

University of California, Santa Cruz
Green Building Checklist
Reference Guide

Project Background:

Buildings in the United States are responsible for 40% of energy consumption, 12% of total water consumption, 68% of electricity use, 60% of non-industrial waste and are the cause for 38% of CO2 emissions. Globally, buildings are the single largest emitter of Carbon Dioxide emissions (USGBC.org) With the gross building square footage on a continual rise, we must figure out better ways to promote, design, construction, commissioning, and demolition of these buildings in a more sustainable manner. The University of California has 10 statewide campuses with large building and energy portfolios, and is continuously looking for ways to be more efficient with their resources use. In 2013, UC President Janet Napolitano announced the system-wide Carbon Neutrality Initiative which requires the entire UC system to be carbon neutral by 2025 (UCOP.edu) This huge endeavour will require all existing campus buildings and new construction projects to achieve an extremely high level of energy efficiency. The University of California, Santa Cruz decided to dedicate significant time and resources to assess this initiative's feasibility, and in the Fall of 2014, they began a year long Climate and Energy Study (CES) to outline the necessary steps to reach carbon neutrality at UCSC. Under current University of California, Office of the President (UCOP) policy, all new buildings and renovation projects over \$5 million are required to achieve Leadership in Energy and Environmental Design (LEED) Silver certification (UCOP.edu) However, the smaller constructions, renovations, retrofits, tenet fill outs and equipment replacements have little policy-binding requirements to achieve a high level of sustainability. Individually, these smaller projects have little overall impact on the University energy portfolio, but when they are added together, they can constitute huge energy savings. This prompted the University of California, Santa Cruz to embark on a project to create a University specific, green building checklist, that would be used on campus projects not required to achieve LEED certification, but still be able to gain the sustainable benefits from a holistic building approach.

Purpose:

Many of the individual UC campuses have specific sustainability goals, however, these goals are not always consistent with the UCOP policies and initiatives. In addition, there is no strict oversight or policing of UCOP policies at each individual campus. If all of the campuses are going to be required to meet the 2025 Carbon Neutrality Initiative, it is going to require significant effort at the individual campus level.

At UCSC, the classrooms, dorms, apartments, labs, libraries, and dining areas on campus are in a constant state of upkeep and renovation. With the 2025 Carbon Neutrality Initiative looming, it is becoming apparent that new measures must be taken to ensure that UCSC will be as energy efficient as possible.

The University of California, Santa Cruz Green Building Checklist (UCSC GBC) will assist project managers in better incorporating sustainable design in the pre-design, preliminary planning, working drawings, construction and commissioning phases of project development. This Checklist will be used on minor and major capital projects that cost under \$5 million and therefore are not required by UCOP to achieve LEED Silver certification.

Integrated Design Process

Purpose:

- In the first 10% of the building design process, 70% of the environmental impacts are made. If the project starts by approach the project from varied viewpoints of multiple participants, we can achieve synergy between systems and a higher level of sustainability.

Requirements:

- Hold a design charette between the project team members
 - Document the present members
 - Record the main points and follow-up questions
- Create project goals and outcomes
 - Document project goals and outcomes
 - Decide if project with use the Savings by Design or Strategic Energy Partnership program.

Request for Qualifications (if necessary)

Purpose:

- Ensure project team members from outside the University will comply with the UCSC GBC

Requirements:

- Create a Request for Qualifications (RFQ) that outlines the project scope, schedule, budget, and sustainability requirements
- Outside hires must comply with the UCSC GBC

University of California Green Building Policy

Procurement of Green appliances and fixtures

Purpose: To use existing federal certifications programs to ensure that all new appliances and water fixtures are achieving required savings.

Requirement:

- All new energy consuming products will be required to have the ENERGY STAR label. Exceptions are allowed for Lab and speciality equipment where ENERGY STAR replacements might not be available.
- All new water use fixtures will be required to have the WaterSense certification, or document that they outperform the WATERSENSE baseline water use.

Product	CalGreen Standards
Toilet	1.28 gpf
Urinal	0.5 gpf
Shower head	2.0 gpm
Faucet	1.5 gpm

New Construction (energy efficiency)

Purpose:

- Ensure that the University System wide policies are being followed for all new construction projects. These policies are in place to maintain a consistent level of building quality across the UC system.
- The University planning and design process will include explicit consideration of lifecycle cost along with other factors in the project planning and design process,

recognizing the importance of long-term operations and maintenance in the performance of University facilities.

Requirements:

- All projects must out perform the CBC (California Building Code) energy efficient standards by 20%

OR

- All projects must meet the UC Systems whole building energy targets. All projects choosing this compliance path shall provide the total building energy use intensity (in kBTU/sf/year) result from the whole-building energy model to demonstrate compliance.

Table: Whole-Building Energy Performance Targets as a Percent of 1999/2000 Benchmark

Year	Compliance Target	Stretch Target
2015	65%	50%
2017	60%	45%
2019	55%	40%
2021	50%	35%
2023	45%	30%
2025	40%	25%

Renovations (energy efficiency)

Purpose:

- Ensure that the University System wide policies are being followed for all renovation projects. These policies are in place to maintain a consistent level of building quality across the UC system.
- The University planning and design process will include explicit consideration of lifecycle cost along with other factors in the project planning and design process, recognizing the importance of long-term operations and maintenance in the performance of University facilities.

Requirements:

- All projects must include a listing of sustainable measures under consideration during budget approval
- All building renovations that require 100% replacement of a mechanical system, or replacement of over 50% of electrical and plumbing systems in all non-shell

areas (interior walls, doors, floor coverings and ceiling systems) must outperform the CBC (California Building Code) Title 24, Part 6, Currently in effect, by 20%.

Savings by Design / Strategic Energy Partnership programs

Purpose:

- Take advantage of funding, rebates and design assistance for all projects

Requirements:

- All Projects must register with either the Savings by Design or Strategic Energy Partnership program.
- Decide which program the project will use

[Savings by Design guide book](#) (new construction/major renovation)

[Strategic Energy Partnership guide](#) (Energy related retrofit)

Savings by Design (SBD)

Savings by Design Basic Process

1. Read through [Savings by Design guide book](#)
2. Initiate contact with SBD representative
3. Submit a completed participation letter/letter of interest (use forms provided by the utility) indicating the interest in the program. When applicable, the Design Team must complete a Design Team Application during the conceptual or schematic design phase to establish their interest in participating, which will be reviewed and approved by the Utility.
4. SBD representative will work with team to confirm that design changes are feasible and help establish initial energy efficiency targets. Projects with a substantially complete design may be required to implement additional energy efficiency enhancements to receive an incentive.
5. SBD representative will work with team to determine which program path (whole building or systems approach) applies and how to optimize energy efficiency on the project

6. At the earliest opportunity, team will submