.
5	Solid Waste Management	Continue to implement the landfill diversion program, expand it to include all sectors of recycling and waste reduction to landfills, and strive to meet the statewide landfill recycling goal of 75% by 2020.

Goal No.	Area of Sustainability	Established Goal
6	Sustainable Procurement	Implement efforts to source campus food, materials, supplies, information technology, equipment, and resources from organizations committed to social responsibility and environmental sustainability.
7	Transportation	Reduce the reliance of students, faculty, and staff on single occupancy vehicle commutes by 5 percent within the next five years, and encourage the use of low and zero emissions vehicles.
8	Water Management	Perform water use benchmarking studies at both campuses and the District Office to better understand usage as compared to similar facilities and community college peers. Based on the results, establish annual water use reduction goals and plan appropriate measures to achieve goals.

The goals described above will apply to both Santa Ana College and Santiago Canyon College, the education centers, and the District Office. The goals are listed in alphabetical order, and are not necessarily listed by priority.

The goals and criteria established for the Sustainability Plan will be monitored during Plan implementation as described in Section 5, "Measure and Report Performance".

SECTION 4.

PROGRAMS AND PROJECTS FOR IMPLEMENTATION

Based on the goals and priorities described above, the SRC has selected the following programs and projects to actively improve campus sustainability. These programs and projects are also reflected in the Implementation Programs and Plans Checklist, located in Appendix 1, which outlines the details of each action item, its priorities, responsibility for implementation, schedules, and estimated cost of each program or project. Note that the paragraph numbering below corresponds to the Checklist items selected and are not necessarily in sequential order. The Checklist will be used by the SRC to manage the implementation process.

4.1 MANAGEMENT AND ORGANIZATIONAL STRUCTURE

In order to implement an effective Sustainability Plan, it will be important for RSCCCD to have a policy mandate for sustainability, the institutional structure required to manage the process, and the financial and programmatic expertise to accomplish Plan goals. The District will implement the following programs to meet this requirement.

4.1.1 ADOPT A DISTRICT SUSTAINABILITY POLICY

The District Board of Trustees has adopted a District Sustainability Policy by delegating authority to the Chancellor to establish administrative regulations for sustainable practices in the following areas: environmental education and training; energy, waste management and recycling, resource conservation, facilities, grounds and landscape management; hazardous materials, transportation and air quality; and purchasing practices.

In addition, the Board of Trustees endorsed the creation of this Sustainability Plan which addresses District-wide and site-specific needs for each college.

4.1.3 APPOINT A CAMPUS SUSTAINABILITY COMMITTEE

The SRC was established as a District-wide committee in 2011 under the leadership of Chancellor Raúl Rodríguez, PhD. The membership, which is open to all interested stakeholders of RSCCD, represents students, faculty, staff, and administration. The Committee is organized into subcommittees, each focusing on one of four areas of interest—transportation, facilities, recycling, and communications. The SRC has also created a logo to represent their sustainable efforts on campus.

The SRC led the development of this Sustainability Plan, and will manage its implementation and monitor progress upon its adoption by the Board of Trustees.

In addition, SAC has established a Green Task Force, which consists of both faculty and students, and works to provide a greener SAC campus. SAC has also created an Environmental Task Force which serves as a sub-committee to the SAC Facilities Committee.

4.1.4 FUNDING AND RESOURCES TO SUPPORT SUSTAINABILITY ACTIVITIES

Rancho Santiago Community College District has worked hard to obtain funding for sustainable development, and to spend these funds responsibly. In 2002, voters approved Measure E, a \$337 million general obligation bond to renovate existing campus buildings and construct new classrooms. In November 2012 Measure Q was also passed, authorizing RSCCD to issue up to \$198M in general obligation bonds to finance renovation, repair and construction at Santa Ana College. These funds from both Measure E and Q have been and will be used to implement a wide variety of sustainability projects throughout the District.

With the passage of California Proposition 39 (“The Clean Energy Jobs Act”) in November 2012, the California Community College system will receive roughly \$30 million annually for five years to fund energy-efficiency and clean energy generation projects. In Fiscal Year 2013-2014 RSCCD’s share of this funding was \$1.02 million, which was utilized to install advanced LED lighting systems at Santa Ana College and retro-commission (RCx) the Santiago Canyon College Science Building, saving energy and money. The District’s Year 2014-2015 Proposition 39 allocation, which amounted to approximately \$800k, has been allotted for further LED lighting installments at the District Office and Santiago Canyon College. At the time of this publication, the District is moving forward with installing these projects, with plans for completion in spring 2015. The District will continue to wisely invest its Proposition 39 allocation in clean energy projects throughout the life of the program.

In addition to funding for capital improvement projects, RSCCD will continue to search for and leverage funding opportunities for all sustainability programs and projects as they become approved.

4.1.5 EMPLOY SUSTAINABILITY PROFESSIONALS AS REQUIRED

The District contracts with energy and sustainability consultants as necessary to ensure that expert knowledge and advice is considered when evaluating and implementing sustainability initiatives. The District has valued and successful relationships with several professional firms and relies on their expertise to ensure program and project success.

4.1.7 INTEGRATE SUSTAINABILITY PLANNING INTO CAMPUS MASTER PLAN

The District has integrated principles of sustainability into the RSCCD Facilities Master Plan, with guidance from the architects and consultants from HMC Architects. The Master Plan committee considered current offerings, potential future programs, current facility challenges, future instructional needs, and the state of infrastructure systems, while striving to incorporate sustainability into all aspects of campus life. The current Master Plan states that the District should update and implement facilities master plans, maximize college and community use of facilities, and incorporate green efforts into facilities development and other efforts when cost-effective.

4.2 ENERGY EFFICIENCY

Energy efficiency is one of the most cost effective ways to reduce a campus's energy use and carbon footprint. When implemented properly, efficiency measures can decrease energy use without compromising comfort and can improve indoor air quality and enhance student, faculty, and staff performance. Energy efficiency will be a higher priority than renewable or other on-site energy generation due to more favorable economics and to avoid over-sizing renewable energy systems.

The following energy-efficiency programs and projects will be implemented at the District.

4.2.1 SET ENERGY EFFICIENCY GOALS

It is important to set goals for the reduction of any resource in order to define success. Planning for energy conservation is important to the District. As such, the District performed an energy benchmark study in 2012-2013 using the Chancellor's Office Energy Calculator. Using this data as a baseline, the District will establish annual energy use reduction goals (targeting an overall annual reduction of 5%) and plan appropriate energy-efficiency, demand reduction, or clean self-generation measures to achieve these goals.

The District has stated that it will continue to participate in the California Community Colleges/Investor Owned Utility (CCC/IOU) Energy Efficiency Partnership, and will continue to leverage Proposition 39 funding, in order to help further their energy-efficiency goals and reduce energy usage and operating costs.

4.2.4 CONDUCT COMPREHENSIVE FACILITY ENERGY AUDITS

The District recognizes the need for energy audits to gain information about the current state of energy use at its facilities. Consequently, it is currently in the process of compiling baseline documentation to complete a comprehensive audit. The audit results will identify energy-efficiency projects and measures that, when implemented, will help to achieve the District's energy usage reduction goals as described above.

4.2.5 IMPLEMENT NEW AND EXISTING AUDIT RECOMMENDATIONS

An energy study was performed at the District Office in May 2013 by a consultant contracted by RSCCD. The study contained recommendations to improve the overall energy efficiency of the facility and to reduce energy costs and the associated carbon footprint of the building. The results of the study were reviewed by Southern California Edison (SCE) and Southern California Gas (SCG) Company and they determined that the projects will qualify for roughly \$108,000 in utility rebates if implemented. Southland Industries is currently conducting a detailed site study to implement the projects.

4.2.8 IDENTIFY AND TAKE ADVANTAGE OF GRANT AND INCENTIVE PROGRAMS

The District has demonstrated an effective use of funding programs to finance many sustainability projects on campus. Funds from Measure Q will be used for the construction of new utility infrastructure and to complete a central plant project at Santa Ana College, which is projected to significantly increase campus energy efficiency. In addition, funds from Measure E were used to update and renovate campus buildings.

As described above, the District participates in the CCC/IOU Energy Efficiency Partnership and maximizes the energy efficiency incentive provided by SCE and SCG to help fund energy projects at the District. These incentives are leveraged to allow the District's Proposition 39 funds to go further and result in deeper energy savings and more comprehensive projects than would otherwise be feasible.

4.2.9 ENERGY EFFICIENT EQUIPMENT

A wide variety of energy-efficient equipment has been installed on both campuses and in the District Office in recent years. The following sections describe both completed projects and projects currently in progress, as well as new, planned projects to install more energy-efficient equipment and systems.

4.2.9.2 Efficient Lighting and Lighting Controls

Santa Ana College and Santiago Canyon College are in the process of installing advanced LED lighting as part of the Building and Site Lighting Replacement projects. LED lighting retrofits have also been a part of the Proposition 39 funding program administered by the Chancellors Office. The District has also participated in an LED Lighting Demonstration Project to educate the public about efficient lighting.

4.2.9.3 Install Energy Efficient HVAC Systems

As briefly noted in section 4.2.8, a new chilled water central plant is planned for Santa Ana College. The central plant will provide chilled water to cool most of the conditioned spaces on campus, and save money and energy by taking advantage of cooling load diversity and off-peak production. The central plant will include a small building to house chillers, pumps, controls, and other equipment, a thermal energy storage (TES) tank for “off peak” chilled water production and storage, a chilled water distribution piping loop, and the integration of the system into the existing campus building HVAC systems. The location of the building and TES tank will be determined during design. The implementation of the central plant will also include several infrastructure improvements such as the replacement of all major utility lines and the retrofit of air handling units on campus buildings connected to the plant, improving efficiency, comfort, and reducing energy costs.

Santiago Canyon College has updated the HVAC control system in their Science Building and is currently re-commissioning the building for more energy-efficient operation. In addition, occupancy sensors will be installed to control the speed of exhaust fans based on building usage, and to modify the sequence of operations for various mechanical equipment, including air handlers, boilers, and fume hood equipment.

For Buildings D and C of Santiago Canyon College, the District plans to replace an inefficient chiller with a new energy-efficient unit and install new pumps equipped with Variable Frequency Drives (VFDs) which will improve efficiency and comfort. In addition, the existing split-system units and single-packaged systems will be replaced with more efficient units. The District also plans to install new variable hot water supply and return valve actuators to distribute reheat water more efficiently.

At the District office, existing chillers, the cooling tower, and pumps will be replaced with more efficient equipment. The equipment will be installed with VFDs to adjust the speed of fans and motors. The existing energy management system (EMS) will be replaced to provide greater ability to monitor and control equipment and reduce energy usage. In addition, the air distribution ducting will be modified to more efficiently ventilate the building.

In addition to the Santa Ana College central plant, various other energy-reducing projects have been implemented utilizing the Investor Owned Utilities (IOUs) incentive programs. These projects include:

Santa Ana College:

- Buildings A, F, and R Boiler Replacements
- Health Sciences Building upgrades
- Science Technology Engineering Math Building (STEM) upgrades
- Committed scheduled maintenance funds to upgrade inefficient boilers
- Campus-wide LED exterior and interior lighting upgrades funded by the Districts Proposition 39 allocation

Santiago Canyon College:

- Building D Chiller and Boiler Upgrades
- Building D & C HVAC Renovations
- Pool Pump VFDs
- Boiler replacement to meet new SCAQMD emissions standards

4.3 FACILITIES OPERATION

In addition to installing energy-efficient equipment, RSCCD strives to operate high-performing facilities, buildings, and energy infrastructure systems that are optimized for inhabitant comfort, productivity, and energy and resource efficiency. Current and planned activities in this area are described below.

4.3.1 ENCOURAGE AND SUPPORT ENERGY EFFICIENCY TRAINING OF STAFF

The Maintenance and Operations staff at both Santa Ana and Santiago Canyon Colleges have been trained to operate new EMS systems installed at their campuses. Further, ongoing training programs will be developed and implemented to ensure that the staff is up-to-date on equipment, system, and operational changes in the facilities.

4.3.2 INSTALL ENERGY MANAGEMENT SYSTEMS

The District will maximize use of computerized EMS systems to provide centralized reporting and control of campus energy related activities. The campus will strive to achieve optimum efficiency in the use of natural gas, electricity, or other energy resources to meet the heating, cooling, and lighting needs of the buildings and/or facilities. Except for areas requiring special operating conditions, such as electronic data processing facilities, or other scientifically critical areas, where rigid temperature controls are required, building and/or facility temperatures will be controlled between the limits stated below. For both campuses, the District will install new, more robust EMS with an expanded range of controls for the mechanical equipment and lighting systems to improve operational energy efficiency. As described in section 4.2.9.3, there are also plans to retrofit air handlers and install new high efficiency motors and fans at various buildings.

4.3.3 ADJUST TEMPERATURE SET POINTS AND SCHEDULE OPERATING TIMES

As part of a new construction program, the District, in coordination with the Colleges, will develop and implement a District-wide Owner Operating Requirement specification that will be used by the commissioning agents and EMS installer to ensure that EMS systems are customized according to campus needs and that HVAC equipment scheduling and maintenance is optimized. These specifications are incorporated into the Science Center Retro-Commissioning and District Operation Center HVAC renovations projects. The Owner Operating Requirements will include specifications for temperature set points and operating schedules.

4.3.4 OPTIMIZE BUILDING OCCUPANCY SCHEDULING

The Owner Operating Requirement will also provide specifications and requirements to optimize the building occupancy scheduling, including:

- Normal Occupancy Schedule
- Pre-occupancy Operating Period
- Non-occupancy Schedule
- Holiday Schedule
- Cleaning Schedule

4.3.5 OPTIMIZE HVAC EQUIPMENT SCHEDULING

To best optimize the equipment scheduling of the HVAC systems, the District will evaluate needs related to instruction so as to utilize entire buildings and shut off HVAC and lighting in buildings that are not being utilized.

In addition, the Owner Operating Requirement specification will include the following items to optimize HVAC equipment scheduling:

- Air Temperature Range
- Humidity Range
- Relative Building Pressure

- Air Filtration
- Ventilation
- Noise Criteria
- Supply Air Temperature Reset Range
- Preferred CO2 Range
- CO Alarm

4.3.6 ACTIVATE ENERGY-SAVING FEATURES FOR APPLIANCES AND COMPUTERS

Santiago Canyon College has made a commitment to utilize energy-saving features by installing motion sensors on its personal computers (PCs) which shut down the PC and ancillary equipment when not needed. The District has plans to evaluate other IT related energy savings technologies, including PC Power Management and Server Virtualization.

4.3.7 PURSUE MONITORING-BASED COMMISSIONING (MBCX)/RETRO-COMMISSIONING (RCX)

Working with the CCC/IOU Partnership, the District plans to develop a Retro-commissioning and Monitoring Based Commissioning (MBCx) implementation program to improve energy efficiency of major facilities operations. The program will involve installation of whole-building energy meters to determine trends in energy use. The process will identify baseline usage data, identify changes in building and systems operations that will reduce usage, and monitor the actual results of projects implemented to demonstrate increased efficiency. The RCx/MBCx program plan will be completed and adopted by end of 2015 and updated every two years.

In addition, Santiago Canyon College has developed a Measurement and Verification (M&V) Plan to evaluate energy system performance at the Science Building following the planned retro-commissioning of the building. The M&V process will evaluate the building and energy systems performance through energy simulation and engineering analysis. The retro-commissioning contractor will install the necessary metering equipment to measure energy use and will track performance by comparing predicted performance to actual performance.

4.4 SUSTAINABLE BUILDING PRACTICES

Construction and renovation of new and existing facilities provides a significant opportunity to reduce the environmental impacts of the built environment through sustainable building practices. The District will incorporate energy and resource efficient “Green Building” practices in the design and construction of all new and renovated facilities. The following implementation programs have been implemented or are planned by the District to meet this goal.

4.4.1 ESTABLISH A GREEN BUILDING STANDARD

In the Facilities Master Plan, the District has stated that it will work to develop green building design standards. Currently, the District is establishing the requirement that all major capital projects and

renovations meet LEED Silver “equivalent” standard and utilize utility “Savings by Design” programs. In addition, the District is developing standards for efficient landscaping and plant materials, irrigation equipment, low-flow plumbing fixtures, low wattage LED lighting, efficient HVAC equipment, glazing and fenestration, insulation, roofing, lowVOC (volatile organic compound) painting and coating, Energy Management Systems, lighting controls, and daylight harvesting strategies. The District has already implemented a policy to minimize the exposure of building occupants to unhealthy off-gassing from indoor materials through and to environmental tobacco smoke. The District prohibits smoking in all buildings except in designated exterior parking lots. The exterior parking areas are at least 25 feet away from entries, outdoor air intakes, and operable windows.

The Sustainable RSCCD Committee has recommended the development of sustainable design standards for the renovation of existing buildings to ensure such buildings are more efficient, cost effective, and comfortable for their occupants. Many buildings on campus have been constructed using sustainable design criteria.

The newest building at Santiago Canyon College is the 90,000-square-foot. Humanities Building, which is a US Green Building Council LEED Gold Building. Sustainable features of this building include a photovoltaic system, a block exterior which requires little maintenance, lighting features that coordinate day-lighting with interior lighting, and drought-tolerant landscaping. It was also designed with low-VOC-emitting products to reduce the quantity of indoor air contaminants that are odorous, irritating, and/or harmful to the comfort and well-being of occupants. To attain an Indoor Environmental Quality LEED credit, the building was designed with the following adhesives and sealants in accordance with South Coast Air Quality Management District (SCAQMD) requirements to limit VOCs: carpet, rubber flooring, drywall, cover base, structural glazing, PVC welding, ABS welding, and top and trim adhesive. The following materials do not exceed Green Seal GS-11 (VOC content limit) and Green Seal Plus requirements; painting and coatings, carpet systems, and composite woods. Both the Humanities Building and the Gymnasium were designed and installed with a fluid-applied roof coating that contain low Solar Reflective Index (SRI) values promoting cooler roofs to avoid heat islands effects, also in pursuit of LEED credits. The cooler roofs reduce building cooling loads. As noted in section 4.3.1, staff have been trained in efficient operations of all campus facilities.

4.4.2 IMPLEMENT SUSTAINABLE DESIGN PRACTICES

All District new construction, renovation, maintenance, and repair projects are planned with consideration of optimum energy-efficiency, low life-cycle operating costs, and compliance with the District’s goals and all applicable energy codes and regulations. Energy efficient and sustainable design strategies are addressed early in the project planning and design phases to maximize cost effectiveness and are balanced with the academic program needs of the project.

Both campuses have made efforts to implement sustainable design practices and to research the best methods for implementation. At Santa Ana College, the Facilities Committee prepares a regular report which describes the sustainable building practices for buildings on campus. Santiago Canyon’s Humanities building embodies sustainable design with its outdoor teaching spaces, which were implemented in pursuit of LEED credits. The outdoor teaching environments are designed such that the

exterior concrete benches are equipped with data connections and power to allow the use of electronic devices to facilitate teaching.

4.4.3 USE AN INTEGRATED SYSTEMS APPROACH IN BUILDING DESIGN

Sustainable building goals will be evaluated in a cost effective manner by identifying economic and environmental performance criteria, evaluating life cycle savings, and adopting an integrated systems approach to design. Such an approach treats the entire building as one system and recognizes that individual building features, such as lighting, windows, heating and cooling systems, will be evaluated and designed as interactive systems.

As an example, the new parking structure planned at Santa Ana College is a potential location for a central cooling plant, which could be integrated into the design. The parking structure also provides an opportunity for integrating a large-scale solar photovoltaic facility into the campus. In addition, the College is considering the feasibility of a rainwater harvesting system, which would use the upper deck as a collection area.

4.4.5 COMMISSION NEW BUILDINGS & MAINTAIN APPROPRIATE OPERATIONS TO SUPPORT FUNCTIONALITY

The District performs new building commissioning after construction to ensure that systems were installed and operating as designed. Individual systems are also commissioned to ensure that they run as efficiently as possible. As part of the Measure 'Q' construction program, Proposition 39 projects, and scheduled maintenance projects, the Facilities Department will require new and renovation projects to contain a comprehensive commissioning plan as part of the project specifications. At Santiago Canyon the Athletics and Aquatics Center (completed in 2012) and Humanities Building (completed in 2014) have both been through the commissioning process.

4.5 ON-SITE GENERATION AND RENEWABLE ENERGY

As described below, the District has evaluated the potential for renewable energy and clean on-site generation. These goals are balanced by the philosophy that renewable generation implementation should occur only after significant efficiency and conservation plans have been implemented to ensure that any self-generation or demand response programs or projects are sized appropriately.

4.5.1 EVALUATE CLEAN COGENERATION AND RENEWABLE ENERGY GENERATION

The Facilities Master Plan contains goals to explore renewable energy opportunities. This has resulted in the development of comprehensive Photovoltaic System Feasibility Study encompassing both SAC and SCC. The results of this study are currently under review by District Facilities staff. In addition, a photovoltaic system has been recently installed on the 90,000-square-foot Humanities Building at Santiago Canyon College, which provides approximately 19% of the building's electricity.

4.5.2 EVALUATE LOAD SHIFTING TECHNOLOGIES

Load shifting technologies, such as thermal energy storage (TES), reduce HVAC energy and power consumption during peak hours. As part of the central plant project at Santa Ana, the campus is implementing an ice based TES system that will make use of load shifting technologies. The chiller will use off-peak energy for production of ice. This technology will reduce the energy costs required to produce the ice. The District will also implement load shifting technologies as part of the future central plant at the Santiago Canyon campus.

4.6 TRANSPORTATION, COMMUTING, AND CAMPUS FLEET & TRAVEL

Transportation at a typical community college accounts for over half of a GHG emissions from the campus. For this reason, Rancho Santiago CCD will strive to reduce Vehicle Miles Traveled (VMT) for students, faculty, and staff commuting to the campuses and encourage the use of low and zero emissions vehicles, public transportation, carpooling, and cycling in an effort to reduce greenhouse gas emissions and minimize the infrastructure costs related to parking. The District has set a goal to reduce the reliance of students, faculty, and staff on single occupancy vehicle commutes by 5 percent within the next five years. The following programs will be implemented to achieve this goal.

4.6.1 UNDERSTAND COMMUTE AND TRAVEL PATTERNS

In order to better understand commute and travel patterns, the District will conduct traffic counts and surveys to determine baselines for commuting trips and total Vehicle Miles Traveled to both colleges. The traffic counts and surveys will be updated periodically to monitor progress toward the reduction goals.

In addition, the employee and student Sustainability Survey (Appendix 2) conducted in 2014 included questions specific to transportation habits and requested suggestions on ways in which the District can facilitate increased use of alternative modes of transportation. Given these data and suggestions, the District is better prepared to implement and facilitate initiatives that will reduce the reliance on single-occupancy vehicle use. The survey results and individual responses were heavily considered during the development of this Sustainability Plan section.

4.6.2 ENCOURAGE AND ENHANCE PUBLIC TRANSPORTATION AND RIDESHARING OPTIONS

The District will or will continue to employ the following strategies to encourage and enhance public transportation and ride sharing options.

4.6.2.2 *Increase Awareness*

The District will be partnering with the South Coast Air Quality Management District (SCAQMD) to develop a program to raise awareness at both colleges about sustainable transportation options. This program, targeted to students, faculty, and staff, will encourage public transportation use by providing information and communicating the environmental and personal benefits of traffic alleviation.

4.6.2.3 *Facilitate Public Transit Use*

In spring of 2014 in conjunction with the preparation of this Sustainability Plan, the SRC conducted an online survey to students and staff campus to gain input on campus and District sustainability efforts. As identified in the Student, Faculty and Staff Sustainability Survey, students and employees alike identified the facilitation of public transit use as the most effective means to reducing their dependency on single-occupancy vehicles. Given these responses, the RSCCD Sustainability Committee will continue to work with the Orange County Transportation Authority (OCTA) to improve bus service to both District campuses and will explore options for discounted transit passes for RSCCD students and employees. Since this is a large concern of the District community, the SRC would like to create a District-Level committee inclusive of students, faculty, staff and possibility community members to spearhead all District transportation efforts.

Currently, Santa Ana College is served by two major bus routes that arrive every 10 minutes at peak times (Route 60 on 17th St and Route 57 on Bristol St). A third route arrives every 30 minutes (Route 51 on Flower). Santiago Canyon College, located in the City of Orange, is at the end of the only bus line that serves the campus. According to the Sustainability Survey, OCTA service is convenient for approximately 15% of students surveyed and only a handful of staff. Increasing and improving the OCTA service to the colleges is a high priority of the District.

4.6.2.4 *Incentivize Public Transportation and Carpooling*

The District currently operates a discounted student public bus pass program to encourage public transit use. The District is also exploring enhanced incentives to promote public transit and carpooling including:

- Promote current student transit passes through communication and/or promotional pricing (focusing on students whose home address is within a quarter of a mile of one of the bus routes serving the colleges)
- Explore a partnership with OCTA to offer student monthly passes (currently only 75-day and 120-day passes are available with a student discount, costing \$115 and \$185 respectively)
- Continue to explore partnering with Student Government to offer an on-going subsidized student transit pass program to facilitate students taking the bus to campus and reduce demand for parking
- Provide parking spaces in preferably located areas for carpools and electric/ hybrid vehicles

4.6.3 **ENCOURAGE AND ENHANCE BICYCLING OPTIONS**

Santa Ana College plans to partner with the City of Santa Ana on a bike-friendly city initiative to increase the use of bicycling as a means of transportation for staff and students. In 2013-2014, Santa Ana purchased additional bike racks to encourage alternative transportation options. The college hopes to continue encouraging bicycle use through the following measures:

- Add bike racks using the inverted-U style in locations recommended by transportation planning professionals
- Plan for and communicate the availability of showers on campus and the District Office

- Add bike lockers or other secure storage (possibly with an associated usage fee)

Approximately two years ago, Santiago Canyon added three bicycle racks on campus to the three existing ones. Since then, usage of the bike racks has noticeably increased.

In 2013, the District held a Ride to Work Day contest, to promote biking throughout both campuses and the District Office. The District will continue promoting bicycle use by sponsoring annual Bike to Work Day events.

4.6.4 IMPROVE CAMPUS FLEET & TRAVEL

Santa Ana College has worked to improve the campus fleet by replacing gas-powered maintenance carts with new, electric-powered carts. SAC also upgraded one of its security vehicles to a Prius hybrid vehicle and utilizes an electric Segway. The District will continue to upgrade its campus fleet with more fuel efficient vehicles as they are replaced.

4.6.5 ENHANCE STUDENT DISTANCE LEARNING

The District Educational Master Plan includes prioritizing the expansion and enhancement of distance-learning education course offerings. A full-time faculty coordinator was hired in July 2014 to manage the program, and an outreach and marketing plan will be developed to encourage student participation. To support distance education and other technology advancements, funding will be needed for faculty and staff to attend conferences and training workshops.

4.6.6 ENCOURAGE FUEL-EFFICIENT VEHICLES FOR COMMUTERS

The District has established a goal to encourage the use of low and zero emissions vehicles for commutes to campus. The surveys described above will assist the District in quantifying how many of these vehicles are already in use. Actions to encourage low and zero emissions vehicles include the following:

- Plans are underway for the installation of electric car charging stations at Santa Ana College and plans are underway for stations at Santiago Canyon College.
- RSCCD will also explore a preferential parking program consisting of “close-in” parking and reduced parking fees to encourage these vehicles for college commutes

4.7 WATER, WASTEWATER, AND SUSTAINABLE LANDSCAPING

Water conservation is an important component of sustainability and is aggressively pursued by both Santa Ana College and Santiago Canyon College. The current drought makes water conservation imperative. The District strives to reduce potable water use as well as waste water discharges to both the sewer and storm water systems. In addition, the District reduces waste water pollution by minimizing chemical fertilizers and pesticide use in association with landscaping practices.

The following implementation programs have been completed or are planned for the District.

4.7.1 ESTABLISH WATER CONSERVATION GOALS

The District will perform water use benchmarking studies at both campuses and the District Office to better understand usage as compared to similar facilities and community college peers. Based on the results, the District will establish annual water use reduction goals and plan new appropriate measures to achieve goals.

4.7.2 IMPLEMENT WATER CONSERVATION STRATEGIES

Both Santa Ana and Santiago Canyon have implemented water conservation strategies through various projects on their respective campuses. For example, Santiago Canyon College is currently working with the Irvine Ranch Water District (IRWD) to utilize reclaimed water to irrigate the athletic fields. Although the area is served by the IRWD, the recycled water is provided through a partnership from the City of Orange Water Department.

In addition, the new Humanities and Gymnasium buildings at SCC were designed with low-flush volume toilets with automatic operation resulting in reduced water usage. Low-flush urinals were also installed and plans have been made to install more when funding is available. Synthetic turf has also been installed on the softball field to reduce the need for water, fertilizer, and pesticides.

Santa Ana College has installed new efficient, low-flow irrigation systems in all of its new perimeter landscaping as well as efficient irrigation valves to reduce its water use on campus. A new tournament-quality artificial turf soccer field was recently installed to reduce the use of water, fertilizer, and pesticides, as well as GHG emissions related to lawn mowers.

Finally, the District would like to explore the feasibility of greywater systems, which capture and repurpose used water for flushing toilets or irrigation. It will aim to pilot a greywater system at one of the campuses.

4.7.3 REDUCE STORM WATER, SEWER DISCHARGES, AND WATER POLLUTION

Efforts to promote sustainable storm water management is a key component of the District's planning for environmental stewardship. Storm water management has been a concern of the District and an environmental issue in Southern California for many years. Drought and long dry seasons followed by frequent, sometimes heavy rains contribute to the flushing of pollutants into the Santa Ana River and the Pacific Ocean. The District Master Plan provides policies for the incorporation of best management practices and employs natural processes to filter and retain the flow of storm water. Opportunities for bioswales and rain gardens have also been explored. Rain gardens will be used to retain and percolate water for building roof drains. The incorporation of bioswales at SCC was investigated and designed by students as part of the Green Infrastructure Construction course. Bioswales will be incorporated in large areas of impervious paving, including roads and parking lots.

The City of Santa Ana storm water drainage system has a finite capacity, and efforts to retain or detain storm water on the campus significantly reduce the College's environmental impact. As future

development occurs, the District will explore the feasibility of harvesting storm water to replace potable water used for irrigation and other uses.

Erosion control systems and best management practices on the construction program have also been implemented. The District has employed a Storm Water Pollution Prevention Program consultant to inspect, monitor, and advise construction personnel and the District on best practices.

4.7.4 ADOPT SUSTAINABLE LANDSCAPING PRACTICES

Various sustainable landscaping projects have been implemented on both campuses, such as the Campus Landscape Improvement Program at Santa Ana College and the Coastkeeper Garden at Santiago Canyon College. The Coastkeeper Garden is a project where SCC leases some of its property to the non-profit Orange County Coastkeepers, who have built a demonstration garden open to the public featuring sustainable landscape techniques. SCC has also undergone campus landscaping projects using native or adaptive plant materials to reduce or eliminate irrigation requirements. Highly water efficient irrigation equipment is employed where irrigation is required. Moving forward, the District will continue to landscape with native plants and employ water-wise landscaping practices.

4.8 SOLID WASTE REDUCTION AND MANAGEMENT

The District strives to minimize solid waste to reduce greenhouse gas emissions and landfill deposits. If designed and implemented effectively, minimizing solid waste can save the District money and create revenue streams that can be reinvested in the campus. The District will employ the principles of “Reduce, Reuse, and Recycle” in its solid waste reduction program.

The following programs will be implemented at the District to manage solid waste and reduce landfill deposits.

4.8.1 CREATE WASTE REDUCTION GOALS

The District has established goals to improve existing landfill diversion programs, expand it to include all sectors of recycling and waste reduction to landfills, and strive to meet the statewide recycling goal of 75% by 2020. The District will monitor progress toward these goals by utilizing the diversion reports provided by its contracted waste haulers.

4.8.2 MAXIMIZE PROGRAMS OFFERED BY CONTRACTED WASTE HAULER

The District is severely limited on service offerings for recycling and green waste and food waste composting based on options from its contracted waste hauler. Currently, all waste is picked up in single-stream form from the campuses and recycling is performed at the local Materials Recovery Facility (MRF), where recyclable material is separated from landfill waste. The SRC waste management subcommittee is working to establish a scope of services for expanded recycling options for the District and will rebid the contract to include these additional services by mid-2015.

4.8.3 REDUCE THE WASTE STREAM TO THE LANDFILL

The District and colleges will act to reduce the waste stream to the landfill by making resource conservation an integral part of its waste reduction and recycling programs. They will integrate the concept of resource conservation by employing the strategies of reduce, reuse, and recycle into its environmental programs. Santiago Canyon College has made efforts to avoid an increase in what goes to landfills despite the increase in student population and in facilities over the past few years.

4.8.3.1 *Raise Awareness of Waste Reduction*

The District and colleges will actively advocate, where appropriate, for resource conservation practices to be adopted at the local, state, and national levels. Both colleges have conducted awareness efforts to improve recycling, and the Santiago Canyon College Facilities Committee is planning to advertise recycling with promotional activities that explain its benefits.

4.8.3.2 *Minimize Unnecessary Waste*

The District will explore the installation of water bottle refilling stations or enhance current water fountains to better accommodate bottle refills. This will encourage the use of reusable bottles, thereby reducing the amount of plastic water bottles purchased and thrown in the waste stream.

The Santa Ana “Don” Bookstore and the Santiago Canyon “Hawk” Bookstore encourages the reuse of student textbooks through their textbook “buy-back” and “swap” programs where students are able to sell or exchange their books with the store or other students.

4.8.3.3 *Reduce Paper Use*

Santiago Canyon’s Facilities Committee hopes to promote the use of electronic media in place of the enormous amount of paper used for syllabi and class handouts. SCC further reduces paper use by employing a standard of double-sided copies at the college printing center. In addition, any white paper discarded at the copy center, which is unused on one-side, is collected and used in the math tutoring center as scratch paper. As captured in the Sustainability Survey results, many faculty throughout the district request electronically submitted student assignments and incorporate other paper waste reduction measures, such as providing course materials online.

4.8.3.7 *Support Producer Responsibility Programs*

The District will consider modifying its current purchasing practices by purchasing from more providers who are environmentally and socially responsible. Currently, the District purchases recycled products, where financially feasible and plans to encourage suppliers, both private and public, to make more recyclable products and unbleached paper products available for purchase.

4.8.4 IMPROVE EXISTING RECYCLING PROGRAMS

As described above, the District is working with its contracted waste hauler to implement a source-

separated recycling program. This may require that the District work with the municipalities where each campus is located to negotiate enhanced services at each campus.

In addition to administrators, students are also concerned about recycling efforts on campus. Currently, community members come on campus and recycle bottles and cans from the trash receptacles for their own needs. Efforts are being made to build a more robust recycling program that would include construction debris, cardboard, mulching and green waste.

At Santiago Canyon, the Humanities building was designed such that free-standing recyclable and trash receptacles are strategically placed in certain key locations of the building to promote recycling, in pursuit of a Storage and Collection of Recyclables LEED credit. Throughout campus a Paper Collection and Recycling Program has also been implemented, and there are plans to place more recycling bins around campus.

4.8.6 GREEN WASTE AND FOOD WASTE COMPOSITING

Santiago Canyon's current contract agreement with its landscape contractor requires that none of the green waste goes to landfill but goes toward composting, thus reducing the waste stream to the landfill and GHG emissions.

Moving forward, the District would like to explore the possibility of a district-wide food-waste composting program.

4.8.7 ADOPT CONSTRUCTION AND DEMOLITION (C&D) RECYCLING

As part of the Measure 'E' and Measure 'Q' building program, all new construction projects contain construction waste management specifications requiring that contractors separate Construction and Demolition (C&D) recyclable material from the construction waste. The contractors separate C&D waste on-site in three categories: re-use or recycle on-site, transport to approved recyclers, and transport to legally designated landfills. The C&D recycling goal is 50% of material diverted from the landfill. The contractor is required to provide a monthly report to verify the target amounts.

4.8.8 CONSIDER FEASIBILITY OF ON-CAMPUS RECYCLING

In addition to working on the expansion of recycling options offered by the District's waste-hauler, SRC would like to explore the feasibility of on-campus recycling.

4.9 GREEN PURCHASING

Rancho Santiago CCD will establish districtwide purchasing policies to meet the goals of environmental, economic, and social sustainability and to use its market power to influence suppliers to be more sustainable.

4.9.1 SUSTAINABLE FOOD PURCHASING

The impacts of food sustainability are far reaching and complex. The District will take into account the sustainability of food served on campuses when making decisions regarding food purchasing. Food sustainability and quality was a concern highlighted by students and faculty in the spring 2014 Student Sustainability Survey. In response to these suggestions, Santa Ana and Santiago Canyon College will explore healthier cafeteria food options, including vegan, vegetarian, organic, and locally produced items.

4.9.2 GREEN PURCHASING PRACTICES

With assistance from the US Environmental Protection Agency's (EPA) Comprehensive Procurement Guidelines, RSCCD will create a Green Purchasing Policy in 2015 aimed at campus-wide, sustainable procurement.

4.9.2.1 Establish Requirements for Minimum Recycled Content

The Director of Purchasing for the District will work with departments to establish minimum recycled content standards for designated recycled products to maximize recycled product availability and recycled content.

4.9.2.2 Establish Standards for Green Purchasing

The District and colleges will use recycled products and recycled materials to meet their needs when possible. The District will require its contractors and consultants to use and specify recycled products in fulfilling contractual obligations whenever practical. A list of recycled products will be maintained and will be made available to all departments as a purchasing resource. Updates to the list will be made as new products become available. The District currently purchases Green Seal janitorial products and "green" custodial paper products and will continue to do so in the future.

4.10 STUDENT AND CURRICULUM DEVELOPMENT

The primary purpose of the California Community College system is to educate students and foster their success by preparing them for the careers of tomorrow. The mission of Rancho Santiago CCD is to deliver high quality instruction to students both within and beyond traditional geographical boundaries and to provide an open and welcoming culture that supports student completion and success. With the economics of environmental sustainability becoming increasingly important in all facets of society, the District has a responsibility to play a role in moving current and future generations toward a sustainable future.

To better prepare its students to pursue a career path within the "green" economy and become responsible stewards of the environment, RSCCD will strive to creatively integrate sustainability into existing course curricula within and beyond the STEM field, promote student enrollment in new and existing courses with emphasis on sustainability, and develop new curricula and career-oriented certificate and training programs with a focus on these topics.

In addition, as RSCCD moves forward with redesigning and retrofitting its campuses and facilities in greener ways, it will strive to utilize these projects as hands-on learning opportunities for students. These so-called “living laboratory” projects merge academics and campus facilities management to provide students with real-world skills and, for the District, a path to meet its sustainability goals. Through the Sustainability Plan initiatives elaborated upon below, faculty, staff, administrators, and students will have opportunities to collaborate, participate, and serve as effective agents for positive change.

4.10.1 CREATE A SUB-COMMITTEE IN THE ASSOCIATED STUDENT GOVERNMENT DEVOTED TO SUSTAINABILITY

Santiago Canyon College Associated Student Government (ASG) has recently established a student leadership position to promote and gain involvement of campus students in environmental issues and sustainability initiatives on campus. To support this role, the campus would like to consider creating a sub-committee devoted to sustainability. The roles and responsibilities for this sub-committee will need to be determined, one of which will be to attend regular meetings with the sustainability sub-committee of the Academic Senate, discussed in section 4.10.6.

4.10.2 PROVIDE PROFESSIONAL DEVELOPMENT AND CREATE A FACULTY FORUM

Since faculty drives change in curriculum, professional development and recognition are key drivers of sustainability curriculum development. Santa Ana and Santiago Canyon College will incorporate sustainability topics within professional forums and Flex Day workshops for faculty to share ideas around curriculum enhancements and revisions. From these events, the colleges will create a working committee of faculty tasked with the implementation and advancement of the RSCCD “Curriculum Development” goal outlined in Section 3 of the Plan.

4.10.3 UTILIZE DIFFERENT PATHWAYS TO INTEGRATE SUSTAINABILITY IN THE CURRICULUM

The Community College Academic Senate Curriculum Committee indicates that faculty members at CCCs are currently integrating sustainability in the curriculum in three main ways: by adding a component to an existing course outline of record, creating a new course, or creating a new certificate or degree program. The District employs these strategies as described more fully below, and all strategies will require leadership from faculty for adoption.

4.10.3.1 *Adding a Component to an Existing Course Outline of Record*

Both Santa Ana and Santiago Canyon Colleges have several courses that incorporate principles of sustainability through the course curriculum, projects, and assignments:

Santiago Canyon College

Biology 109 – Fundamentals of Biology – Biology 109 focuses on the principles of biology and stresses the relationship of all organisms from anatomical, physiological and ecological points of view. Includes cell machinery, genetics, reproduction, embryology, animal behavior, botany, ecology, evolution and human physiology. The course dedicates lab exercise to environmental issues, which includes an in-depth

discussion of the human ecological “footprint,” global warming, and the effects of the human population on the environment. Students are recommended to concurrently enroll in Biology 109L, which is the laboratory component of the course.

Biology 109L – Fundamentals of Biology Laboratory – This laboratory section includes experiments to identify and illustrate significant organisms and their structures. Emphasis is placed on the relationship of all organisms from an anatomical, physiological, and ecological framework.

Biology 200/ Environmental Studies 200 – The Environment of Man – Sustainability is fundamental to the class, as it touches on environmental problems such as energy, resources, pollution, land use, population and food, including economic and political factors.

Business 150 – Introduction to Information Systems and Applications – This course is an introduction to computer concepts and management information systems. Students learn to use application to solve business problems. Included in the course is a discussion on computer and technology recycling programs.

History 240 – Introduction to Peace and Conflict Studies – Historical, social and economic development of the world order along with a wide range approach integral to the examination of global studies and peace and conflict resolution. The study of peace and conflict areas to include the war system, war prevention, nonviolence, human rights, social justice, environmental sustainability and the role of the United Nations and other international governing bodies.

Public Works 069 – Green Infrastructure Construction – This course covers the use of green infrastructure (vegetation, soils, and natural processes) to manage storm water runoff and create healthier urban environments. Students will learn the principles and techniques of Low Impact Development (LID) and how storm water runoff controls/best management practices (BMPs) that utilize LID can help support sustainable communities while providing habitat, flood protection, cleaner air, and cleaner water. Students will also learn the process for selecting, siting, and sizing LID BMPs for various project types, as well as inspection and verification and operation and maintenance protocols. As part of the course curriculum, students participate in the *Campus RainWorks Challenge* sponsored by the United States Environmental Protection Agency (USEPA) where they design an innovative green infrastructure project on campus that demonstrates how managing storm water at its source can benefit the campus community and the environment.

Sociology 100 – Introduction to Sociology – Sociology 100 focuses on the scientific study of human societies and behavior focusing on the process of social interaction, patterns of social inequality, and the influence of social institutions on individuals as members of social groups. Environmentally sustainable practices are both formally and informally integrated in the classroom and coursework through education about the environment, social change, and volunteerism.

Santa Ana College

Anthropology 100 – Introduction to Cultural Anthropology – A cross-cultural survey of the major areas of cultural anthropology including subsistence patterns, economic and political systems, family and

kinship, religion, and cultural change. Also includes contemporary issues facing humankind such as the environment, resource depletion, ethnic conflict, globalization, and warfare. Emphasis is on understanding cultural diversity and cultural universals.

Automotive Technology 085 – Basic Clean Air Car Course – A Bureau of Automotive Repair recognized Basic Clean Air Car Course, which prepares students for the State Smog Technician Exam.

Biology 109 – Fundamentals of Biology – See above under Santa Ana College courses.

Biology 111 – Marine Biology – This course covers basic concepts of marine ecosystems including oceanographic principles, ecology and a survey of marine habitats and diversity of marine organisms. Half of the designated course hours are dedicated to laboratory experiments.

Biology 127 – Ecology – Introduction to the basic principles of ecology. Study of ecosystems, biomes, and the relationships of plants and animals in the natural world.

Biology 128 – Natural History of the California Coast – A field study course focused on the ecological study of plant and animal life of the southern and central California coast.

Biology 129 – Ecology of Southern California – Identification and study of the plants and animals of the ocean, mountain and desert regions of Southern California with emphasis on the organisms relationship to their environment. This is a field study course and includes overnight camping.

Biology 170/ Environmental Studies 170 – Environmental Challenge of the 21st Century – Examines the environmental impacts of increased human population on food, water and energy resources. Land use policies and environmental effects of pollution will also be analyzed.

Biology 200/ Environmental Studies 200 – The Environment of Man – See above under Santa Ana College courses.

Biology 212 – Animal Diversity and Ecology – A study of ecological principles, and relationships between animal diversity and ecosystems. Habitat, populations, ecological interactions, and environmental influences are stressed while surveying animal diversity and addressing structure, function, behavior, and adaptation of major taxonomic groups. Two-thirds of the designated course hours are devoted to laboratory experiments.

Biology 214 – Evolution and Plant Diversity – Principles and processes of evolution leading to biodiversity. Survey of the organisms, viruses, prokaryotes, fungi, algae, and plants with emphasis on evolutionary adaptations of the anatomy, physiology, and life cycles of these organisms. Two-thirds of the designated course hours are devoted to laboratory experiments.

Biology 259 / Environmental Studies 259 – Introduction to Environmental Biology – This course includes the study of ecosystems, population dynamics, and classification, diversity of plant and animal species, effects of pollutants at both the cellular and organismal levels and principles of ecology. Half of the designated course hours are dedicated to laboratory experiments.

Chemistry 109 – Chemistry in the Community – The non-science major will study practical applications of chemistry and the chemical principles behind them including: the scientific method, atomic structure, molecular models, and chemical reactions. Environmental and community issues will be the focus of student centered laboratories, discussions and field trips. Group work and computer activities will be used in this cooperative learning environment. May be repeated.

Engineering 143 – Fundamentals of Construction Engineering/Construction (AEC) Drafting Standards – An overview of residential, commercial, institutional, industrial, and heavy civil construction and associated codes, standards, and ethical boundaries. Areas of focus to include type of foundations, materials, contract documents, working drawings and vocabulary. Includes an introduction to LEED/Green Construction.

Engineering 165 – Introduction to Energy – See above under Santa Ana College courses.

Engineering 175 – Introduction to Energy Analysis – See above under Santa Ana College courses.

Engineering 203 – Sustainable Construction and Facilities Management – This course provides students the means to apply core sustainable principles to each step within the facilities planning, design and management process. It examines best practices for site and building: energy, conservation, reclamation, recycle-ability, air, water, waste, sound, ecological literacy, and management tools.

English 101 – Freshman Composition – This course emphasizes expository and argumentative essays and the completion of a research paper. In certain course sections, environmental topics are emphasized in course material, essays and presentations.

Environmental Studies 140/ Geology 140 – Environmental Geology – This course focuses on the study of urban geologic hazards: earthquakes, groundwater pollution, flood potential, landslides and creep, soil expansion, coastal erosion, and volcanic hazards.

Geography 102 – Cultural Geography – An introductory survey of the geography of culture, and the influences of the physical environment on culture, along with the impact of human activity on the environment, and the role of culture within societies and social groups. The course includes global patterns of population, migration, religion, language, agriculture, politics, customs, resources, and urban and rural settlement.

Geology 150 – Introduction to Oceanography – Introductory study of the ocean and its topography, sediments, circulation, shoreline processes, biological productivity and mineral resources.

Centennial Education Center / Orange Education Center

English as a Second Language (ESL) – ESL curriculum develops the ability of non-English speaking students in basic literacy skills, including letter and number recognition/production, simple personal

information, and basic oral communication in preparation for enhanced job opportunities. Sustainability topics, vocabulary, and lessons are incorporated within the curriculum.

4.10.3.3 *Create a New Certificate or Degree Program*

The following sustainability-related degree and certificate programs are currently offered by RSCCD:

Earth Science Degree – The associate degree curriculum in Earth Science prepares students for transfer to a four-year institution leading to a baccalaureate degree in Earth Science or Geology. A baccalaureate degree in Earth Sciences may provide the recommended content preparation for students interested in teaching science at the middle school level or are planning to go to law school in the area of Environmental Law or Public Policy. Students may also gain skills necessary for opportunities with Geotechnical or Environmental consulting firms or with government agencies such as the National Park Service.

Energy Analysis Degree & Certificate – This degree program trains students for work in energy analysis and auditing. Students completing training will be prepared for work performing Title 24 energy calculations or for work in utility companies, or private companies that do energy analysis and auditing. Course work includes: Engineering 165, Engineering 175 (described above).

Sustainable Facilities Management Certificate – The certificate in Sustainable Facilities Management at Santa Ana College is focused towards training the student in sustainable methods for improving the operational performance of offices, schools, hospitals, and other residential and commercial buildings. It will provide needed skilled and qualified workers, particularly as building technologies become more advanced.

Water Utility Science Degree & Certificate – The Water Utility Science program and certificate at Santiago Canyon offers a wide range of courses that directly apply to water distribution, treatment, and wastewater management. The program provides a great opportunity for students to be trained in a growing and important field centered on environmental sustainability. With completion of the program, students are prepared for entry-level jobs in the water distribution, treatment and water reclamation industries. The associate of science degree provides coursework and internship experience designed to provide an overview of a wide range of environmental career opportunities.

Moving forward, the faculty at Santa Ana and Santiago Canyon would like to explore the creation of additional certificate and degree programs inclusive of environmental sustainability. Students have also expressed their desire for development of more environmental programs. When asked what kinds of programs and services Santiago Canyon College should offer in the spring 2014 survey, most participants touched on developing programs in the areas of High Technology and Green Technology. For example, participants suggested that the college should not only expand upon its signature programs in Water and Surveying, but also develop green technology programs and create environmental studies and sustainable studies programs.

4.10.4 **ADVOCATE FOR CHANGE AT THE STATEWIDE LEVEL**

The Sustainable RSCCD Committee hopes to advocate for sustainability on a larger scale by sending

representatives from both the SRC and the Campus Facilities Committees to the annual Higher Education Sustainability Conference. This will provide a venue for learning, sharing experiences with other higher education institutions, and collaborating statewide on various sustainability initiatives and programs.

4.10.5 TRAINING OPPORTUNITIES FOR STUDENTS

Students can enhance the learning done in the classroom environment with hands on experience by applying what they have learned to the real world. The District will employ the following strategies to enhance student learning outside of the classroom.

4.10.5.2 Facilitate Hands-On Campus Projects

RSCCD would like to incorporate “living laboratory” opportunities for students, as explained in the introduction to section 4.10, wherever possible. It will continue to explore this concept by creating the appropriate working groups at both Santa Ana and Santiago Canyon College, consisting of instructors, facilities, and staff. Once these groups are established, the colleges would like to focus on integrating at least one “living laboratory” project within course curricula at each college, per semester. For further information regarding this topic and how to effectively incorporate it into the community college setting, please see Appendix 4, “The Campus as a Living Laboratory – Using the Built Environment to Revitalize College Education: A Guide for Community Colleges.”

RSCCD is currently integrating hands-on learning projects in the following ways:

- The Green Infrastructure Construction (Public Works 069) course at SCC which, as described in detail above, has students participate in the *Campus RainWorks Challenge* where they design an innovative green infrastructure project on campus that demonstrates how managing storm water at its source can benefit the campus community and the environment.
- Biology faculty at Santa Ana oversee a group called the Green Task Force, which works to identify recycling projects and organizes Earth Day events. Recently, the Associated Student Government (ASG) committed to improving District recycling efforts and generating greater student interest. The Administrative Services Department agreed to provide recycling bins for cans and bottles to assist in this effort. Students will regularly empty them along with the current containers used for paper recycling. The students will then deliver the collections to recycling centers.

In addition, students have expressed interest in other facilities-related projects such as replacing old restroom faucets with more water efficient fixtures, working on drought-tolerant landscape and efficient-irrigation renovations, and the installation of water bottle filling stations to reduce the use of disposable water bottles. RSCCD looks forward to formally integrating these and similar opportunities into relevant course curriculum or student organizations.

4.10.5.4 Invite Notable Speakers

Santiago Canyon College 2014 Earth Day event featured several guest speakers who presented on a variety of sustainability topics.

4.10.5.5 *Support Student Committees & Clubs*

The District Master Plan states that the District will engage student organizations and clubs and support student activities designed to improve sustainability.

Student Clubs at Santa Ana College include the Collegiate Alliance for Positive Environmental Stewardship (CAPES) Engineering Club. Students involved in CAPES participate in activities that focus on sustainable topics such as sustainable design and building with solar.

4.10.6 JOINT MEETING WITH FACULTY & STAFF (ACADEMIC SENATE) AND STUDENTS (ASSOCIATED STUDENT GOVERNMENT)

Both campuses would like to explore the possibility of holding regular sustainability meetings with individuals from the Academic Senate and the sustainability subcommittee within the Associated Student Government to foster on-going communication and collaboration between faculty, staff, and students.

4.11 CAMPUS AND COMMUNITY OUTREACH & AWARENESS

The sustainability of a college is highly dependent on the actions of individual students, faculty, administration, and staff. While the installation of energy-efficient equipment or provision of recycling receptacles can make a District more sustainable, fostering a campus culture centered on environmental sustainability and positively influencing behavior are crucial to the overall effectiveness of these programs. Additionally, it is important to maintain transparency and inform the campus and local community of the District's progress with sustainability plan implementation. This is hard work and contributions to the sustainability of the District should be recognized. The District will implement the following programs related to campus and community outreach and awareness.

4.11.1 CREATE A WEBSITE DEDICATED TO CAMPUS SUSTAINABILITY

The District has established a website to publicize the activities of the Sustainable RSCCD Committee. The website identifies committee members, contains meeting agendas and minutes, as well as describing other sustainability activities going at campuses and the District level. The Sustainable RSCCD Committee's web page can be found here:

<http://rscdd.edu/Discover-RSCCD/Pages/Sustainable%20RSCCD%20Committee.aspx>

4.11.3 SUSTAINABILITY EVENTS

Since 2013, the District has worked with student clubs to plan, organize, and hold Earth Day events at each campus. Santa Ana College's annual sustainability event, "Sustain-a-Palooza," which started in 2013, has been a success, with overflowing crowds, informational presentations, speakers and involvement by a number of campus clubs. At the 2014 event, a presentation to students was given to inform students of the RSCCD Sustainability Plan creation and vision. Students were given the opportunity to provide input to the plan and suggestions for improved sustainability on campus. All of these suggestions have been reviewed by the Sustainable RSCCD Committee and considered for

implementation, and several have been incorporated into this Sustainability Plan. A list of the student input from the “Sustain-a-Palooza” event can be found in Appendix 3.

At Santiago Canyon College, students have organized an on-going, periodic campus clean-up day. Moving forward, both colleges hope to plan reoccurring volunteer days focused on the environment through student-run sustainability clubs.

The Transportation Subcommittee of the Sustainable RSCCD Committee proposes to designate a day in May of each year as “Ride Your Bike to Work Day”. The District will publicize the event and provide prizes for participants to encourage bicycling to campus and reducing vehicle commutes.

4.11.4 CAMPUS SPECIFIC OUTREACH & AWARENESS

The SRC publishes a Sustainable RSCCD e-newsletter to inform the campus community about sustainability news and events.

In spring of 2014 in conjunction with the preparation of this Sustainability Plan, the SRC conducted an online survey to students and staff campus to gain input on campus and District sustainability efforts. Over 730 students and 200 faculty, staff and administrators completed the survey and provided valuable insight and recommendations for improved sustainability on campus. The SRC will use the survey responses to help the District achieve its sustainability goals. In addition, specific recommendations provided by students, faculty, and staff have been included in the Sustainability Plan for future implementation. The SRC will conduct similar surveys on an annual basis to measure the District’s progress in the field of sustainability (using the 2014 survey as a baseline), provide a means for student and employee involvement, and to act as a tool informing students, faculty, and staff of the District’s ongoing commitment. The Survey Results are attached in Exhibit 2 of the Plan.

4.11.5 COMMUNITY SPECIFIC OUTREACH & AWARENESS

The RSCCD Master Plan states that the District will work to foster community partnerships related to sustainability. Specific to this effort are the public transportation needs of the campus community and discussions held between the District and local transportation officials. Please see section 4.6 for the ways in which RSCCD plans to partner with community members and organizations to reach their transportation goals.

4.12 CREATE A CLIMATE ACTION PLAN

4.12.5 MAKE A COMMITMENT TO REDUCE GREENHOUSE GAS EMISSIONS

Moving forward, RSCCD may want to discuss the possibility of becoming a signatory to the American College and University Presidents’ Climate Commitment (ACUPCC). Signatories of the ACUPCC agree to complete a greenhouse gas (GHG) inventory; create an action plan with targets and milestones for reducing emissions; integrate sustainability into curriculum; and make their plans, inventory, and progress reports publicly available.

SECTION 5.

MEASURE AND REPORT PERFORMANCE

As with any successful program, the ongoing progress and performance of sustainability plan activities should be *monitored and compared to goals and criteria*. This will require continuous participation of the Sustainable RSCCD Committee, students, faculty, and staff, and other participants in the process. To communicate results and ensure transparency and accountability, the *results of the Sustainability Plan activities should be communicated to the larger campus community on a regular basis*.

The following section describes the planned process for measuring and reporting sustainability activities and achievements.

5.1 MEASURING PERFORMANCE

In order to monitor the Districts progress towards its sustainability goals, the SRC plans to collect information on the following key metrics at the regular intervals described below. In addition, the table below indicates responsibility for the accomplishment of each goal to meet the timelines established.

Goal No.	Goal	Goal Description	Performance Metric and Frequency of Measurement	Responsibility
1	Campus & Community Engagement	Encourage participation in and awareness of sustainability issues through effective education and engagement. Integrate sustainability into all facets of student life, including student government, clubs, and organizations.	Develop and implement a program to raise awareness in the campus community to inspire behavioral changes to enhance sustainability. Increase community awareness and support of the college sustainability efforts through the use of targeted media. Develop a Campus & Community Engagement Plan by the Spring Semester of 2015 with implementation by the Fall Semester of 2015.	RSCCD Chancellor's Office President's Cabinet, each College Director of Public Affairs & Publications Associated Student Government
2	Curriculum Development	Facilitate the inclusion of environmental sustainability and social responsibility into existing curriculum and develop new curricula and career-oriented certificate and training courses with an emphasis on sustainability.	Develop an Implementation Plan to achieve Curriculum Goals by the Spring Semester of 2015.	Academic Senate College Curriculum Committee VP of Academic Affairs, each college

Goal No.	Goal	Goal Description	Performance Metric and Frequency of Measurement	Responsibility
3	Energy	Perform energy use benchmarking studies at both campuses and the District Office to better understand District energy use as compared to similar facilities and community college peers. Based on the results, establish annual energy use and demand reduction goals and plan appropriate energy efficiency, demand reduction, or clean self-generation measures to achieve goals.	Utilize 2012-2013 benchmark study to establish annual energy use and demand reduction goals (target 5% reduction). Plan appropriate energy efficiency, demand reduction, or clean self-generation measures by mid-2015 to meet reduction goals.	VP of Administrative Services, each college Facilities Committee Assistant Vice Chancellor Facility Planning, District Construction & Support Services Facilities Manager, each college
4	Facilities Design & Operation	Design and construct all major capital projects and renovations to meet LEED Silver “equivalent” standard and operate facilities to meet solid waste, energy, and water use reduction goals. Employ sustainable landscaping practices.	All major capital projects and renovations shall meet LEED Silver “equivalent” standard. Require this standard with all design and construction contracts starting immediately. Working with the CCC/IOU Partnership, develop a Retro-commissioning (RCx) and Monitoring Based Commissioning (MBCx) implementation program to improve energy efficiency of major facilities operations. RCx/MBCx program to be completed and adopted by end of 2015 and updated every two years.	VP of Administrative Services, each college Facilities Committee Assistant Vice Chancellor Facility Planning, District Construction & Support Services Facilities Manager, each college

Goal No.	Goal	Goal Description	Performance Metric and Frequency of Measurement	Responsibility
5	Solid Waste Management	Continue to implement the landfill diversion program, expand it to include all sectors of recycling and waste reduction to landfills, and strive to meet the statewide landfill-recycling goal of 75% by 2020.	Strive to meet the statewide landfill diversion goal of 75 percent by 2020. Establish 2014 as a baseline year for diversion measurement and develop a plan with appropriate measures by mid-2015 to meet goals. Evaluate diversion results annually and update program as needed to meet goals.	<p>Vice Chancellor for Business Operations and Fiscal Services</p> <p>VP of Administrative Services, each college</p> <p>Facilities Committee</p> <p>Assistant Vice Chancellor Facility Planning, District Construction & Support Services</p>
6	Sustainable Procurement	Implement efforts to source campus food, materials, supplies, information technology, equipment, and resources from organizations committed to social responsibility and environmental sustainability.	Develop procurement standards to achieve sustainable procurement goals by the Spring Semester 2015. Implement standards in all areas of procurement concurrent with adoption of standards.	<p>VP of Administrative Services, each college</p> <p>Vice Chancellor for Business Operations/Fiscal Services</p> <p>Director of Purchasing, each College</p> <p>Director of Public Affairs & Publications</p>

Goal No.	Goal	Goal Description	Performance Metric and Frequency of Measurement	Responsibility
7	Transportation	Reduce the reliance of students, faculty, and staff on single occupancy vehicle commutes by 5 percent within the next five years, and encourage the use of low and zero emissions vehicles.	Conduct annual traffic counts and surveys to determine baselines for commuting trips and total Vehicle Miles Traveled to both colleges. Update traffic counts and surveys annually to monitor progress toward 5% reduction goals. Develop programs and projects by the end of 2015 to meet goals.	RSCCD Chancellor's Office VP of Administrative Services, each college Assistant Vice Chancellor Facility Planning, District Construction & Support Services Director of Public Affairs & Publications Associated Student Government
8	Water Management	Perform water use benchmarking studies at both campuses and the District Office to better understand usage as compared to similar facilities and community college peers. Based on the results, establish annual water use reduction goals and plan appropriate measures to achieve goals.	Perform benchmarking studies by 2015. Establish annual water use reduction goals (minimum 5% below average for similar facilities) and plan appropriate measures to meet reduction goals by the end of-2015 for implementation.	VP of Administrative Services, each college Assistant Vice Chancellor Facility Planning, District Construction & Support Services Facilities Manager, each college

5.2 REPORTING PERFORMANCE

In order to keep the campus community informed of the progress of the Sustainability Plan activities, the SRC will publicize sustainability activities on the Sustainable RSCCD Committee web site. Additionally, the Committee will summarize activities, metrics, and progress towards goals in an annual report to the District Board of Trustees, which will be available publicly on the sustainability website.

5.2.1 CAMPUS WORKSHOPS

The Sustainable RSCCD Committee will hold periodic workshops open to all campus members throughout the planning and implementation phases of the project. This will be designed to encourage a two-way dialogue where information is provided to the campus community and feedback is solicited and incorporated into the plan.

APPENDICES

Appendix 1 – Programs and Plans Checklist

Appendix 2 – 2014 Sustainability Survey Results

Appendix 3 – 2014 Santa Ana College “Sustain-a-palooza” Student Input

Appendix 4 – “The Campus as a Living Laboratory – Using the Built Environment to Revitalize College Education: A Guide for Community Colleges”

Appendix 1 Programs and Plans Checklist

The completed Implementation Programs and Planning Checklist is attached. The checklist reflects the Programs and Projects identified in Section 4 of the Sustainability Plan. For each selected program or project, the priority, current status, associated plan goal, target completion date, and responsibility assignments is indicated on the Checklist Summary Report.

The Implementation Programs and Plans Checklist will be used by the Sustainable RSCCD Committee to manage the implementation of the Sustainability Plan.

**Sustainability Template Plan Summary
Implementation Programs and Checklist**

District: Rancho Santiago Community College District
Santiago Canyon College, Santa Ana College, District Office, Centennial Education Center, Orange
Campus: Education Center
Project: Sustainability Plan
Date: 2/20/2015

Click Here to go to
Output Tab

Plan Section	Template Plan Section Description	# of Programs Available	# of Programs Selected	# of Selected Programs Ongoing & Completed
4.1	Management and Organizational Structure	7	5	5
4.2	Energy Efficiency	11	6	2
4.3	Facilities Operation	7	7	3
4.4	Sustainable Building Practices	5	4	0
4.5	On-Site Generation and Renewable Energy	5	2	0
4.6	Transportation, Commuting, and Campus Fleet & Travel	6	6	4
4.7	Water, Wastewater, and Sustainable Landscaping	4	4	2
4.8	Solid Waste Reduction and Management	8	7	2
4.9	Green Purchasing	3	2	0
4.10	Student and Curriculum Development	6	6	0
4.11	Campus and Community Outreach & Awareness	5	4	1
4.12	Create a Climate Action Plan	4	1	0
4.13	Other Programs and Projects for Implementation	0	0	0
Totals		71	54	19

For questions, comments, or feedback, please contact Matt Sullivan, Newcomb | Anderson | McCormick, 415-896-0300, matt_sullivan@newcomb.cc

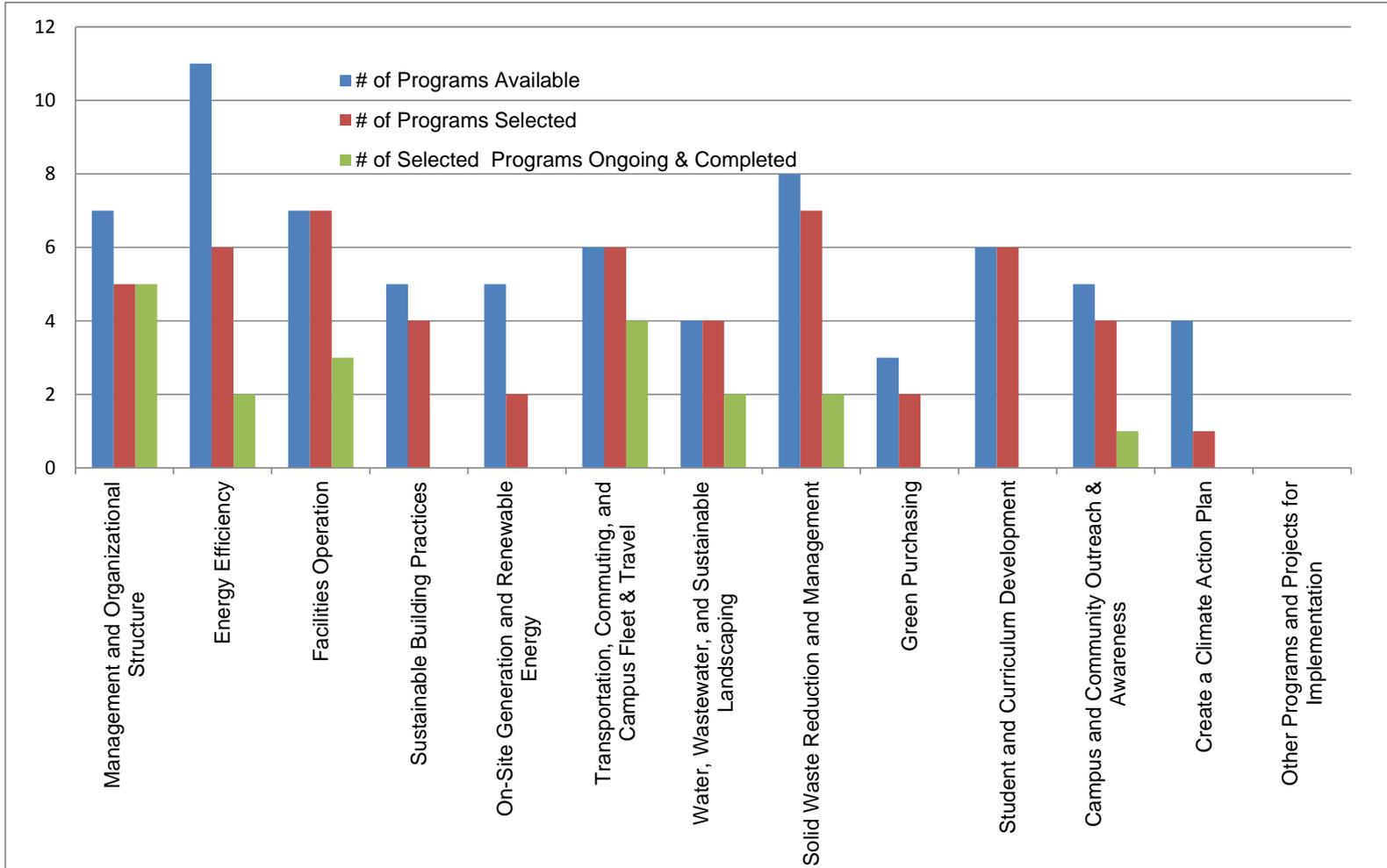
Sustainability Template Programs Chart

District: Rancho Santiago Community College District

Campus: Santiago Canyon College, Santa Ana College, District Office, Centennial Education Center, Orange Education Center

Project: Sustainability Plan

Date: 2/20/2015



**Sustainability Template Plan
Implementation Programs and Plans Checklist**

District: Rancho Santiago Community College District
Campus: Santiago Canyon College, Santa Ana College, District Office, Centennial Education Center, Orange Education Center
Project: Sustainability Plan
Date: 2/20/2015

Priority Implementation Plans Indicated Below

Selected Programs and Plans for Implementation are Summarized Below		
Section 4.1 MANAGEMENT AND ORGANIZATIONAL STRUCTURE	Comments	
<input checked="" type="checkbox"/>	4.1.1	Adopt a District Sustainability Policy
<input type="checkbox"/>	4.1.2	Appoint a Sustainability Coordinator, Establish an Office of Sustainability
<input checked="" type="checkbox"/>	4.1.3	Appoint a District Sustainability Committee
<input checked="" type="checkbox"/>	4.1.4	Funding and Resources to Support Sustainability Activities
<input checked="" type="checkbox"/>	4.1.5	Employ Sustainability Professionals, as required
<input type="checkbox"/>	4.1.6	Consider Sustainability in Endowment Investments
<input checked="" type="checkbox"/>	4.1.7	Integrate Sustainability Planning into Campus Master Plan
<input type="checkbox"/>	4.1.8	<i>Enter Other Program and Project 1, text will change color</i>
<input type="checkbox"/>	4.1.9	<i>Enter Other Program and Project 2, text will change color</i>

See Sustainability Template Plan Section 7.1 for Details of Implementation Plans.

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Back to Summary Tab

**Sustainability Template Plan
Implementation Programs and Plans Checklist**

District: Rancho Santiago Community College District
Campus: Santiago Canyon College, Santa Ana College, District Office, Centennial Education Center, Orange Education Center
Project: Sustainability Plan
Date: 2/20/2015

Priority Implementation Plans Indicated Below

Selected Programs and Plans for Implementation are Summarized Below		
Section 4.2 ENERGY EFFICIENCY	Comments	
<input checked="" type="checkbox"/>	4.2.1	Set Energy Efficiency Goals
<input type="checkbox"/>	4.2.2	Evaluate Mechanisms for the Implementation of Energy Efficiency Projects
<input type="checkbox"/>	4.2.3	Conduct Facility Prioritization Survey
<input checked="" type="checkbox"/>	4.2.4	Conduct Comprehensive Facility Energy Audits
<input checked="" type="checkbox"/>	4.2.5	Implement New and Existing Audit Recommendations
<input type="checkbox"/>	4.2.6	Implement Ongoing Energy Monitoring
<input type="checkbox"/>	4.2.7	Participate in Demand Response Programs
<input checked="" type="checkbox"/>	4.2.8	Identify and Take Advantage of Grant and Incentive Programs
<input type="checkbox"/>	4.2.9.1	Establish an Energy Efficiency Purchasing Policy
<input checked="" type="checkbox"/>	4.2.9.2	Efficient Lighting and Lighting Controls
<input checked="" type="checkbox"/>	4.2.9.3	Install Energy Efficient HVAC Systems
<input type="checkbox"/>	4.2.9	<i>Enter Other Program and Project 1, text will change color</i>
<input type="checkbox"/>	4.2.9	<i>Enter Other Program and Project 2, text will change color</i>

See Sustainability Template Plan Section 7.2 for Details of Implementation Plans.

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Back to Summary tab

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Implementation Programs and Plans Checklist**

District: Rancho Santiago Community College District
Campus: Santiago Canyon College, Santa Ana College, District Office, Centennial Education Center, Orange Education Center
Project: Sustainability Plan
Date: 2/20/2015

Priority Implementation Plans Indicated Below

Selected Programs and Plans for Implementation are Summarized Below		
Section 4.3 FACILITIES OPERATION	Comments	
<input checked="" type="checkbox"/>	4.3.1	Encourage and Support Energy Efficiency Training of Staff
<input checked="" type="checkbox"/>	4.3.2	Install Energy Management Systems
<input checked="" type="checkbox"/>	4.3.3	Adjust Temperature Set Points and Schedule Operating Times
<input checked="" type="checkbox"/>	4.3.4	Optimize Building Occupancy Scheduling
<input checked="" type="checkbox"/>	4.3.5	Optimize HVAC Equipment Scheduling
<input checked="" type="checkbox"/>	4.3.6	Activate Energy-Saving Features for Appliances and Computers
<input checked="" type="checkbox"/>	4.3.7	Pursue Monitoring-Based(MBCx)/Retro-Commissioning (RCx)
<input type="checkbox"/>	4.3.8	<i>Enter Other Program and Project 1, text will change color</i>
<input type="checkbox"/>	4.3.9	<i>Enter Other Program and Project 2, text will change color</i>

See Sustainability Template Plan Section 7.3 for Details of Implementation Plans.

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Back to Summary tab

**Sustainability Template Plan
Implementation Programs and Plans Checklist**

District: Rancho Santiago Community College District
Campus: Santiago Canyon College, Santa Ana College, District Office, Centennial Education Center, Orange Education Center
Project: Sustainability Plan
Date: 2/20/2015

Priority Implementation Plans Indicated Below

Selected Programs and Plans for Implementation are Summarized Below		
Section 4.4 SUSTAINABLE BUILDING PRACTICES	Comments	
<input checked="" type="checkbox"/>	4.4.1	Establish a Green Building Standard
<input checked="" type="checkbox"/>	4.4.2	Implement Sustainable Design Practices
<input checked="" type="checkbox"/>	4.4.3	Use an Integrated Systems Approach in Building Design
<input type="checkbox"/>	4.4.4	Hire Sustainable Building Design Professionals
<input checked="" type="checkbox"/>	4.4.5	Commission New Buildings & Maintain Appropriate Operations to Support Functionality
<input type="checkbox"/>	4.4.6	<i>Enter Other Program and Project 1, text will change color</i>
<input type="checkbox"/>	4.4.7	<i>Enter Other Program and Project 2, text will change color</i>

See Sustainability Template Plan Section 7.4 for Details of Implementation Plans.

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Back to Summary tab

**Sustainability Template Plan
Implementation Programs and Plans Checklist**

District: Rancho Santiago Community College District
Campus: Santiago Canyon College, Santa Ana College, District Office, Centennial Education Center, Orange Education Center
Project: Sustainability Plan
Date: 2/20/2015

Priority Implementation Plans Indicated Below

Selected Programs and Plans for Implementation are Summarized Below		
	Section 4.5 ON-SITE GENERATION AND RENEWABLE ENERGY	Comments
<input checked="" type="checkbox"/>	4.5.1	Evaluate Clean Cogeneration and Renewable Energy Generation
<input checked="" type="checkbox"/>	4.5.2	Evaluate Load Shifting Technologies
<input type="checkbox"/>	4.5.3	Minimize Greenhouse Gas Intensity of Purchased Electricity
<input type="checkbox"/>	4.5.4	Evaluate Participation in Community Choice Aggregation
<input type="checkbox"/>	4.5.5	Identify and Take Advantage of Grant and Incentive Programs
<input type="checkbox"/>	4.5.6	<i>Enter Other Program and Project 1, text will change color</i>
<input type="checkbox"/>	4.5.7	<i>Enter Other Program and Project 2, text will change color</i>

See Sustainability Template Plan Section 7.5 for Details of Implementation Plans.

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Back to Summary tab

**Sustainability Template Plan
Implementation Programs and Plans Checklist**

District: Rancho Santiago Community College District
Campus: Santiago Canyon College, Santa Ana College, District Office, Centennial Education Center, Orange Education Center
Project: Sustainability Plan
Date: 2/20/2015

Priority Implementation Plans Indicated Below

Selected Programs and Plans for Implementation are Summarized Below		
Section 4.6 TRANSPORTATION, COMMUTING, AND CAMPUS FLEET & TRAVEL	Comments	
<input checked="" type="checkbox"/>	4.6.1	Understand Commute and Travel Patterns
<input checked="" type="checkbox"/>	4.6.2	Encourage and Enhance Public Transportation and Ridesharing Options
<input checked="" type="checkbox"/>	4.6.3	Encourage and Enhance Bicycling Options
<input checked="" type="checkbox"/>	4.6.4	Improve Campus Fleet & Travel
<input checked="" type="checkbox"/>	4.6.5	Enhance Student Distance Learning
<input checked="" type="checkbox"/>	4.6.6	Encourage Low or Fuel-Efficient Vehicles for Commuters
<input type="checkbox"/>	4.6.7	<i>Enter Other Program and Project 2, text will change color</i>

See Sustainability Template Plan Section 7.6 for Details of Implementation Plans.

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Back to Summary tab

**Sustainability Template Plan
Implementation Programs and Plans Checklist**

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Campus: Santiago Canyon College, Santa Ana College, District Office, Centennial Education Center, Orange Education Center
Project: Sustainability Plan
Date: 2/20/2015

Priority Implementation Plans Indicated Below

Selected Programs and Plans for Implementation are Summarized Below		
Section 4.7 WATER, WASTEWATER, AND SUSTAINABLE LANDSCAPING	Comments	
<input checked="" type="checkbox"/>	4.7.1	Establish Water Conservation Goals
<input checked="" type="checkbox"/>	4.7.2	Implement Water Conservation Strategies
<input checked="" type="checkbox"/>	4.7.3	Reduce Storm Water, Sewer Discharges, and Water Pollution
<input checked="" type="checkbox"/>	4.7.4	Adopt Sustainable Landscaping Practices
<input type="checkbox"/>	4.7.1	<i>Enter Other Program and Project 1, text will change color</i>
<input type="checkbox"/>	4.7.2	<i>Enter Other Program and Project 2, text will change color</i>

See Sustainability Template Plan Section 7.7 for Details of Implementation Plans.

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Back to Summary tab

**Sustainability Template Plan
Implementation Programs and Plans Checklist**

District: Rancho Santiago Community College District
Campus: Santiago Canyon College, Santa Ana College, District Office, Centennial Education Center, Orange Education Center
Project: Sustainability Plan
Date: 2/20/2015

Priority Implementation Plans Indicated Below

Selected Programs and Plans for Implementation are Summarized Below			
Section 4.8 SOLID WASTE REDUCTION AND MANAGEMENT		Comments	
<input checked="" type="checkbox"/>	4.8.1	Create Waste Reduction Goals	
<input checked="" type="checkbox"/>	4.8.2	Maximize Programs Offered by Contracted Waste Hauler	
<input checked="" type="checkbox"/>	4.8.3	Reduce Waste Stream to the Landfill	
<input checked="" type="checkbox"/>	4.8.4	Improve Existing Recycling Programs	
<input type="checkbox"/>	4.8.5	Collect and Sell All Recyclable Material	
<input checked="" type="checkbox"/>	4.8.6	Green Waste and Food Waste Composting	
<input checked="" type="checkbox"/>	4.8.7	Adopt Construction and Demolition (C&D) Recycling	
<input checked="" type="checkbox"/>	4.8.8	Consider feasibility of Recycling	Med priority / medium-term
<input type="checkbox"/>	4.8.9	<i>Enter Other Program and Project 2, text will change color</i>	

See Sustainability Template Plan Section 7.8 for Details of Implementation Plans.

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Back to Summary tab

**Sustainability Template Plan
Implementation Programs and Plans Checklist**

District: Rancho Santiago Community College District
Campus: Santiago Canyon College, Santa Ana College, District Office, Centennial Education Center, Orange Education Center
Project: Sustainability Plan
Date: 2/20/2015

Priority Implementation Plans Indicated Below

Selected Programs and Plans for Implementation are Summarized Below		
Section 4.9 GREEN PURCHASING	Comments	
<input checked="" type="checkbox"/>	4.9.1	Sustainable Food Purchasing
<input checked="" type="checkbox"/>	4.9.2	Green Purchasing Practices
<input type="checkbox"/>	4.9.3	Socially Responsible Purchasing
<input type="checkbox"/>	4.9.4	<i>Enter Other Program and Project 1, text will change color</i>
<input type="checkbox"/>	4.9.5	<i>Enter Other Program and Project 2, text will change color</i>

See Sustainability Template Plan Section 7.9 for Details of Implementation Plans.

For questions, comments, or feedback, please contact Matt Sullivan, Newcomb | Anderson | McCormick, 415-896-0300, matt_sullivan@newcomb.cc



Back to Summary tab

**Sustainability Template Plan
Implementation Programs and Plans Checklist**

District: Rancho Santiago Community College District
Campus: Santiago Canyon College, Santa Ana College, District Office, Centennial Education Center, Orange Education Center
Project: Sustainability Plan
Date: 2/20/2015

Priority Implementation Plans Indicated Below

Selected Programs and Plans for Implementation are Summarized Below			
Section 4.10 STUDENT AND CURRICULUM DEVELOPMENT		Comments	
<input checked="" type="checkbox"/>	4.10.1	Create a Sub-Committee in the Associated Student Government Devoted to Sustainability	
<input checked="" type="checkbox"/>	4.10.2	Provide Professional Development and Create a Faculty Forum	
<input checked="" type="checkbox"/>	4.10.3	Utilize Different Pathways to Integrate Sustainability in the Curriculum	
<input checked="" type="checkbox"/>	4.10.4	Advocate for Change at the Statewide Level	
<input checked="" type="checkbox"/>	4.10.5	Training Opportunities for Students	
<input checked="" type="checkbox"/>	4.10.6	Joint Meeting with Faculty & Staff from Academic Senate and students from the Associated Student Government	Plan sustain-a-palooza event; Spring 2015; High
<input type="checkbox"/>	4.10.7	<i>Enter Other Program and Project 2, text will change color</i>	

See Sustainability Template Plan Section 7.10 for Details of Implementation Plans.

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Back to Summary tab

**Sustainability Template Plan
Implementation Programs and Plans Checklist**

District: Rancho Santiago Community College District
Campus: Santiago Canyon College, Santa Ana College, District Office, Centennial Education Center, Orange Education Center
Project: Sustainability Plan
Date: 2/20/2015

Priority Implementation Plans Indicated Below

Selected Programs and Plans for Implementation are Summarized Below		
Section 4.11 CAMPUS AND COMMUNITY OUTREACH & AWARENESS		Comments
<input checked="" type="checkbox"/>	4.11.1	Create a Website Dedicated to Campus Sustainability
<input type="checkbox"/>	4.11.2	Hold Workshops and Presentations
<input checked="" type="checkbox"/>	4.11.3	Sustainability Events
<input checked="" type="checkbox"/>	4.11.4	Campus Specific Outreach & Awareness
<input checked="" type="checkbox"/>	4.11.5	Community Specific Outreach & Awareness
<input type="checkbox"/>	4.11.6	<i>Enter Other Program and Project 1, text will change color</i>
<input type="checkbox"/>	4.11.7	<i>Enter Other Program and Project 2, text will change color</i>

See Sustainability Template Plan Section 7.11 for Details of Implementation Plans.

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Back to Summary tab

**Sustainability Template Plan
Implementation Programs and Plans Checklist**

District: Rancho Santiago Community College District
Campus: Santiago Canyon College, Santa Ana College, District Office, Centennial Education Center, Orange Education Center
Project: Sustainability Plan
Date: 2/20/2015

Priority Implementation Plans Indicated Below

Selected Programs and Plans for Implementation are Summarized Below		
Section 4.12 CREATE A CLIMATE ACTION PLAN		Comments
<input checked="" type="checkbox"/>	4.12.5	Make a Commitment to Reduce Greenhouse Gas Emissions
<input type="checkbox"/>	4.12.6	Perform a Campus Greenhouse Gas Inventory
<input type="checkbox"/>	4.12.7	Create and Execute a Climate Action Plan with Prioritized Greenhouse Gas Reduction Measures
<input type="checkbox"/>	4.12.8	Regularly Monitor and Report Progress to Campus
<input type="checkbox"/>	4.12.9	<i>Enter Other Program and Project 1, text will change color</i>
<input type="checkbox"/>	4.12.10	<i>Enter Other Program and Project 2, text will change color</i>

See Sustainability Template Plan Section 7.12 for Details of Implementation Plans.

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Back to Summary tab

**Sustainability Template Plan
Implementation Programs and Plans Checklist**

District: Rancho Santiago Community College District
Campus: Santiago Canyon College, Santa Ana College, District Office,
Project: Sustainability Plan
Date: 2/20/2015



Back to Summary Tab

Priority Implementation Plans Indicated Below

Section 4.1 MANAGEMENT AND ORGANIZATIONAL STRUCTURE										
Section	Selected Program or Project	Action Items/Notes	Priority (select)	Status (select)	Linked to	Cost (\$)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
4.1.1	Adopt a District Sustainability Policy		High	Complete			1		Chancellor	
4.1.3	Appoint a District Sustainability Committee		High	Complete			1		Chancellor	
4.1.4	Funding and Resources to Support Sustainability Activities	Measure E, Measure Q, and Prop 39 Funds; Utility Incentives	High	Ongoing			1-8	Ongoing	Assistant Vice Chancellor of Facility Planning, District Constructon, and Support Services (AVCF) & VP's of Administrative Services	
4.1.5	Employ Sustainability Professionals, as required		Med	Ongoing			3,4	Ongoing	AVCF	
4.1.7	Integrate Sustainability Planning into Campus Master Plan		High	Complete			3,4	Ongoing	AVCF	

Section 4.2 ENERGY EFFICIENCY										
Section	Selected Program or Project	Action Items/Notes	Priority (select)	Status (select)	Linked to	Cost (\$)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
4.2.1	Set Energy Efficiency Goals	Annual energy use reduction goals to be established based on 2012-13 baseline data	High	Complete			3	Complete	AVCF & VP of Administrative Services	
4.2.4	Conduct Comprehensive Facility Energy Audits	DO currently in process of compiling baseline data for audit in conjunction with SCE & CCC-IOU Partnership	High	Ongoing			3	Ongoing	AVCF	
4.2.5	Implement New and Existing Audit Recommendations		High	In-Process			3	Ongoing	AVCF	
4.2.8	Identify and Take Advantage of Grant and Incentive Programs	Measure E, Measure Q, and Prop 39 Funds, CCC-IOU Partnership	High	In-Process			3	Ongoing	AVCF & VP of Administrative Services	
4.2.9.2	Efficient Lighting and Lighting Controls		High	In-Process			3	Ongoing	AVCF	
4.2.9.3	Install Energy Efficient HVAC Systems	Chilled Water Central Plant planned at SAC; Upgraded HVAC control system planned at SCC; DO plans to replace chillers, cooling tower, and pumps	High	In-Process			3	Ongoing	AVCF	

**Sustainability Template Plan
Implementation Programs and Plans Checklist**

District: Rancho Santiago Community College District
Campus: Santiago Canyon College, Santa Ana College, District Office,
Project: Sustainability Plan
Date: 2/20/2015



Back to Summary Tab

Priority Implementation Plans Indicated Below

Section 4.3 FACILITIES OPERATION										
Section	Selected Program or Project	Action Items/Notes	Priority (select)	Status (select)	Linked to	Cost (\$)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
4.3.1	Encourage and Support Energy Efficiency Training of Staff	M&O staff trained to operate EMS; ongoing training programs to be developed for specific systems as well	High	Ongoing			3,4	Ongoing	Site & Campus Facility Manager	
4.3.2	Install Energy Management Systems	EMS currently installed (SCC); Plans to install a new, more robust EMS at both campuses; Meet Title 24	High	In-Process			3,4	2017	AVCF	
4.3.3	Adjust Temperature Set Points and Schedule Operating Times	Development of facility design standards and demand-response program currently in progress with SCE	High	In-Process			3,4	Ongoing	AVCF, VP of Administrative Services, Facility Managers	
4.3.4	Optimize Building Occupancy Scheduling		High	Ongoing			3,4	Ongoing	Site & Campus Facility Manager	
4.3.5	Optimize HVAC Equipment Scheduling		High	Ongoing			3,4	Ongoing	Site & Campus Facility Manager	
4.3.6	Activate Energy-Saving Features for Appliances and Computers	Measures currently in place at SCC; District plans to evaluate and implement other IT -related energy savings technologies, including PC Power Mgmt and Server Virtualization	Med	In-Process			3,4	Medium-term	ITS, Site/Campus Facility Manager	
4.3.7	Pursue Monitoring-Based(MBCx)/Retro-Commissioning (RCx)	Working with the CCC/IOU Partnership, develop a Retro-commissioning (RCx) and Monitoring Based Commissioning (MBCx) implementation program to improve energy efficiency of major facilities operations.	Med	In-Process			3,4	Ongoing	AVCF	

Section 4.4 SUSTAINABLE BUILDING PRACTICES										
Section	Selected Program or Project	Action Items/Notes	Priority (select)	Status (select)	Linked to	Cost (\$)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
4.4.1	Establish a Green Building Standard	District is currently developing District design standards and implementing those that are already in place	High	In-Process			3,4,8	2015	AVCF	
4.4.2	Implement Sustainable Design Practices		High	In-Process	On-going		1,3,4,6,8	Ongoing	AVCF, VP of Administrative Services	
4.4.3	Use an Integrated Systems Approach in Building Design		Med	Planned	On-going		1,3,4,6,8	Ongoing	AVCF	
4.4.5	Commission New Buildings & Maintain Appropriate Operations to Support Functionality	Two buildings completed in 2012 and 2014 have been commissioned; District is committed to commissioning all new buildings in the future as well	High	In-Process			3,4	Ongoing	AVCF, VP of Administrative Services, Site/Campus Facility Manager	

Section 4.5 ON-SITE GENERATION AND RENEWABLE ENERGY										
Section	Selected Program or Project	Action Items/Notes	Priority (select)	Status (select)	Linked to	Cost (\$)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
4.5.1	Evaluate Clean Cogeneration and Renewable Energy Generation	Comprehensive photovoltaic system feasibility study at SCC and SAC currently under review	Med	In-Process			3	Ongoing	AVCF, VP of Administrative Services	
4.5.2	Evaluate Load Shifting Technologies	In-process at SAC; planned at SCC as part of future central plant	Med	In-Process			3	Ongoing	AVCF, VP of Administrative Services	

**Sustainability Template Plan
Implementation Programs and Plans Checklist**

District: Rancho Santiago Community College District
Campus: Santiago Canyon College, Santa Ana College, District Office,
Project: Sustainability Plan
Date: 2/20/2015



Back to Summary Tab

Priority Implementation Plans Indicated Below

Section 4.6 TRANSPORTATION, COMMUTING, AND CAMPUS FLEET & TRAVEL										
Section	Selected Program or Project	Action Items/Notes	Priority (select)	Status (select)	Linked to	Cost (\$)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
4.6.1	Understand Commute and Travel Patterns	Conduct traffic counts and surveys to determine baseline for commuting trips and total Vehicle Miles Traveled to both campuses; Parking demand analysis updated for SAC	Med	In-Process			1,7	Ongoing	AVCF, VP of Administrative Services, Campus	
4.6.2	Encourage and Enhance Public Transportation and Ridesharing Options	Several initiatives currently planned or in place including: Increase Awareness, Facilitate Public Transit Use, and Incentivize Public Transportation and Carpooling	High	In-Process			1,7	Ongoing	VP of Administrative Services, Campus	
4.6.3	Encourage and Enhance Bicycling Options	Add bike racks; plan for and communicate the availability of showers for commuters; add bike lockers or other secured storage	High	Ongoing			1,7	Ongoing	VP of Administrative Services, Campus	
4.6.4	Improve Campus Fleet & Travel	District will continue to upgrade campus fleets with more fuel efficient vehicles	Med	Ongoing			7	Ongoing	VP of Administrative Services, Campus	
4.6.5	Enhance Student Distance Learning	Expand and enhance distance-learning education course offerings; Full-time faculty coordinator hired (July 2014) to manage distance-learning program	High	Ongoing			1,7	Ongoing	VP of Administrative Services, Campus	
4.6.6	Encourage Low or Fuel-Efficient Vehicles for Commuters		Med	Ongoing			1,7	Ongoing	VP of Administrative Services, Campus	

Section 4.7 WATER, WASTEWATER, AND SUSTAINABLE LANDSCAPING										
Section	Selected Program or Project	Action Items/Notes	Priority (select)	Status (select)	Linked to	Cost (\$)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
4.7.1	Establish Water Conservation Goals	Perform benchmarking studies by mid-2015. Establish annual water use reduction goals (minimum 5% below average for similar facilities) and plan appropriate measures to meet reduction goals by end of 2015 for implementation.	High	Planned			8	2015	AVCF, VP of Administrative Services, Site-specific/Campus	
4.7.2	Implement Water Conservation Strategies	Several water conservation measures have been implemented throughout the District; Included in Facility Design Standards	High	Ongoing			8	Ongoing	AVCF, VP of Administrative Services, Site-specific/Campus	
4.7.3	Reduce Storm Water, Sewer Discharges, and Water Pollution	Plans to implement rain gardens and bio swales in place; Erosion control systems have been implemented as well as a Storm Water Pollution Prevention Program	High	Ongoing			8	Ongoing	AVCF, VP of Administrative Services, Site-specific/Campus	
4.7.4	Adopt Sustainable Landscaping Practices	Campus Landscape Improvement Program at SAC and the Coastkeeper Garden at SCC (implemented/on-going); District will continue to landscape with native plants and employ water-wise landscaping practices ; Included in Facility Design Standards	High	In-Process			8	Ongoing	AVCF, VP of Administrative Services, Site-specific/Campus	

**Sustainability Template Plan
Implementation Programs and Plans Checklist**

District: Rancho Santiago Community College District
Campus: Santiago Canyon College, Santa Ana College, District Office,
Project: Sustainability Plan
Date: 2/20/2015



Back to Summary Tab

Priority Implementation Plans Indicated Below

Section 4.8 SOLID WASTE REDUCTION AND MANAGEMENT										
Section	Selected Program or Project	Action Items/Notes	Priority (select)	Status (select)	Linked to	Cost (\$)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
4.8.1	Create Waste Reduction Goals	Establish 2014 as a baseline year for diversion measurement and develop a plan with appropriate measures by mid-2015 to meet goals. Evaluate diversion results annually and update program as needed to meet goals	High	Planned			5	Mid-2015	Site & Campus	
4.8.2	Maximize Programs Offered by Contracted Waste Hauler	SRC waste management subcommittee working to establish scope of services for expanded recycling throughout the District	High	In-Process			5	Mid-2015	Director of Purchasing, Campus	
4.8.3	Reduce Waste Stream to the Landfill	District plans to reduce waste stream to the landfill through the following: Raise Awareness of Waste Reduction; Minimize Unnecessary Waste; Reduce Paper Use; Support Producer Responsibility Programs	High	Ongoing			1,5,6	Ongoing	Director of Purchasing, Campus	
4.8.4	Improve Existing Recycling Programs		High	In-Process			1,5	Mid-2015	Campus	
4.8.6	Green Waste and Food Waste Composting	SCC current contract agreement with landscape contractor requires that all waste is composted; District plans to explore possibility of food-waste composting program district-wide	High	In-Process			5	Mid-2015	Director of Purchasing, Campus	
4.8.7	Adopt Construction and Demolition (C&D) Recycling	C&D recycling requirements currently in place	High	Complete			5	Complete	AVCF	
4.8.8	Consider feasibility of Recycling		Med	Planned			5	Mid-term	VP Administrative Services, Campus	

Section 4.9 GREEN PURCHASING										
Section	Selected Program or Project	Action Items/Notes	Priority (select)	Status (select)	Linked to	Cost (\$)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
4.9.1	Sustainable Food Purchasing	Both colleges to explore healthier cafeteria food options, including vegan, vegetarian, organic, and locally produced items	High	Planned			1,6	Fall 2015	Director of Auxillary Services, Campus	
4.9.2	Green Purchasing Practices	RSCCD will create a Green Purchasing Policy in 2015 aimed at campus-wide, sustainable procurement	High	Planned			6	Fall 2015	Director of Purchasing, Campus	

**Sustainability Template Plan
Implementation Programs and Plans Checklist**

District: Rancho Santiago Community College District
Campus: Santiago Canyon College, Santa Ana College, District Office,
Project: Sustainability Plan
Date: 2/20/2015



Back to Summary Tab

Priority Implementation Plans Indicated Below

Section 4.10 STUDENT AND CURRICULUM DEVELOPMENT										
Section	Selected Program or Project	Action Items/Notes	Priority (select)	Status (select)	Linked to	Cost (\$)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
4.10.1	Create a Sub-Committee in the Associated Student Government Devoted to Sustainability		High	Planned			1		Campus	
4.10.2	Provide Professional Development and Create a Faculty Forum	Flex Day workshops at SCC and SAC to incorporate sustainability topics; Working committee of faculty to be created tasked with the implementation and advancement of the RSCCD "Curriculum Development" goal	High	Planned			1,2	Spring 2015	Campus	
4.10.3	Utilize Different Pathways to Integrate Sustainability in the Curriculum	Sustainability has been integrated extensively within curriculum at both colleges; Plans in place to increase availability of these courses and to create new sustainability-oriented/ focused courses and programs	High	In-Process			1,2	Ongoing	Campus	
4.10.4	Advocate for Change at the Statewide Level	District hopes to send representatives to the Higher Ed Sustainability Conference	Med	Planned			1	2015	Campus	
4.10.5	Training Opportunities for Students	Facilitate Hands-On Campus Projects; Invite Notable Speakers; Support Student Committees and Clubs	High	In-Process			1,2	Ongoing	Campus	
4.10.6	Joint Meeting with Faculty & Staff from Academic Senate and students from the Associated Student Government		High	Planned			1	2015	Campus	

Section 4.11 CAMPUS AND COMMUNITY OUTREACH & AWARENESS										
Section	Selected Program or Project	Action Items/Notes	Priority (select)	Status (select)	Linked to	Cost (\$)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
4.11.1	Create a Website Dedicated to Campus Sustainability		High	Complete			1		Campus	
4.11.3	Sustainability Events	Several sustainability events at SCC and SAC have occurred/ are on-going; Transportation subcommittee to plan "Bike to Work" day	High	In-Process			1,7	On-Going	Campus	
4.11.4	Campus Specific Outreach & Awareness	Sustainability Student, Faculty & Staff survey completed Spring 2014; To be repeated annually; Develop Campus & Community Engagement Plan by the Spring Semester of 2015 with implementation by the Fall Semester of 2015	High	In-Process			1	Spring 2015/ Fall 2015 (see notes)	Campus	
4.11.5	Community Specific Outreach & Awareness	Public transportation partnerships with the District (see 4.6); Campus & Community Engagement Plan by the Spring Semester of 2015 with implementation by the Fall Semester of 2015	High	In-Process			1,7	Spring 2015/ Fall 2015 (see notes)	Campus, Director of Public Affairs & Publications	

Section 4.12 CREATE A CLIMATE ACTION PLAN										
Section	Selected Program or Project	Action Items/Notes	Priority (select)	Status (select)	Linked to	Cost (\$)	Associated GOAL(s)	Target Completion Date	Assigned To	Email address
4.12.5	Make a Commitment to Reduce Greenhouse Gas Emissions	Energy-Efficient Programs & Demand Reponse Program participation	Med	Planned			2,3,4,5,6,7	Ongoing	AVCF, VP of Administrative Services, Site/Campus Facility Manager	

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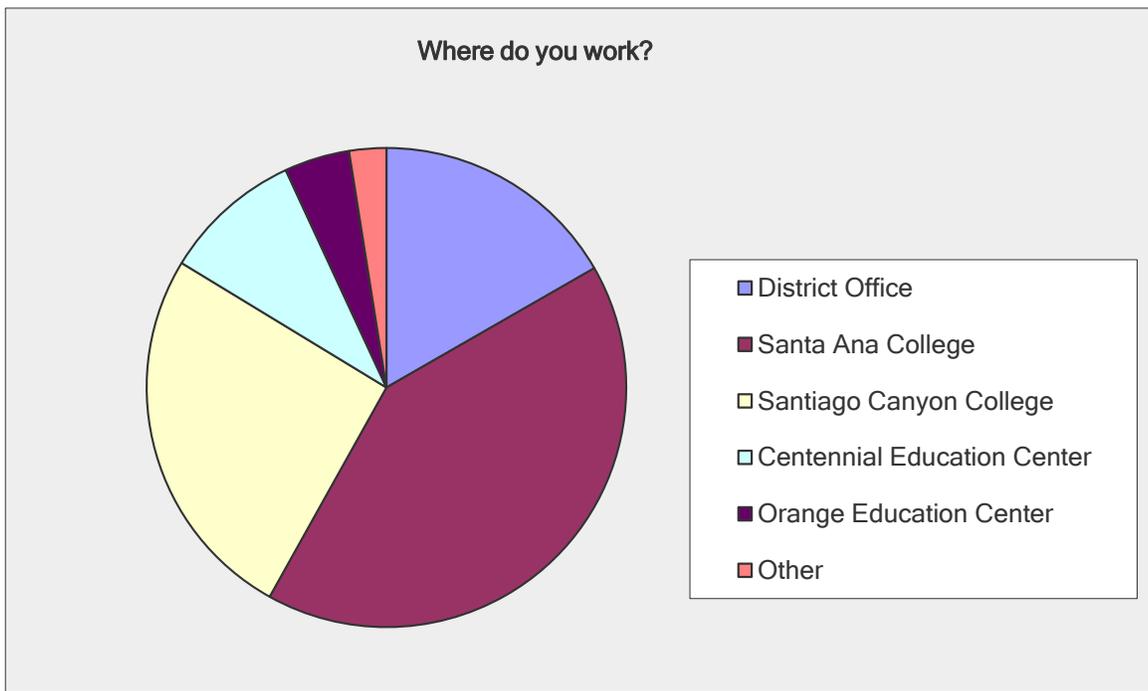
Appendix 2 2014 Sustainability Survey Results

Attached are the questions and results of the online sustainability surveys distributed to students, faculty, and staff in spring of 2014.

Faculty, Administration & Staff Sustainability Survey

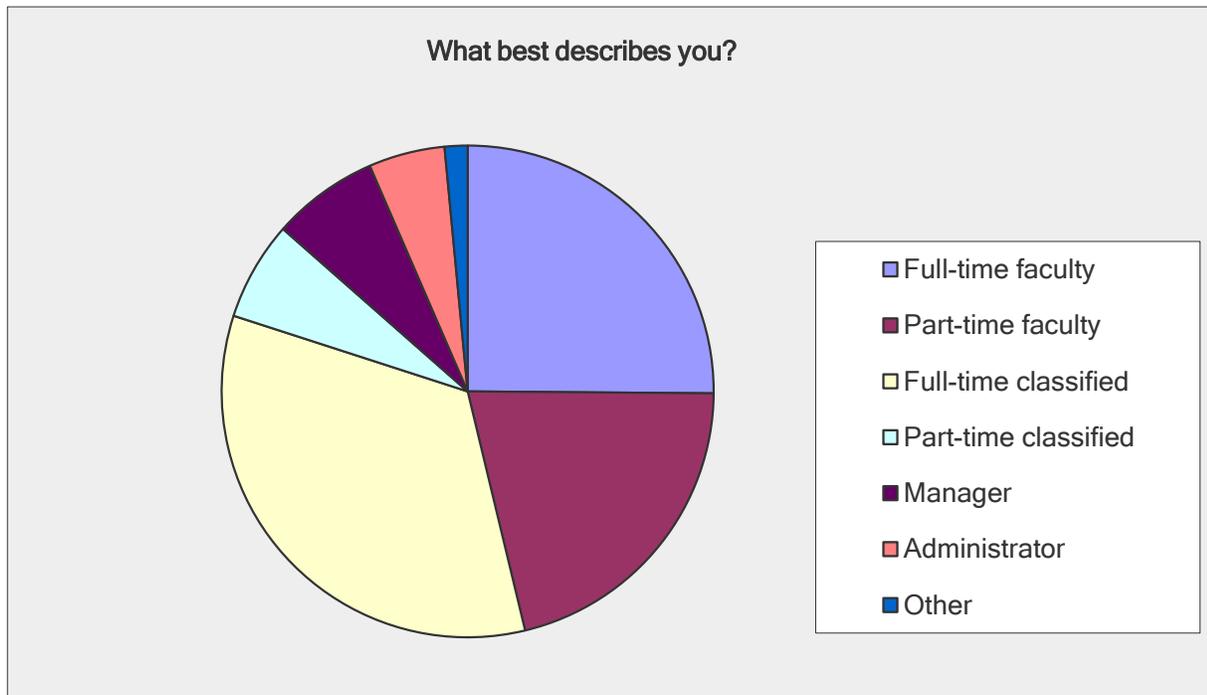
Where do you work?

Answer Options	Response Percent	Response Count
District Office	16.7%	34
Santa Ana College	41.4%	84
Santiago Canyon College	25.6%	52
Centennial Education Center	9.4%	19
Orange Education Center	4.4%	9
Other	2.5%	5
<i>answered question</i>		203
<i>skipped question</i>		0



Faculty, Administration & Staff Sustainability Survey

What best describes you?		
Answer Options	Response Percent	Response Count
Full-time faculty	25.1%	50
Part-time faculty	21.1%	42
Full-time classified	33.7%	67
Part-time classified	6.5%	13
Manager	7.0%	14
Administrator	5.0%	10
Other	1.5%	3
<i>answered question</i>		199
<i>skipped question</i>		4

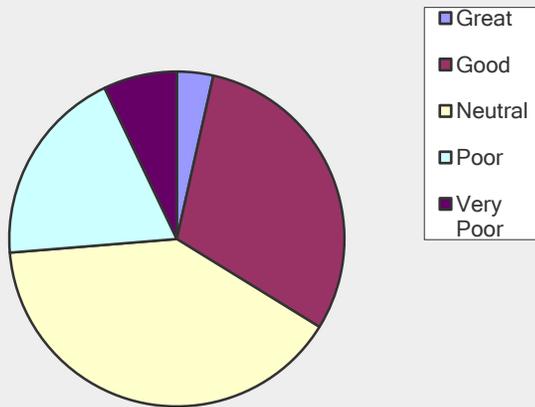


Faculty, Administration & Staff Sustainability Survey

Overall, how would you rate the level of sustainability at the campus or location you work?

Answer Options	Response Percent	Response Count
Great	3.5%	7
Good	30.3%	60
Neutral	39.9%	79
Poor	19.2%	38
Very Poor	7.1%	14
<i>answered question</i>		198
<i>skipped question</i>		5

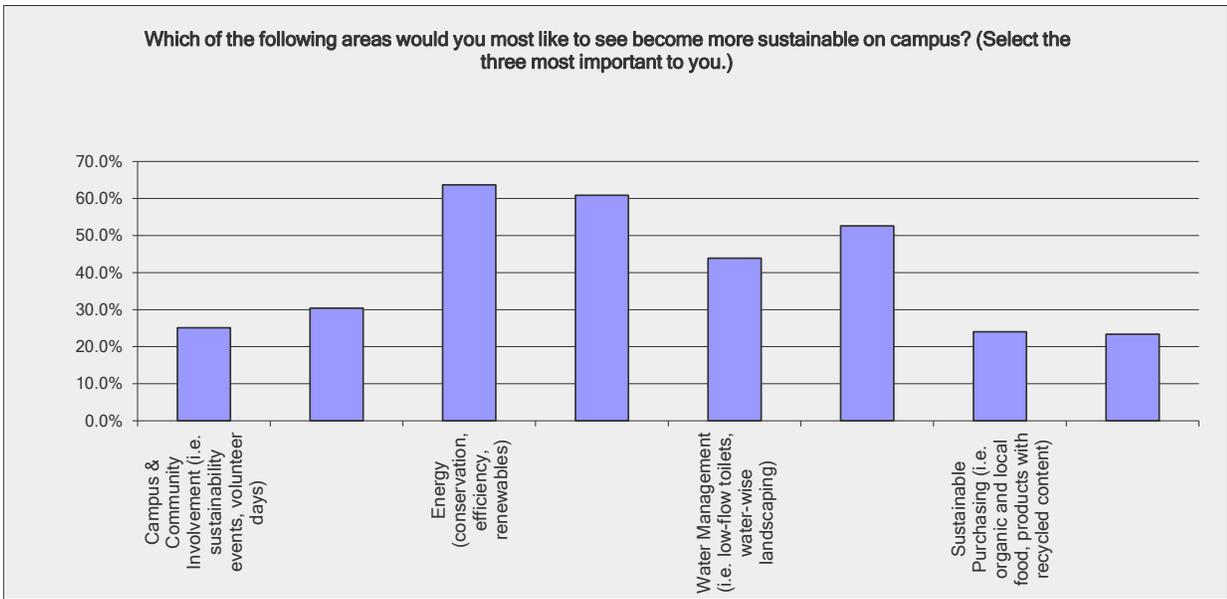
Overall, how would you rate the level of sustainability at the campus or location you work?



Faculty, Administration & Staff Sustainability Survey

Which of the following areas would you most like to see become more sustainable on campus? (Select the three most important to you.)

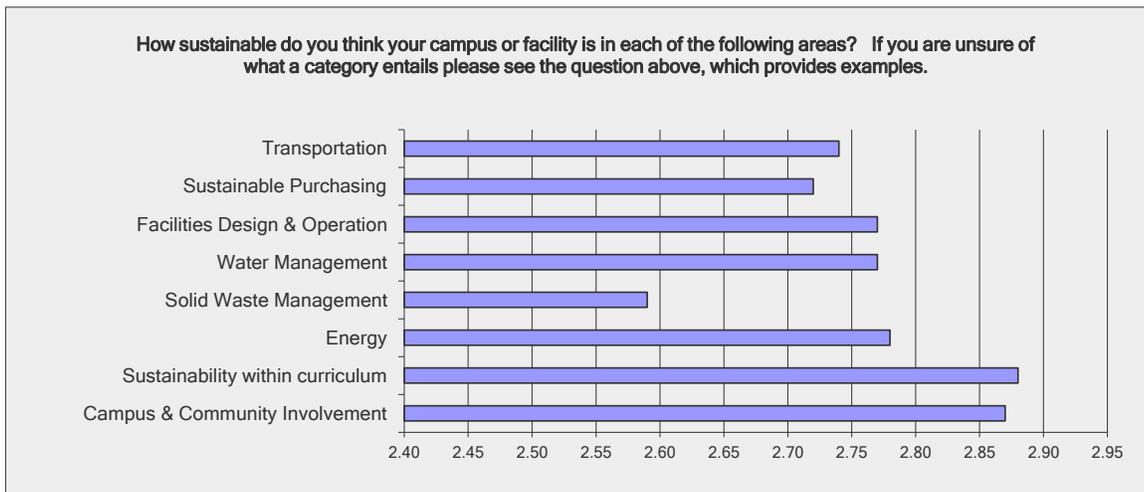
Answer Options	Response Percent	Response Count
Campus & Community Involvement (i.e. sustainability events, volunteer days)	25.1%	43
Sustainability within curriculum (i.e. more sustainability course options and career-oriented)	30.4%	52
Energy (conservation, efficiency, renewables)	63.7%	109
Solid Waste Management (recycling, composting, reduction, reuse)	60.9%	105
Water Management (i.e. low-flow toilets, water-wise landscaping)	43.9%	75
Facilities Design & Operation (i.e. "green" buildings, sustainable landscaping)	52.6%	90
Sustainable Purchasing (i.e. organic and local food, products with recycled content)	24.0%	41
Transportation (i.e. public transit, bike options)	23.4%	41
Other (please specify)		15
<i>answered question</i>		173
<i>skipped question</i>		32



Faculty, Administration & Staff Sustainability Survey

How sustainable do you think your campus or facility is in each of the following areas? If you are unsure of what a category entails please see the question above, which provides examples.

Answer Options	Very poor	Poor	Neutral	Good	Great	Rating Average	Response Count
Campus & Community Involvement	11	44	76	38	3	2.87	172
Sustainability within curriculum	12	30	98	31	1	2.88	172
Energy	13	45	78	34	0	2.78	170
Solid Waste Management	26	44	73	26	0	2.59	169
Water Management	14	43	82	30	1	2.77	170
Facilities Design & Operation	21	38	72	35	3	2.77	169
Sustainable Purchasing	13	41	97	18	1	2.72	170
Transportation	20	36	82	30	1	2.74	169
<i>answered question</i>							176
<i>skipped question</i>							27



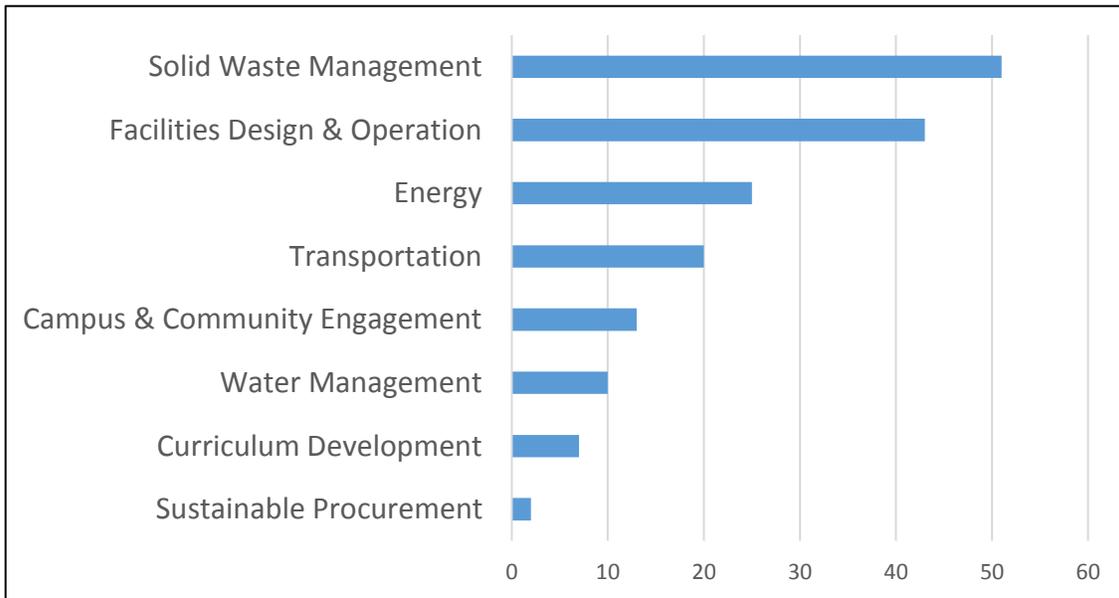
Faculty, Administration & Staff Sustainability Survey

What specific sustainability measures or programs would you like to see at your campus, facility, or district-wide? Please list all ideas that come to mind.

Answer Options	Response Count
	100
<i>answered question</i>	100
<i>skipped question</i>	103

es

Areas of Sustainability Mentioned	Response Count
Sustainable Procurement	2
Curriculum Development	7
Water Management	10
Campus & Community Engagement	13
Transportation	20
Energy	25
Facilities Design & Operation	43
Solid Waste Management	51



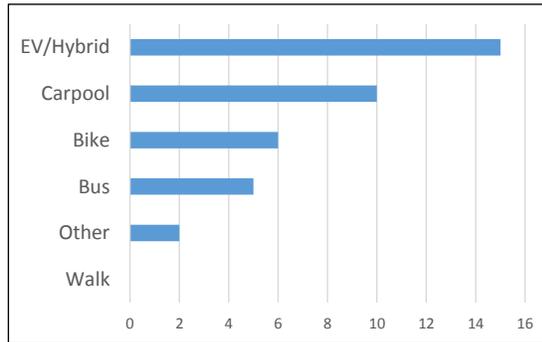
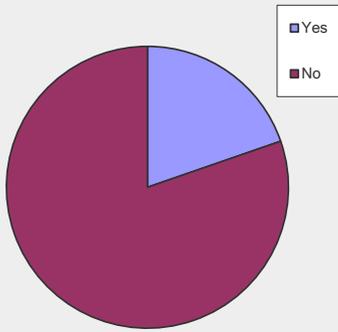
Faculty, Administration & Staff Sustainability Survey

Do you ever use alternate modes of transportation to travel to or from your campus or facility? (i.e. bus, bike, electric/ hybrid vehicle)

Answer Options	Response Percent	Response Count
Yes	19.7%	34
No	80.3%	139
If yes, please elaborate in the space below.		37
<i>answered question</i>		173
<i>skipped question</i>		30

Alternative Modes of Transportation Mentioned	Count
Walk	0
Other	2
Bus	5
Bike	6
Carpool	10
EV/Hybrid	15

Do you ever use alternate modes of transportation to travel to or from your campus or facility? (i.e. bus, bike, electric/ hybrid vehicle)

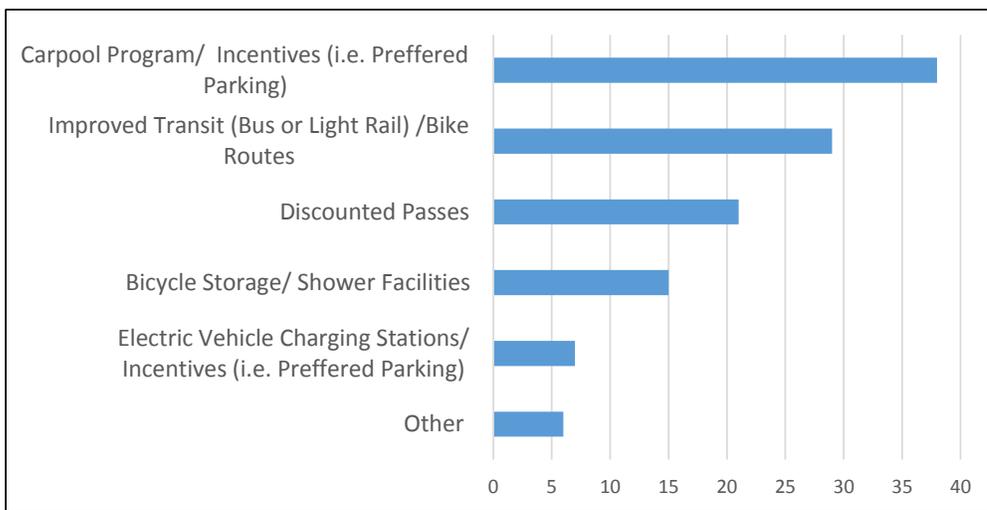


Faculty, Administration & Staff Sustainability Survey

What programs or changes would encourage you to use or increase your use of alternative transportation to and from your campus or facility? (i.e. discounted bus pass, improved bus routes and frequency, better bike storage, carpool program)

Answer Options	Response Count
	117
<i>answered question</i>	117
<i>skipped question</i>	86

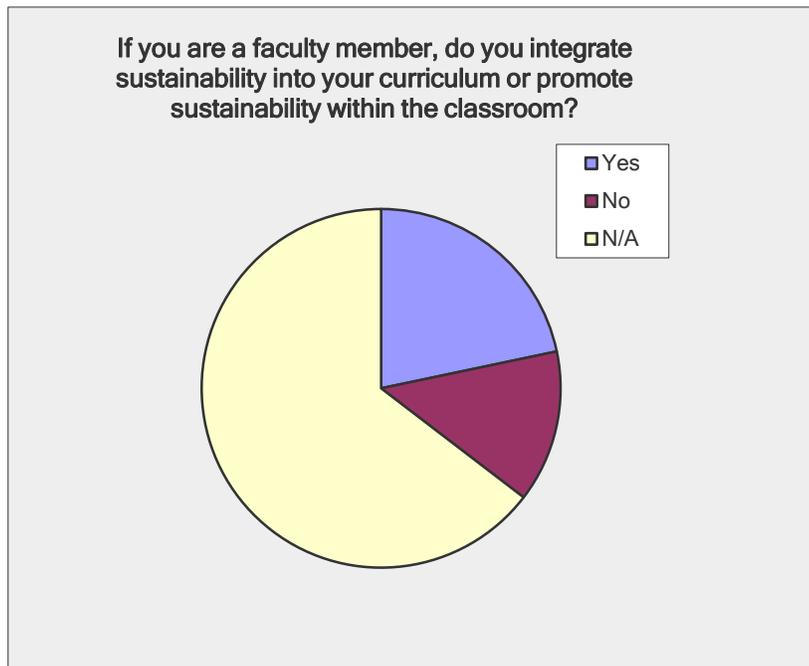
Category	Count
Other	6
Electric Vehicle Charging Stations/ Incentives (i.e. Preferred Parking)	7
Bicycle Storage/ Shower Facilities	15
Discounted Passes	21
Improved Transit (Bus or Light Rail) /Bike Routes	29
Carpool Program/ Incentives (i.e. Preferred Parking)	38



Faculty, Administration & Staff Sustainability Survey

If you are a faculty member, do you integrate sustainability into your curriculum or promote sustainability within the classroom?

Answer Options	Response Percent	Response Count
Yes	21.7%	35
No	13.7%	22
N/A	64.6%	104
If yes, what is the course name?		29
<i>answered question</i>		161
<i>skipped question</i>		42

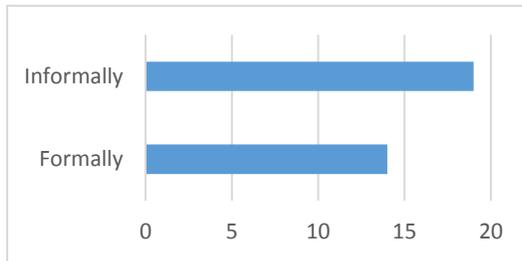


Faculty, Administration & Staff Sustainability Survey

Please explain the sustainability practice(s) and/or coursework you mentioned in Q7. Are they formally (included in syllabus) or informally integrated within the classroom?

Answer Options	Response Count
	32
<i>answered question</i>	32
<i>skipped question</i>	171

Category	Count
Formally	14
Informally	19



Faculty, Administration & Staff Sustainability Survey

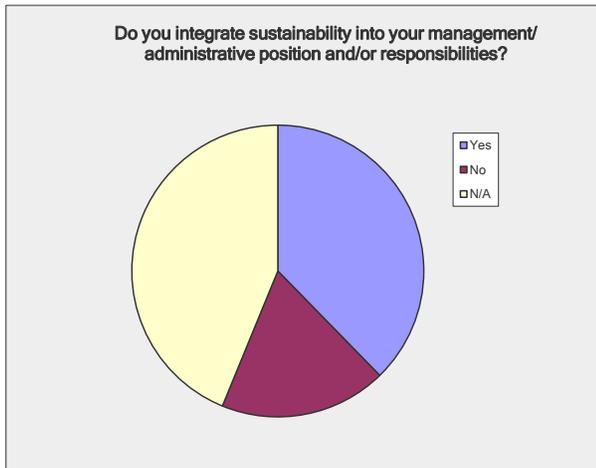
Would you be willing to share the ways in which you have integrated sustainability in the classroom with other faculty in an effort to promote sustainability throughout the district

Answer Options	Response Percent	Response Count
Yes	45.2%	14
No	54.8%	17
If yes, please provide your name and email address below.		9
	<i>answered question</i>	31
	<i>skipped question</i>	172

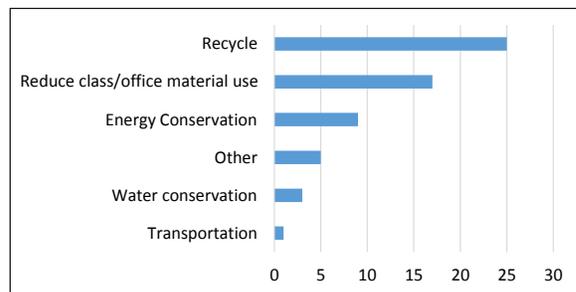


Faculty, Administration & Staff Sustainability Survey

Do you integrate sustainability into your management/ administrative position and/or responsibilities?		
Answer Options	Response Percent	Response
Yes	37.7%	61
No	18.5%	30
N/A	43.8%	71
If yes, please elaborate in the space below.		44
		answered question 162
		skipped question 41



Category	Count
Transportation	1
Water conservation	3
Other	5
Energy Conservation	9
Reduce class/office material use	17
Recycle	25

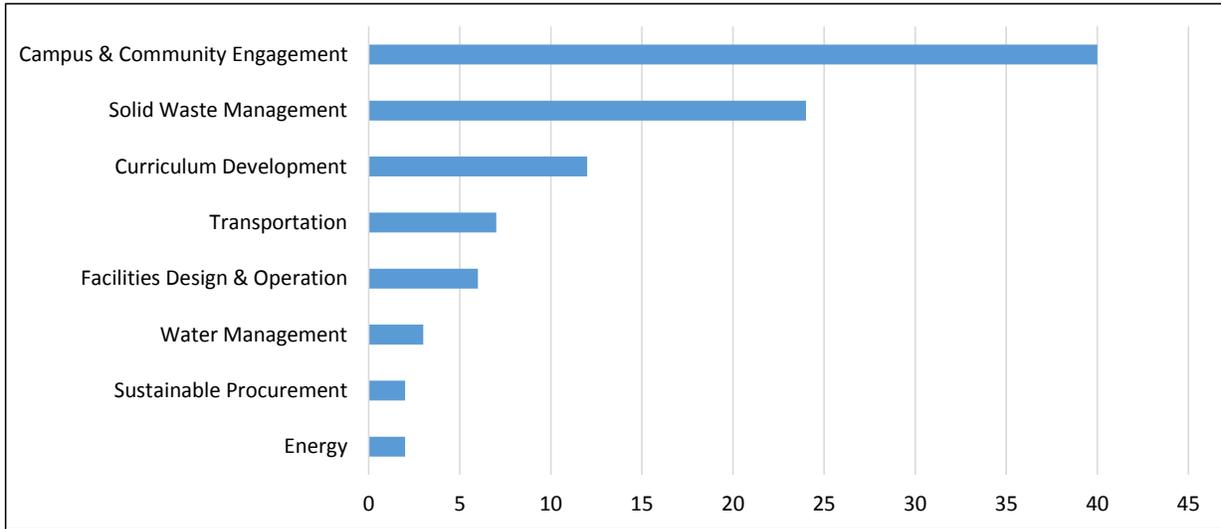


Faculty, Administration & Staff Sustainability Survey

What could the administration, faculty, or staff do to help promote sustainability among students, on campus, and as a district?

Answer Options	Response Count
	102
<i>answered question</i>	102
<i>skipped question</i>	101

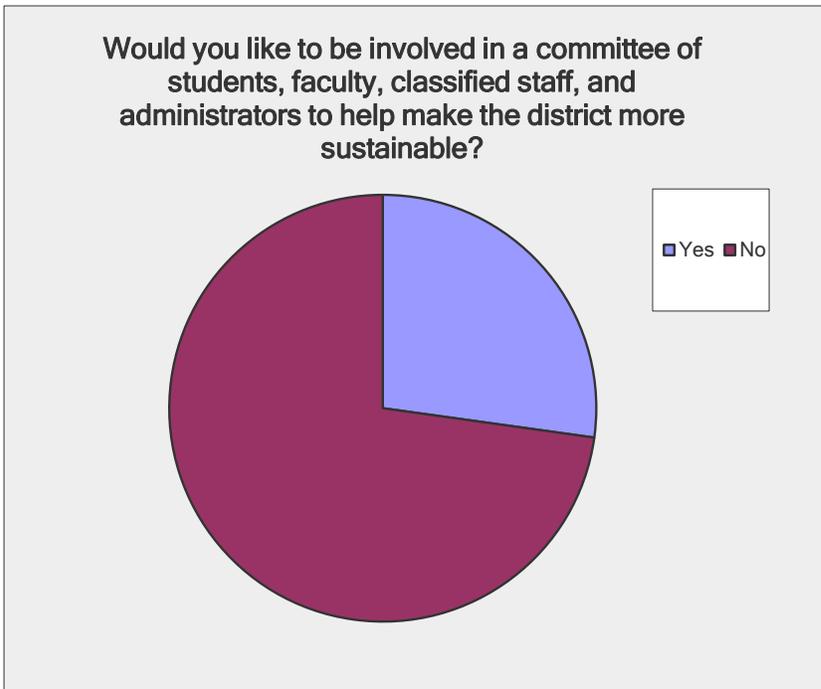
Areas of Sustainability Mentioned	Count
Energy	2
Sustainable Procurement	2
Water Management	3
Facilities Design & Operation	6
Transportation	7
Curriculum Development	12
Solid Waste Management	24
Campus & Community Engagement	40



Faculty, Administration & Staff Sustainability Survey

Would you like to be involved in a committee of students, faculty, classified staff, and administrators to help make the district more sustainable?

Answer Options	Response Percent	Response Count
Yes	27.2%	40
No	72.8%	107
If yes, please provide your name and email address below.		34
<i>answered question</i>		147
<i>skipped question</i>		56

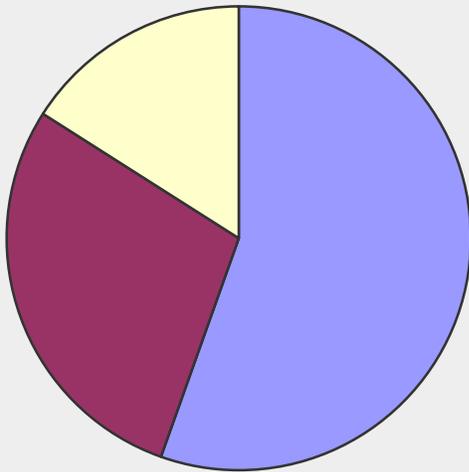


Student Sustainability Survey

Which college do you attend?

Answer Options	Response Percent	Response Count
Santa Ana College	55.5%	406
Santiago Canyon College	28.6%	209
Both	16.0%	117
<i>answered question</i>		732
<i>skipped question</i>		0

Which college do you attend?



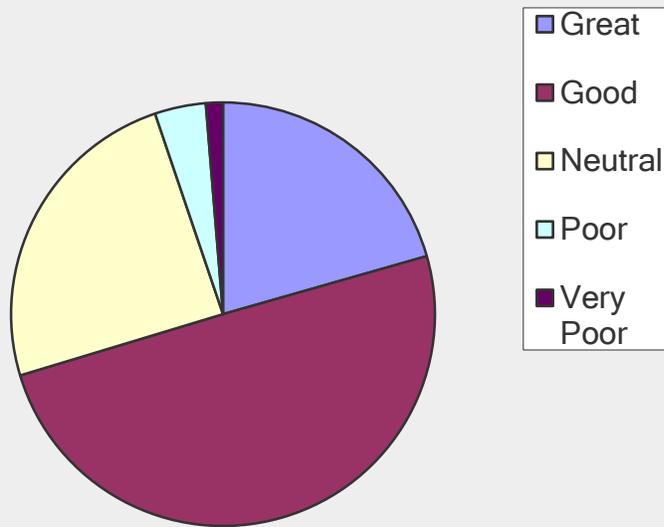
- Santa Ana College
- Santiago Canyon College
- Both

Student Sustainability Survey

Overall, how would you rate the level of sustainability on campus?

Answer Options	Response Percent	Response Count
Great	20.6%	148
Good	49.8%	358
Neutral	24.5%	176
Poor	3.9%	28
Very Poor	1.3%	9
<i>answered question</i>		719
<i>skipped question</i>		13

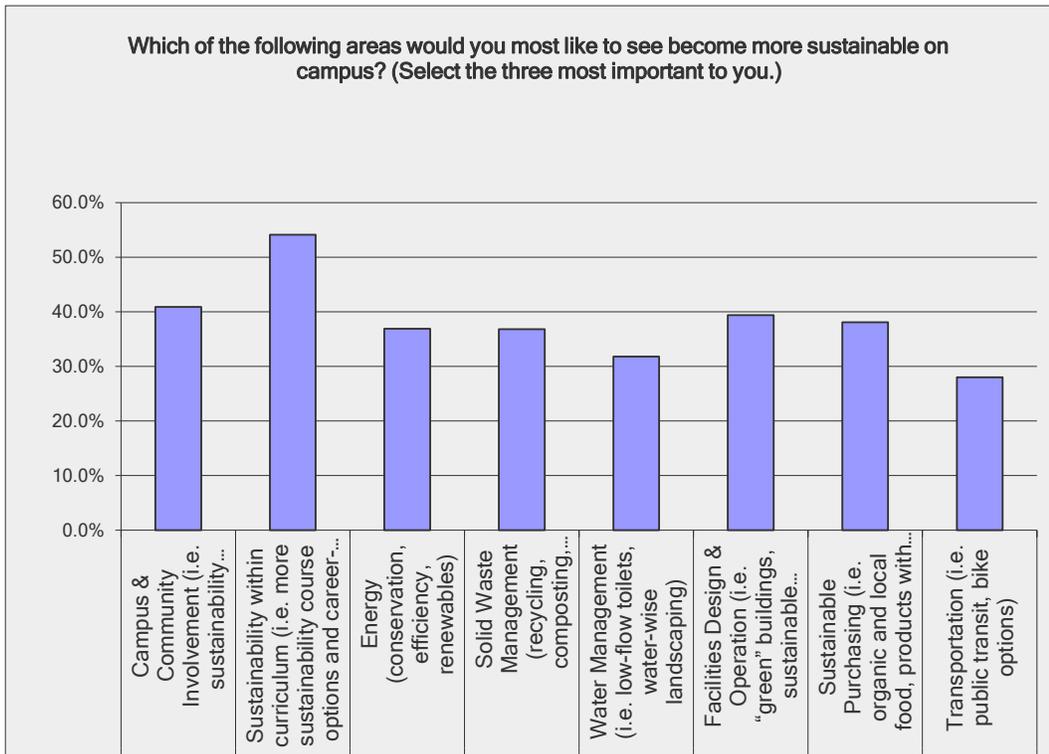
Overall, how would you rate the level of sustainability on campus?



Student Sustainability Survey

Which of the following areas would you most like to see become more sustainable on campus? (Select the three most important to you.)

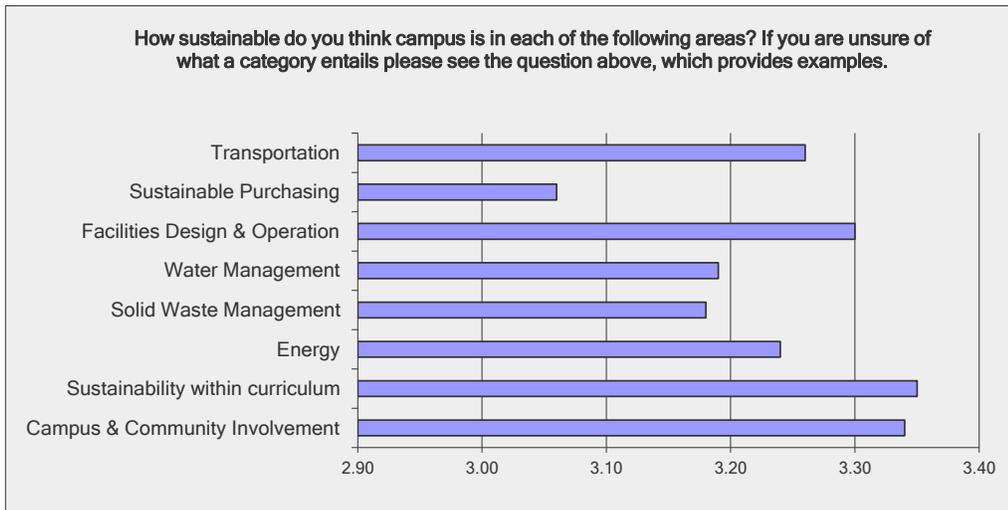
Answer Options	Response Percent	Response Count
& Campus & Community Involvement (i.e. sustainability events, volunteer days)	40.9%	246
Sustainability within curriculum (i.e. more sustainability course options and career-oriented programs)	54.1%	325
Energy (conservation, efficiency, renewables)	36.9%	222
Solid Waste Management (recycling, composting, reduction, reuse)	36.8%	221
Water Management (i.e. low-flow toilets, water-wise landscaping)	31.8%	191
Facilities Design & Operation (i.e. "green" buildings, sustainable landscaping)	39.4%	237
Sustainable Purchasing (i.e. organic and local food, products with recycled content)	38.1%	229
Transportation (i.e. public transit, bike options)	28.0%	168
Other (please specify)		30
<i>answered question</i>		601
<i>skipped question</i>		131



Student Sustainability Survey

How sustainable do you think campus is in each of the following areas? If you are unsure of what a category entails please see the question above, which provides examples.

Answer Options	Very poor	Poor	Neutral	Good	Great	Rating Average	Response Count
Campus & Community Involvement	17	67	269	203	53	3.34	609
Sustainability within curriculum	17	86	229	212	61	3.35	605
Energy	13	99	267	181	44	3.24	604
Solid Waste Management	26	93	269	176	39	3.18	603
Water Management	25	91	274	175	41	3.19	606
Facilities Design & Operation	19	94	239	192	60	3.30	604
Sustainable Purchasing	37	108	276	144	36	3.06	601
Transportation	18	79	284	171	51	3.26	603
<i>answered question</i>							616
<i>skipped question</i>							116

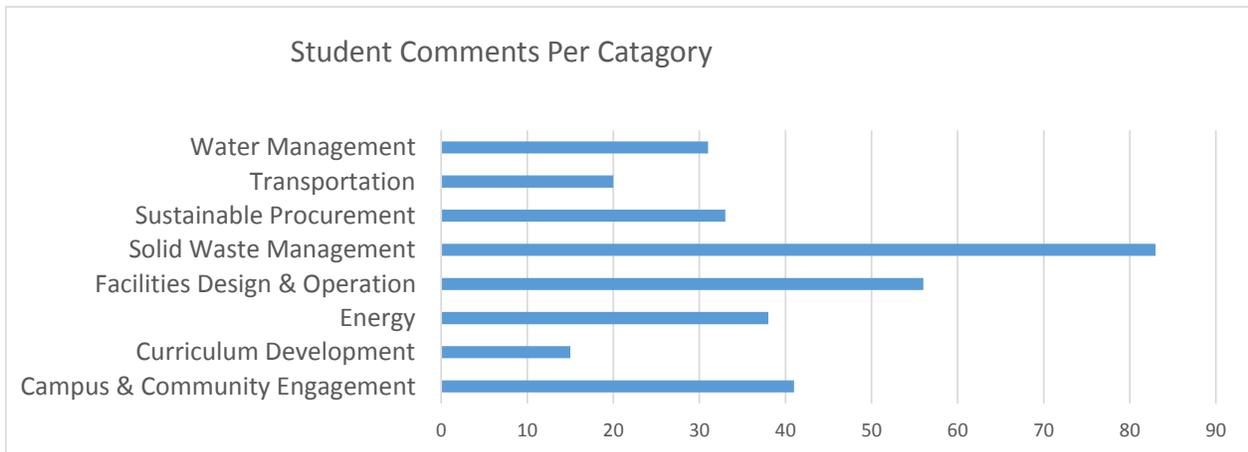


Student Sustainability Survey

What specific sustainability measures or programs would you like to see on campus? Please list all ideas that come to mind.

Answer Options	Response Count
	296
<i>answered question</i>	296
<i>skipped question</i>	436

Areas of Sustainability	Response Count
Campus & Community Engagement	41
Curriculum Development	15
Energy	38
Facilities Design & Operation	56
Solid Waste Management	83
Sustainable Procurement	33
Transportation	20
Water Management	31

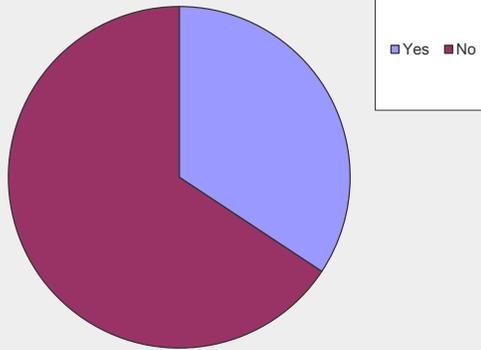


Student Sustainability Survey

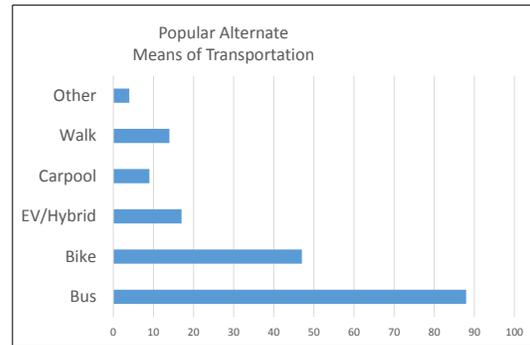
Do you ever use alternate modes of transportation to travel to or from campus? (i.e. bus, bike, electric/ hybrid vehicle)

Answer Options	Response Percent	Response Count
Yes	34.3%	199
No	65.7%	381
If yes, please elaborate in the space below.		160
answered question		580
skipped question		152

Do you ever use alternate modes of transportation to travel to or from campus?
(i.e. bus, bike, electric/ hybrid vehicle)



Category	Count
Bus	88
Bike	47
EV/Hybrid	17
Carpool	9
Walk	14
Other	4

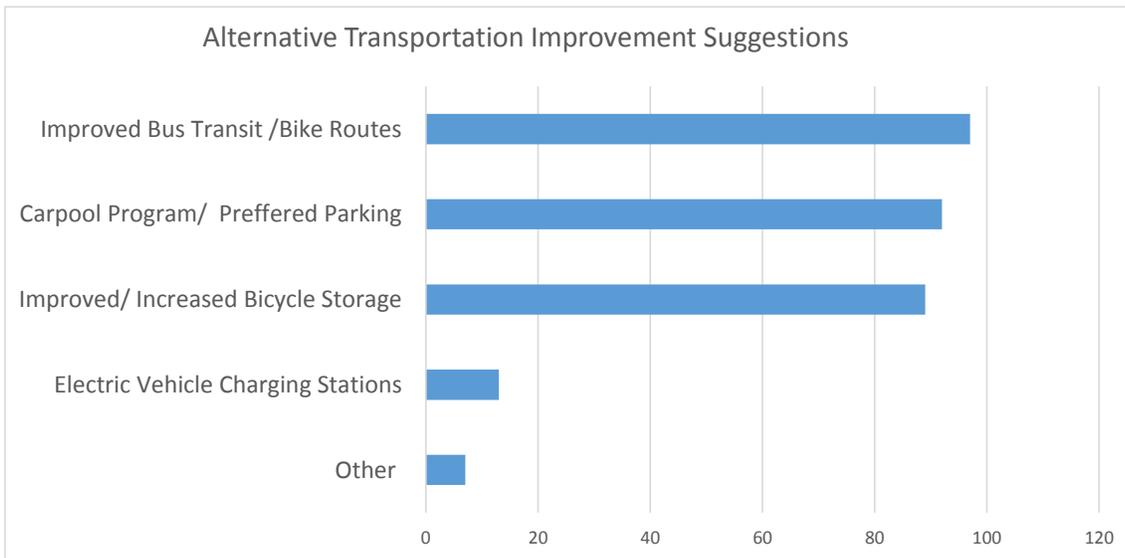


Student Sustainability Survey

What programs or changes would encourage you to use or increase your use of alternative transportation to and from your campus or facility? (i.e. discounted bus pass, improved bus routes and frequency, better bike storage, carpool program)

Answer Options	Response Count
	375
<i>answered question</i>	375
<i>skipped question</i>	357

Category	Count
Other	7
Electric Vehicle Charging Stations	13
Improved/ Increased Bicycle Storage	89
Carpool Program/ Preferred Parking	92
Improved Bus Transit /Bike Routes	97
Discounted Transit Pass/ Incentives	152

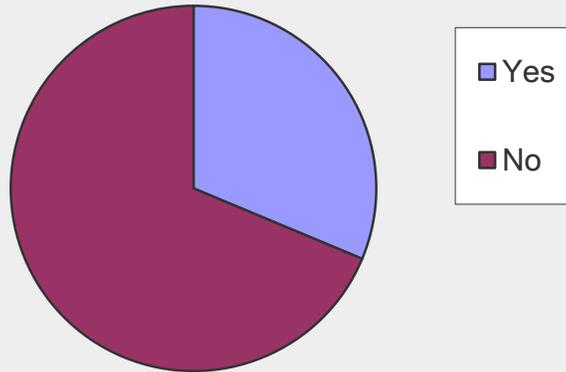


Student Sustainability Survey

Are interested in finding out more about sustainability on campus and how to get involved?

Answer Options	Response Percent	Response Count
Yes	31.3%	177
No	68.7%	388
If yes, please provide your name and email address below.		121
<i>answered question</i>		565
<i>skipped question</i>		167

Are interested in finding out more about sustainability on campus and how to get involved?



Appendix 3
2014 Santa Ana College “Sustain-a-palooza” Student Input

Attached is a list of the student input given during the 2014 “Sustain-a-palooza” event held at Santa Ana College.

Student Sustainability Suggestions
 Santa Ana College - Sustain-a-Palooza Event
 4/23/2014

Topic	Suggestion	Count	Total
Waste	School-wide recycling program, recycling cans next to all trash cans and in every classroom, on campus recycling center	15	26
	Trash cans by parking lots	1	
	Eliminate usage of plastic bags on campus (ie college stores)	1	
	Compost program	5	
	Hold reoccurring volunteer days focused on restoring/ cleaning up local environment/ trash pick-up on campus	2	
	More cigarette trash disposal	1	
	Solar powered trash compactors	1	
Water	Conserve water in school experiments, like chemistry labs (dry labs instead)	2	25
	Provide filtered water (hot and cold) for drinking and instant food; more water fountains	12	
	Waterless urinals	1	
	Reclaimed water for irrigation and toilets	2	
	Hand sensed faucets; Eliminate water flowing unnecessarily	2	
	More efficient restrooms	3	
	Establish culture of water conservation by educating campus community	1	
Water wise landscaping	2		
Energy	Renewable energy generation on campus	7	21
	Solar powered outlets	1	
	Energy efficient lighting, more natural light	5	
	Raise AC set points (often too cold in buildings), thermally efficient buildings, solar powered AC, turn off AC during winter	6	
	Turn off computers at night	1	
	Outfit gym with equipment to harness Kinetic Energy	1	
Transportation	Carpool program- created/ facilitated within the classroom; reward those who carpool	4	15
	Fuel-efficient maintenance/ campus vehicles	1	
	Better public transit to and from campus / Student pass program / College Shuttle Bus	5	
	More parking so you don't waste gas going around the lot several times	3	
	Better bike racks, conducive to safer bike locking	1	
	Outfit parking with equipment to harness kinetic energy	1	
Landscaping	Plant more trees and flowers; campus tree-planting project	7	14
	More gardens like Coastkeepers, student gardens, organic gardens	3	
	Shaded outdoor study area	1	
	More native California plants on campus/ desert landscaping	2	
	Campus/ community garden; harvest fruit and vegetables	1	
Curriculum/ Student Involvement	More sustainability lectures and classes/ regular documentary screenings - knowledge and awareness are going to be the largest contributing factors to the sustainability of our planet	2	10
	Hold student events such as green day, hiking trips, ocean clean ups	3	
	Sustainability reward program - honor/ celebrate those who are making a difference!	1	
	Paperless classes : Do not require students to print notes/ capacity to submit more homework online	3	
	Contribute to the local community through course projects or field trips/ volunteer days	1	
Procurement (Food and Products)	Organic/ healthier food options on campus	6	16
	Re-evaluate/ eliminate contracts with Pepsi/Sysco	1	
	Host farmer's market on campus	1	
	Recycled/ hemp product options	1	
	Community engagement through purchasing / Sustainable purchasing	2	
	Recycled toilet paper and paper towels (from recycled materials)	2	
	Used materials repurposing	1	
	Reduce use of plastic containers	1	
	No flyers! Use a screen or teleprompter attached to smart code reader for flyer download	1	
Total		127	

Appendix 4

“The Campus as a Living Laboratory – Using the Built Environment to Revitalize College Education: A Guide for Community Colleges”

The American Association of Community Colleges, the Sustainable Education & Economic Development (SEED) Center, and Center for Green Schools at the U.S. Green Building Council (USGBC) created a helpful guide that highlights the eight essential elements to building effective living labs. It will be a valuable resource for RSSCD as SAC and SCC further explore and integrate the concept.

THE CAMPUS AS A LIVING LABORATORY

Using the Built Environment to Revitalize College Education

A GUIDE FOR COMMUNITY COLLEGES



ACKNOWLEDGMENTS



The American Association of Community Colleges (AACC) is the primary advocacy organization for the nation's more than 1,100 community, junior, and technical colleges and their more than 13 million students. Community colleges are the largest sector of higher education. Headquartered in Washington, D.C., AACC has been in operation since 1920. www.aacc.nche.edu



This publication is a product of the SEED (Sustainability Education and Economic Development) Center established by AACC. SEED aims to advance sustainability and clean technology education programs at community colleges by sharing innovative practices to help college administrators, faculty, and staff build the green economy. More than 470 community colleges are members of SEED, and more than 30 college presidents make up SEED's Sustainability Task Force. www.theseedcenter.org



The Center for Green Schools at the U.S. Green Building Council is making sure every student has the opportunity to attend a green school within this generation. From kindergarten to college and beyond, the Center works directly with staff, teachers, faculty, students, administrators, elected officials and communities to drive the transformation of all schools into sustainable places to live and learn, work and play. www.centerforgreenschools.org

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ABOUT THIS GUIDE

As community colleges redesign and retrofit campuses in greener ways, many forward-thinking institutions are using these projects as hands-on learning opportunities for students. These so-called “living laboratories” merge academics and campus facilities management to provide students with real-world skills and, for the institution, a path to meet its sustainability goals.

This guide is designed for community college personnel who are interested in launching or advancing effective living laboratory models on their campuses. Faculty, sustainability officers, and facilities staff, in particular, will find the information, best practices, and links useful.

ABOUT SEED

AACC’s SEED Center helps build the capacity of community colleges in educating for and building a sustainable economy. For more information about building campus living laboratories or to get connected to college leaders at the institutions highlighted in this guide, please contact sustainability@aacc.nche.edu or visit www.theseedcenter.org.

TABLE OF CONTENTS

- 1. Introduction 5**
- 2. Eight Elements to Building a Living Lab 9**
 - Element 1: Engage the right campus participants
 - Element 2: Identify key collegiate programs
 - Element 3: Build credibility through engagement and data
 - Element 4: Integrate it into the curriculum
 - Element 5: Expand beyond individual programs of study
 - Element 6: Build partnerships with industry
 - Element 7: Engage support beyond the campus
 - Element 8: Open your labs to the community
- 3. Conclusion 22**
- 4. Appendix: Resources..... 23**
- 5. Endnotes 24**

INTRODUCTION

Over the past decade, St. Clair County Community College (SC4) in Michigan has transformed its 25-acre campus into a sustainable “living laboratory.” Green roofs dot the tops of buildings, a bioswale cleans tens of thousands of gallons of rainwater, and solar panels, wind turbines, and a geothermal field generate energy to power computer labs and other facilities. These green projects serve a dual purpose: to reduce the college’s carbon footprint and provide students with critical real-world, hands-on learning opportunities.

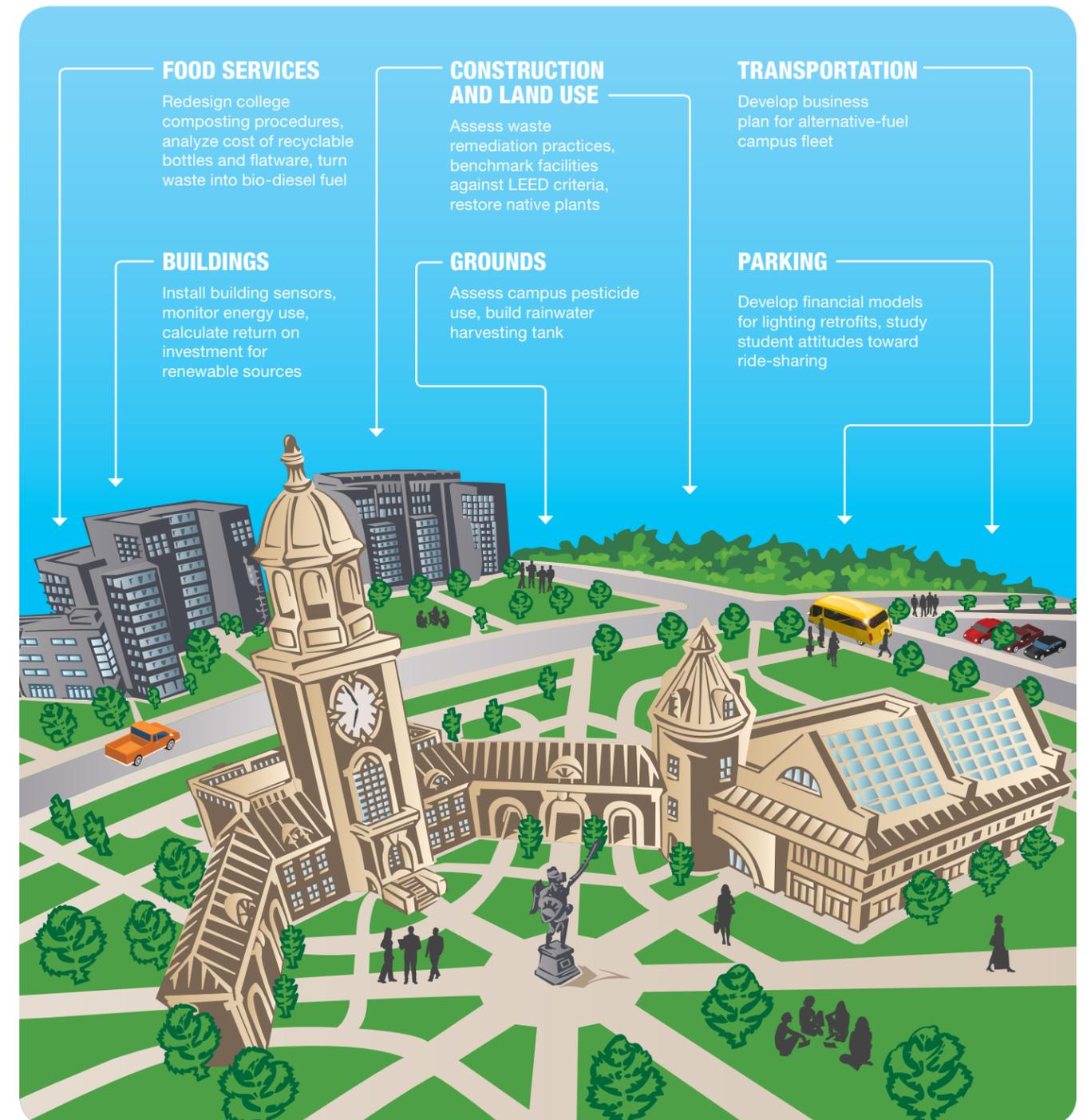
The installations are accessible to students and faculty to research, repair, and in some cases, take apart and reinstall. For SC4, this is being done in conjunction with traditional classroom learning to make instruction more relevant to students who are pursuing careers in clean technology sectors or simply have a passion for addressing sustainability and climate change.

The opportunity for wider adoption of these living laboratories across community colleges is vast. Most colleges do not consider experiential learning opportunities as part of regular facilities improvement strategies, and sustainability-focused course projects are often employed only by faculty in environmental programs.

It will require careful planning and collaboration—especially between facilities staff and faculty—for more colleges to develop these living laboratories in a way that maximizes all students’ learning experiences and yields benefits for the college’s bottom line. This guide highlights eight essential elements to building effective campus-wide living labs. It tackles some of the biggest challenges in these efforts, from breaking down internal institutional silos to addressing student safety to engaging industry. There is no single path to implementing living labs, but interviews with leaders of the most successful institutions revealed these common elements.

THE CAMPUS AS A LIVING LABORATORY

The campus facilities provide an array of dynamic sustainability learning opportunities for students across academic and technical programs.



WHY CAMPUS LIVING LABS? A Vehicle for the 21st Century Community College

Increasing enrollment, decreasing budgets, aging infrastructure, and pressure to improve student completion rates are pushing community college leaders to re-examine how they allocate resources, deliver curriculum, and keep students on campus and engaged. Living labs that couple academic rigor with applied learning on sustainability-related campus infrastructure projects provide an opportunity for community colleges to address many of these objectives simultaneously. Specifically, living labs can:

1. Facilitate experiential learning and make curricula relevant

It's well documented that experiential education—in particular, through hands-on, project-based learning—facilitates student success.^{i,iii,iii} When students are able to practice concepts learned in the classroom, they are more engaged, comprehend material better, and develop skills desired by employers.^{iv} More than three-quarters of community college students, however, say they have not participated in experiential education as part of a course, and only 13% of faculty require it.^v

Using the campus built environment to educate for sustainability lends itself perfectly to this pedagogical approach. Classroom instruction centered on creating healthier ecosystems, social systems, and economies¹ is inherently multidisciplinary and can be supplemented with enticing project learning experiences found across any college campus.

At Alfred State College (NY), applied technology students master math skills as they calculate energy flow from their campus' [net-zero model home](#). “To determine how to optimize the home's small wind energy source for maximum efficiency, for example, students are using algebra, geometry,

¹ These elements are referred to as sustainability's triple bottom line: assessing financial, social, and environmental impacts of corporate and institutional decision making.

and basic math,” said Craig Clark, dean. “But because the learning is contextualized within exciting projects—saving home energy and conserving resources—it's so much more interesting for them.”

Living lab experiences also enable students across college programs to understand the interdependence of local sustainability challenges (e.g., how more efficient campus landscaping can reduce water usage, which will lower a college's utility bills, conserve community resources, and produce more climate-resilient regions). This understanding helps students become more than just skilled workers; they become better consumers, homeowners, and change agents who can move communities to become models of sustainability.

2. Reduce the carbon footprint

Through initiatives like the [American College & University Presidents' Climate Commitment](#), hundreds of community colleges are pursuing climate neutrality in campus operations. Engaging students and faculty in the process through living lab educational experiences can help institutions reach this goal more quickly. For example, when Georgia Piedmont Technical College's (GPTC's) building automation students tracked patterns in the college's heating and cooling system use, they noticed that both systems often ran simultaneously and at times when no one was on campus. The students' recommendations—to specify scheduling changes and sub-meter facilities—saved the college hundreds of thousands of dollars in energy costs and have made a significant dent in the institution's greenhouse gas emissions.

Green Spaces and Student Productivity

- 80% of institutions of higher education have conducted at least some green retrofits and operational improvements
- 63% of these institutions report that these spaces have improved student productivity and test scores

Reference: 2013 McGraw-Hill report: *New and Retrofit Schools: The Cost Benefits and Influence of a Green School on its Occupants*

3. Use institutional resources efficiently

It's a simple case of institutional resource management: New labs are costly and community colleges have depleted coffers. Why not leverage a college's existing facilities or new green installations for use as the labs themselves? Colleges spend nearly \$10 billion a year on building construction and renovation^{vi} (and these projects are increasingly green).^{vii} “It occurred to me that between our older and newer energy-efficient buildings, we had every conceivable mechanical and electrical system right here on campus,” said Tom Donovan, SC4's director of physical plant. SC4's newer buildings incorporate highly complex energy monitoring and controls that provide abundant data about real-time building performance. “Through these technologies, we're creating not only energy savings for the college, but also lesson plans for students on important topics like building automation and energy efficiency.”



Students help to install solar panels atop Alfred State's net-zero model home.

4. Improve college completion

The living lab model can support colleges in their efforts to create pathways to college completion. At Gateway Technical College (WI), the initial campus living lab work with Trane allowed students to learn on the college's new energy-efficient HVAC system and resulted in a dynamic workforce partnership. “The project work with Trane allowed our instructors to better understand needed skill sets and hone HVAC training for in-demand, clean technology occupations,” said Dr. Bryan Albrecht, president of Gateway. “This, in turn, has led to the development of coherent career pathways in engineering and, ultimately, more students leaving with [industry-recognized credentials](#) and jobs.”

EIGHT ELEMENTS TO BUILDING A LIVING LAB

Based on feedback from community colleges actively implementing living laboratory pedagogy in their curriculum, the following eight elements emerged as key components for successful adoption. The elements are not linear or prescriptive, but provide a framework to assist colleges in adding facilities-based, experiential learning opportunities on their campuses.

ELEMENT 1: Engage the right campus participants

Successful integration of a living laboratory curriculum hinges on the active involvement of a number of key campus stakeholders. At their core, living labs bring together facilities staff and faculty—two groups that rarely interact—to study the campus infrastructure and make improvements. Asked about the facilities/faculty divide, one college director of technical education commented that he had been teaching energy efficiency for 20 years and had never even met the campus’ energy manager.

The living lab experience doesn’t work without this relationship. The facilities director holds the key (often literally) to improving institutional energy efficiency and making campus facilities accessible laboratories for faculty to develop sustainability learning. Understanding the facilities world—and making facilities directors feel comfortable that the projects will be safe and well-defined—is crucial.

Building a dedicated group of academic leaders, trustees, operational staff, and students will also help transform the living lab from a single-course project to a strategic initiative that supports the college’s broader sustainability priorities.

Living Lab Initiatives: Key College Participants

Instructor: Those who have an understanding of and passion for sustainability concepts and are eager to create project-based learning experiences.

Division chair: Critical for prioritizing resource requests related to experiential activities.

Academic dean or vice president of academic affairs: Important for promoting living lab pedagogy across the institution and engaging faculty from relevant programs.

Facilities director: Will work with faculty to identify opportunities and ultimately approve student access to facilities and grounds.

Human resources director: Engagement will help to resolve student liability—a critical early barrier.



GPTC’s Starnes Center, where the college’s living lab initiatives began.

UNDERSTANDING AND COMMUNICATING WITH YOUR FACILITIES DIRECTOR	
COMMON FACILITIES DIRECTOR CONCERNS	MESSAGING THAT WORKS
Campus building systems are highly complex and dangerous —not the place for students.	Many living lab projects (e.g., energy audits, cost-benefit analyses of solar panels) require only minimal direct access to equipment for students. Those projects that do require special access (e.g., students to climb on roofs) will include direct oversight by faculty or facilities staff.
We’re understaffed. Now I have to oversee students working on this?	Student projects can actually relieve some important workload items—such as campus waste inventories and equipment logging and tracking—and can provide better data and success stories to the administration and community.
Our budget is too tight.	Living lab projects can build internal capacity with untapped resources (e.g., students). They are also designed to deeply engage corporations, which can mean an influx of technical assistance, equipment, and other donations that support facility operations.
Sounds great, but I operate in “reactive mode” and spend my time responding to emergency hot and cold calls, water leaks, and equipment malfunctions.	Living lab projects tend to attract the attention of college leaders and the media and often, as a result, more resources for creative ideas. This can allow for more time to think proactively and strategically about energy savings and campus resource conservation.

SUCCESS STORY:**Gearing Up**

GEORGIA PIEDMONT TECHNICAL COLLEGE
(DeKalb County, GA)

After some preliminary successes, Georgia Piedmont Technical College (GPTC) building automation and refrigeration faculty decided to embark on a more formalized living lab effort with input from a campus-wide committee. Instructors met with the vice president of academic affairs, the department chair, the human resources manager, the academic dean, the college's financial officer, and the facilities director. The instructors presented the benefits of living laboratory pedagogy, including better student retention of concepts, improved communication and team-building skills, applied and independent learning, and improved analytical skills. Two key concerns raised by the committee were student liability and the potential disruption of normal building operations, including the risk of students breaking expensive equipment.

In response to the committee's concerns, the instructors created a plan detailing a set of stipulations to be put into place before the projects commenced:

- All work would start with a small building (29,000 square feet).
- Student work would be clearly documented and defined within the course materials and would be required as a graded component, much like a traditional lab.
- The work would have to support either course or institutional student learning outcomes.
- All living laboratory experiences would have to be supervised by faculty and coordinated with the facilities director.
- A safety course would be a prerequisite to student participation.

The committee, and later the president, approved the plan. These early meetings with key decision-makers laid an important foundation to create buy-in, allay fears, and set clear deliverables and measurable outcomes.

ELEMENT 2: Identify key collegiate programs

Hands-on, applied education is generally associated with technical training, but there also are many opportunities to incorporate living labs into academic programs. The items at right are examples of program areas well-suited to living laboratory integration:



In coordination with Gateway's grounds team, a student in the horticulture program uses natural techniques to enrich soil on the Kenosha campus.

Academic Programs

Agriculture: sustainable farming practices, nutrient cycling, erosion control, pollution management, assessing campus guidelines and sustainable materials to use for water, pesticide, and nutrient management

Business and Accounting: business case for college-wide green purchasing policies and for sustainable facilities retrofits, cost analysis, simple payback and return on investment calculations, full-cost accounting

Engineering: campus building energy audits, energy modeling to optimize building renovations, heat transfer through composite walls, designing renewable energies applications (see also the [U.S Environmental Protection Agency's green engineering library](#))

Environmental Science: campus carbon footprint measurement, greenhouse gas emissions inventory, facility waste management

Physics: solar radiation effects, heat and mass transfer, unit conversions, gas inventories

Psychology: sustainability awareness and education influencing student behavior toward energy efficiency

Technical Programs

Building Automation: facility historical log analysis, building scheduling and occupancy monitoring

CAD: building shell and construction drawings, building information modeling

Construction: existing campus stormwater filtering and waste remediation practices (see also [USGBC's Hands-On LEED: Guiding College Student Engagement](#) for specific LEED-related student activities)

Electrical: branch and feeder circuit location, code violation identification, building electrical consumption tracking, identification of peak demand charges

Green-Related Technical Programs: rainwater harvesting product design, solar photovoltaics installation, alternative fuel research

HVAC: inventory and location of mechanical systems, heat gain calculation, efficiency analyses, preventive maintenance

Industrial Maintenance: campus preventive maintenance program assessment

For more information on projects within any of these disciplines, see the appendix of resources.

Examples:**Agricultural Programs:**

Gateway Technical College's associate degree program in [horticulture](#) teaches students about sustainable plant production, including limiting the use of chemicals, growing in compostable pots, and using organically based fertilizers. Students work with the college's buildings and grounds team to incorporate these practices into the campus landscaping efforts, starting with the space around the college's child care center.

HVAC and Industrial Programs:

Forty-five Davidson County Community College (NC) HVAC and industrial design students installed a heat pump with one of the highest energy-efficiency ratings and an energy recovery ventilator that allows for more homeowner control of ventilation into their green-home campus renovation project. The home now houses international students.

Business and Innovation Programs:

Students at Indian River State College's (FL) 65,000-square-foot LEED Silver [Brown Center for Innovation and Entrepreneurship](#) regularly analyze the building's energy tracking monitors to understand distributed power generation and use. Students use that information to compare the types of vertical wind turbines and solar panels that power much of the facility and how much energy they produce. They also use the information to understand how weather patterns such as heavy air, sun intensity, and wind affect air-conditioning use and solar electricity production.

ELEMENT 3: Build credibility through engagement and data

As with any initiative to manage institutional change, early wins are essential to build momentum. Best-practice colleges have focused on these early indicators to demonstrate success and build interest among a wider audience:

Documenting energy and utility savings through student involvement: When Georgia Piedmont Technical College's (GPTC's) building automation faculty and students documented the hundreds of thousands of dollars of potential savings from some simple scheduling changes, their work became a convincing argument for a full campus living lab initiative. "Once we realized that there were dollars to be saved, everyone became very intrigued," said the former facilities director. "Senior leadership buy-in after that was really pretty simple."

Engaging the right partners: Forming partnerships was a key element in the creation of Milwaukee Area Technical College's (MATC's) 32-acre, 540 kW solar photovoltaic educational lab. The college brought in more than 30 entities, including Johnson Controls, the Midwest Renewable Energy Association, and Milwaukee Public Schools, to design the

project to meet energy and job training objectives. "Having diverse and influential players in the room was important to ensure that the project ultimately serves a range of constituent needs," said Dr. Michael Burke, president of MATC. "Critically, it also brought a level of excitement that convinced our board that resources were being well-spent."

Measuring student outcomes: Conducting student assessments before and after the living lab projects is critical. At GPTC, instructors assess students at both intervals on their technical skills (reading blueprints and engineering drawings) and interpersonal skills (communication and teamwork). The assessments enable the instructors to continually improve the experience for students and demonstrate to senior leadership that the living lab is a worthy investment.

Bringing money to the table: Johnson County Community College (KS) faculty and students approached the facilities department with \$400,000 (generated through the students' own initiated "green fee") and an idea to equip campus buildings with building sensors. The students' money was used to purchase the sensors, which the facilities department agreed to install. Students across various programs are now using the sensors as part of class assignments to monitor building performance.



A St. Clair County Community College engineering professor explains to his students the design features of one of the college's green roofs.

SUCCESS STORY:

Engaging Facilities Staff in the Classroom

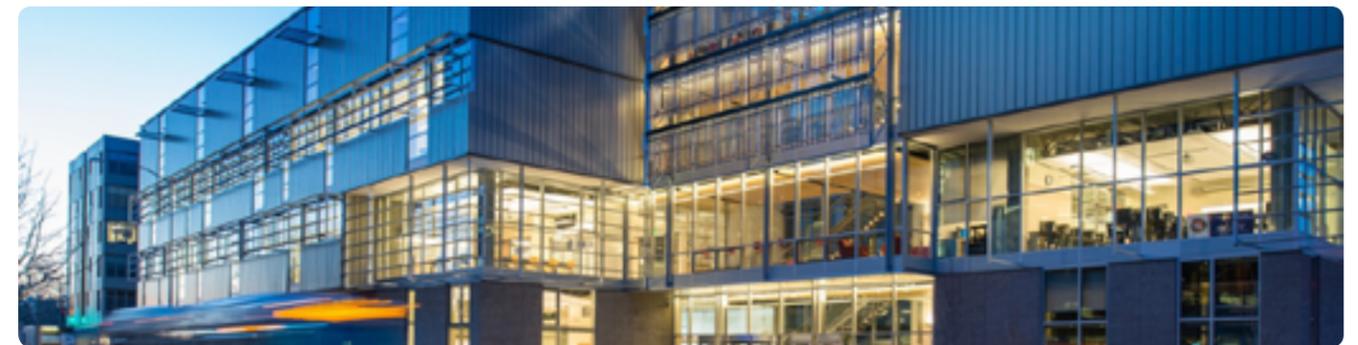
BY TOM DONOVAN, PHYSICAL PLANT DIRECTOR,
ST. CLAIR COUNTY COMMUNITY COLLEGE

I regularly lecture in our college's alternative energy classes and take the students to our warehouse to see the front-end building automation system work in real time. It is very exciting to see the reactions of the students. Many cannot believe that such a system exists and that you can control an entire building from one computer. As the system continually adjusts temperature settings in a remote room, for example, the students start to see how the concepts they learned in class play out.

For me personally, it is a wonderful added part of the job to teach. Sometimes I get questions from students that I've never thought about before.

The key to all of this is the relationship I have with the faculty. We've moved beyond regularly scheduled living lab planning meetings and now we email one another to discuss different classroom exercise ideas or articles about emerging clean technologies. All of the speed bumps we encountered early on are long gone, and it's just become part our culture.

Lane Community College's new LEED Platinum downtown campus.



ELEMENT 4: Integrate it into the curriculum

Incorporating effective living laboratory exercises into the curriculum requires creativity and careful planning by the instructional staff.

Instructors should find ways to connect the course's student learning outcomes (SLOs) to learning projects involving campus buildings or grounds. For example, a physics course could include a project in which students calculate annual incident solar radiation absorption at a certain location on campus. The project could be enhanced by asking students how much energy could be reasonably captured annually with solar arrays at the location and how many tons of greenhouse gases would be eliminated. This project would support several physics SLOs related to energy, reflectivity, incident angle of radiation, and absorption. For specific classroom resources and examples, see links in the appendix.

Explicit instructions are critical to even simple living laboratory experiences. The syllabus should include topics related to the experience and handouts should incorporate at minimum:

- A full description of the project, including the topic's connection to the college's broader sustainability goals, if they exist
- Student learning outcomes
- Where and when the work will take place
- Expectations for on-site behavior
- Safety issues to keep in mind
- Student work expectations

SUCCESS STORY:**How Living Laboratory Pedagogy Can Be Effectively Used Across the Curriculum**

LANE COMMUNITY COLLEGE (Eugene, OR)

In the first year of the college's associate degree program in energy management technician training, all students take courses to ensure that they have a strong technical understanding of building construction and operations. Classes focus on how the building shell, HVAC, lighting, and systems affect energy efficiency. Students pursuing concentrations such as renewable energy learn how to choose, size, and install renewable energy systems for photovoltaic and solar domestic hot-water systems.

To reinforce the concepts of energy efficiency, each year students study a building on campus or in the community. Built in 1965, the campus provides an array of opportunities to analyze older building systems to determine how to improve energy efficiency of existing facilities. Under the supervision of a faculty member, students conduct energy, water, and lighting audits and log data at the facilities. Students prepare formal technical reports that include results of the audits, evaluation of the data, simple payback calculations, and a life-cycle cost analysis. The reports are presented to the facilities department and include

potential improvements to energy efficiency. In some cases, the measures may have few or no budget implications, and others may require a comprehensive, long-range implementation plan.

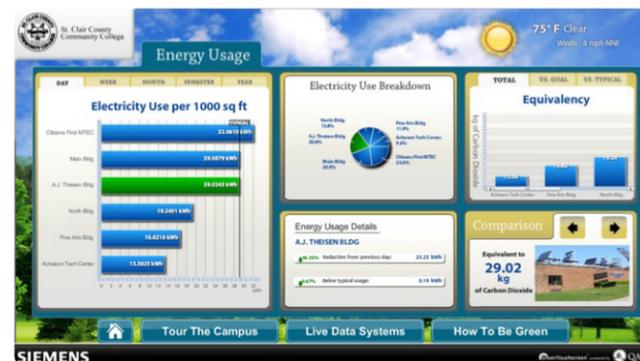


Lane Community College students set up data loggers to monitor building efficiency. Each logger must be configured with the right sensor type and information for a specific installation location.

In December 2012, the college opened the [Downtown Center](#) to house the energy and water education programs. The building is LEED Platinum and showcases the latest in green building design, construction, and operations. From the earliest design phases, faculty have used the building's shell, five comfort systems, and light lab as tools to prepare students for careers in the new green economy.

Leveraging LEED on Campus Through Student Participation

The LEED green building rating system can serve as a tool to facilitate project-based learning opportunities for students and can support efforts to transform the campus into a living laboratory. Whether through a course, internship, or volunteer opportunity, students can research LEED credits, assess their impact on buildings, conduct energy and water audits, develop and implement recycling programs, administer building-occupant and transportation surveys, and facilitate design charrettes. [Learn more at USBG's Center for Green Schools.](#)



St. Clair County Community College's real-time green touch screen allows students to monitor campus energy usage from an accessible campus kiosk. The information is also available online for an external audience.

ELEMENT 5: Expand beyond individual programs of study

Instructors who are new to sustainability-focused, project-based learning should begin with small projects within a single course. As instructors gain experience, they can begin to broaden their project scope by collaborating with other

SUCCESS STORY:**Cross-Disciplinary Living Lab Initiative**

GEORGIA PIEDMONT TECHNICAL COLLEGE

When GPTC's living lab initiative became interdisciplinary, students' retention of core concepts improved (as measured by course assessments), and companies involved in the effort (including large building automation companies and smaller technology contracting firms) hired many of the graduating students.

Living lab projects at GPTC began to spill over into new buildings and program areas. The Starnes Center for adult education was selected for an interdisciplinary pilot project because it was close to the main campus, was relatively small (less than 30,000 square feet), lacked accurate floor plans, and was extremely inefficient (it had no central control system and so heating and cooling systems ran continuously). Instructors from accounting, HVAC, building automation, drafting, engineering, and green technologies formed a project design team, designed the project elements for each student group, and defined the parameters for collaboration between the groups.

The accounting students formed a hypothetical company responsible for "greening" the Starnes Center. They obtained quotes from mock subcontracting firms comprised of student teams from each major, with accounting students acting as the general contractor and other student teams as subcontractors. The instructors played the role of building owner. All interactions were patterned on real-world practices, and students received technical training on the products and technologies from a faculty and industry team.

faculty and staff on interdisciplinary projects, exposing students to the inherent synergies of sustainability (and shedding light on the range of clean-technology professions). Interdisciplinary projects like this will build students' systems-thinking skills—a core competency desired by companies in these industries.

The project's outputs included:

- Energy models in eQuest software
- 3-D rendering of the facility
- Scale drawings of the building
- Comprehensive project proposals in professional format
- Energy conservation proposals
- Automation system design proposal and drawings
- Sustainable technologies systems proposals with ROI calculations
- HVAC systems inventory and load calculations
- Business plan

At the end of the semester, students presented these products and plans to the college's facilities department and a panel of industry representatives. Students will now help to design, install, and monitor the approved energy conservation measures at the Starnes Center. In addition, the college is moving forward with plans to replicate this student-led work at other buildings across GPTC's campus.

GPTC Cross-Disciplinary Living Lab: Project Team (Student) Responsibilities

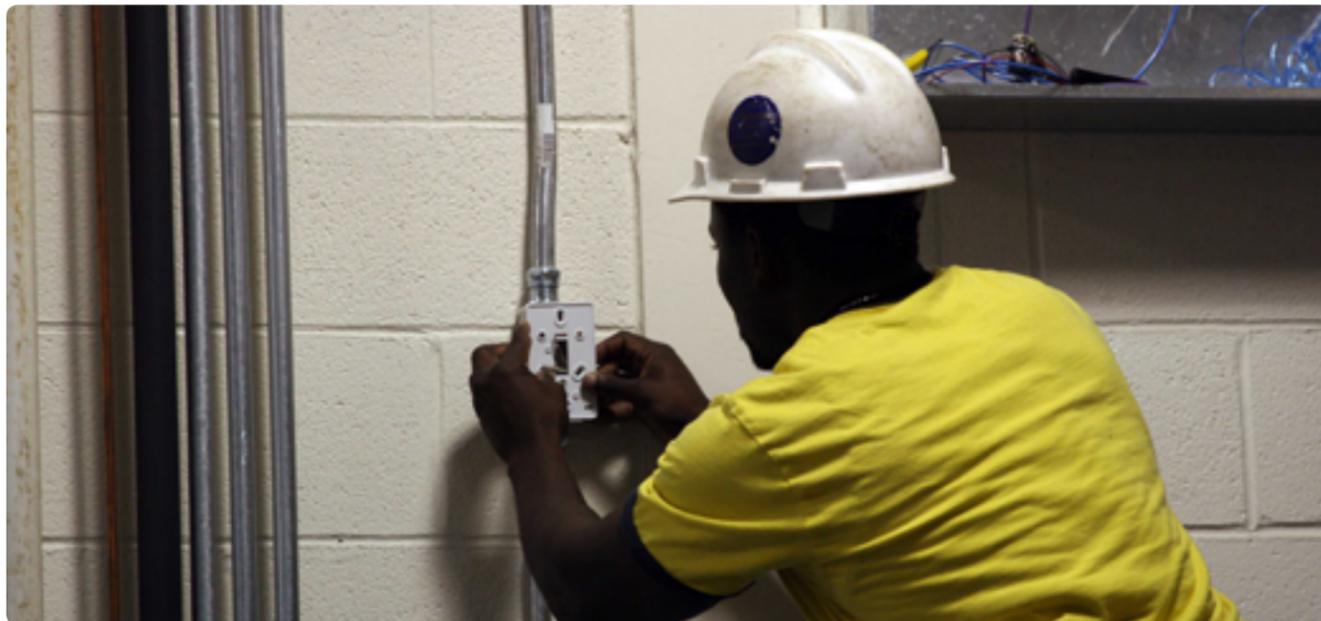
- Accounting:** overall project management, cost analysis, proposals to building owner
- Air-Conditioning:** HVAC systems inventory, efficiency assessments, heat gain/loss calculations
- Building Automation:** automation system assessment, design, installation
- Drafting:** scale drawing of building in AutoCAD
- Engineering:** Level III Energy Audit with eQuest modeling and energy conservation measures recommendations
- Green Technologies:** proposals for rainwater harvesting, solar array, solar thermal heating



GPTC students install a communications network to track building conditions as a required, graded component of their course work. Both students have since graduated and are project managers at two building control companies in the region.

Living Labs as a Bridge From Noncredit to Credit

The living lab model can serve as a vehicle to bridge noncredit programming in clean technology to credit-based degrees. For a stand-alone, noncredit course developed quickly in response to a perceived need, collaborating with corporations and credit-based instructors on a living lab can bring the attention and support needed to justify a related program for credit. Alternatively, the effort can expose faculty to the connection between programs leading to better integrated curricula. At one college, the living lab laid a foundation to integrate a noncredit solar photovoltaics course, which was at risk for elimination, into an existing HVAC associate degree program. Through the integration, the college is able to continue its important renewable energy instruction.



A building automation student mounts a sensor in GPTC's Green Technologies Academy.

ELEMENT 6: Build partnerships with industry

Most successful campus-based living laboratory projects are conducted with industry partners. Businesses ranging from lumber companies to commercial cleaners to solar panel manufacturers to food services will naturally be hired to implement green- or sustainability-related projects on campus. Companies like these, however, are also showing an interest in leveraging their equipment and services to support student learning.



St. Clair County Community College students use data loggers to measure and analyze water temperatures as part of the new Siemens solar-powered hot water system in the college's Acheson Technology Center.

SUCCESS STORY:

Energy Service Companies (ESCOs) as Partners

SIEMENS AND ST. CLAIR COUNTY COMMUNITY COLLEGE (Port Huron, MI)

ESCOs like Siemens Industry, Inc., Trane, and Johnson Controls, Inc., provide colleges a comprehensive set of energy efficiency, renewable energy, and distributed generation services. These partnerships often yield benefits beyond efficiency savings.

Siemens and St. Clair County Community College have worked together for more than 10 years to build a comprehensive campus sustainability initiative. Siemens helped SC4 conceptualize its campus living lab and has served as a single point of contact to implement a range of renovations and retrofits. Almost all of them serve as educational opportunities, including:

- A new building automation system with tagged, labeled, and color-coded piping and wiring to help students and faculty understand how the pieces of

the new energy-efficient HVAC system work together and flow through the college's main mechanical room

- A window wall for students to view the new equipment
- A kiosk that shows temperature, flow rates, and other data to allow observers to see the building automation system in action and understand how the building's comfort is controlled
- A donated wind turbine accessible to students and faculty

Siemens also worked with SC4 faculty and administrators to add courses on energy analysis of commercial buildings and facility management, and planned a site visit for SC4 faculty at Lane Community College's nationally recognized AAS program in energy management to support implementation of the new coursework.

"Siemens recognizes that deep relationships with campus partners mean supporting experiential learning opportunities for students and staff that leverage complex technology and facility infrastructure improvement projects," said Charles Cohen, building technologies sustainability education director.

"Most important, students who have been trained on these living labs, solving real sustainability problems, no doubt have the hard and soft skills that are urgently needed in our industry."

-Siemens executive

SUCCESS STORIES:

Living Lab Internships and Co-ops

MERCED COLLEGE (Merced, CA) AND HONEYWELL INTERNATIONAL, INC.

As part of a campus energy retrofit, Merced College partnered with Honeywell and local subcontractors to launch an enhanced college curriculum focused on teaching conservation strategies using the building upgrades as case studies. Students across programs now use the school's energy statistics in a series of structured classroom assignments that help them understand how technology and behavior change can affect a building's performance.

Honeywell has since hired two students as paid interns, including Joe Newman, within Merced's engineering math and science department. Under the guidance of the company and the department's dean, Newman is responsible for developing energy management reports for Merced's facilities department. He also leveraged the campus excitement from the living lab assignments to launch a Honeywell-sponsored recycling program. "The internship was a real eye-opening experience," said Newman. "It was a way to connect the theoretical knowledge with practical skills and see how major campus construction projects actually get done."

LANE COMMUNITY COLLEGE AND LOCAL UTILITIES

Lane Community College's energy management program includes a co-op requirement that provides students with relevant field experience that integrates theory and practice while providing opportunities to develop skills, explore career options, and network with professionals and employers in the field. The program has organized co-ops at many organizations and companies, including the local utility and an architectural firm. Through these co-ops, students learn to conduct energy audits, log data, and administer lighting surveys.



Students install a 1 kW solar PV system on the Lane Community College science building roof.

ELEMENT 7: Engage support beyond the campus

Don't have any suitable projects on your campus? Try finding one in your community. Communities across the country are undertaking sustainability efforts that range from fuel-efficient public transportation systems to the adoption of new green-building codes. Colleges can integrate living lab projects into courses using these off-campus opportunities.

"One of the best places to conduct off-campus energy audits [as part of an internship process] is at public buildings," said Roger Ebbage, a faculty member at Lane Community College. "Elementary schools, middle schools, and libraries, in particular, often cannot afford to hire a professional energy services firm to conduct an energy, water, or light audit." Final assignments for Lane's energy management students include a report to the school district or city identifying opportunities to save energy including a cost-benefit analysis of different system solutions.

SUCCESS STORY:

Community Colleges and Habitat for Humanity

YAVAPAI COLLEGE (Prescott, AZ)

Arizona's first net-zero energy house was built as a cooperative effort between [Yavapai College's residential building technology \(RBT\) program](#) and its local [Habitat for Humanity affiliate](#). Green features of the building include a water-managed foundation, airtight frame construction, high-performance windows, solar hot water, and photovoltaic panels. The house was designed to meet the standards of several national green-building rating systems and won five awards, including an Energy Value Housing Award from the National Association of Home Builders Research Center. The project supported RBT learning outcomes, including mastering energy-saving strategies and technologies.

USGBC Student Group

The USGBC Students program is a national initiative of the Center for Green Schools that equips college students with tools and resources to transform their campuses, communities, and careers. Members of USGBC Students integrate sustainability themes into their coursework and advocate for green university practices and policies on campus. Contact studentgroups@usgbc.org to learn more about starting a student group at your school.



Yavapai College's residential building technology students complete work on a neighborhood Habitat for Humanity green home.

ELEMENT 8: Open your labs to the community

Effective campus living laboratories have an impact beyond the student body. If designed and promoted well, they can serve as a learning model for community members and enhance the college's reputation as a regional sustainability leader (which, in turn, can drive more prospective student interest). Some of the innovative ways that colleges are generating community excitement about their living lab work include:

Tours and field trips: Alfred State College conducts regular tours of its campus [green demonstration home](#) that students designed and built. Labor unions, K-12 students and teachers, community-based organizations, and interested homeowners are taken through the building to see the green construction and supporting technology, including a monitoring and control system screen in the entryway that shows the home's real-time energy consumption trends.

Signage: To draw attention to the sustainability efforts on campus, Delta College (MI) developed signs with a landscape architecture firm to identify and explain green features to campus visitors and students. The signs for the new sustainable stormwater management system, for example, highlight the redesigned watercourse, natural filtration system, and habitat restoration.

Web presence: Davidson County Community College captured its 1,000-square-foot green home renovation project in a series of YouTube videos referenced on its college sustainability page. The series allows the viewer to see how students progressed and completed the building.

Workshops: Continuing education classes, workshops, or lectures incorporating the college's living laboratory projects can enhance the college's reputation. Butte College (CA), [the nation's first grid-positive college](#), conducts regular workshops for homeowners and business leaders on topics such as green home and business facility improvements, energy and utility bill savings, and landscape design for water reduction and wastewater reuse. Different parts of the campus are used as demonstration projects.



Delta College's sustainability awareness signs, found at various green campus locations, are used in conjunction with classroom learning and independent study.



Lane Community College's building engineer leads a tour of the new health and wellness building for the public to learn about energy-efficient designs in lighting and space.

CONCLUSION

Living laboratories can be a new paradigm for how community colleges promote student success and serve their communities. By creating these hands-on learning opportunities, colleges will be preparing students with the analytical, interpersonal, and technical skills required to succeed in a variety of careers from conventional green jobs to finance, farming, and construction management. Living labs can also instill in students the desire and ability to think critically about our most daunting sustainability challenges.

Our hope is that as more colleges follow the elements highlighted in this guide, these living laboratories will become a common core strategy for community colleges making the 21st century transformation.

For more information about building campus living laboratories, or [to get connected, formally, to a mentor](#) at one of the institutions highlighted in this guide, please contact sustainability@aacc.nche.edu or visit www.theseedcenter.org.

APPENDIX: RESOURCES

The following organizations provide resources specific to the design and execution of higher education living laboratories.

Advanced Technology Environmental and Energy Center (ATEEC)

www.ateec.org. ATEEC is a National Science Foundation Advanced Technological Education Center (ATE). The site has curricular materials for a range of clean technology fields.

American College & University President's Climate Commitment (ACUPCC)

www.presidentsclimatecommitment.org. Resources for designing, implementing, and financing living laboratory models. Well over 100 community colleges are signatories of the ACUPCC network, each submitting their own campus climate plans. As of the summer of 2013, 51 have reported a total of 54 completed green building projects and 49 have reported 696 completed energy efficiency projects. Descriptions and case studies of these activities are available for download.

American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE)

www.ashrae.org. Resources, events, and scholarships for colleges with engineering, HVAC, or building automation programs. ASHRAE local chapters work with community colleges to integrate sustainability practices into campus facilities maintenance and related curriculum.

Association for the Advancement of Sustainability in Higher Education (AASHE)

www.aashe.org. Resources, case studies, and guidelines for higher education institutions to implement sustainability initiatives including living lab models. See www.sustainabilityscience.org/files/StoriesfromtheField.pdf for specific living lab case studies.

Building Efficiency for a Sustainable Tomorrow (BEST)

www.bestcte.org. BEST is a National Science Foundation ATE Center focused on building automation and efficiency. BEST offers professional development and online resources for college educators.

Experiential Learning Center at Truckee Meadows Community College

www.learnpbl.com. Resources on and examples of experiential learning practices.

National Association of College and University Business Officers (NACUBO)

www.nacubo.org. Resources and professional development events for operational staff interested in integrating sustainability into campus operations.

National Council for Science and the Environment (NCSE)

www.ncseonline.org. Resources for deans and faculty teaching sustainability and environmental disciplines.

National Renewable Energy Laboratory (NREL)

www.nrel.gov/sustainable_nrel. U.S. Department of Energy site with education materials on a range of clean technology areas.

National Wildlife Federation (NWF)

www.nwf.org/Campus-Ecology.aspx. Reports and case studies of higher education institutions' sustainability efforts. Their Greenforce Initiative, with Jobs for the Future, supports a number of community college sustainability best practices.

Second Nature's Campus Green Builder

www.campusgreenbuilder.org. Campus carbon reduction resources and community of action for campus sustainability initiatives.

Sustainability Improves Student Learning (SISL)

www.serc.carleton.edu/sisl/index.html. A collaboration of academic associations dedicated to sustainability education. Includes classroom activities.

U.S. Department of Education Energy Efficiency and Renewable Energy

www1.eere.energy.gov/education/index.html. Resources on a range of clean technology industry sectors, including a section for educators.

U.S. Green Building Council (USGBC)

www.centerforgreenschools.org. Resources, case studies, and events for colleges that are incorporating LEED into their curriculum.

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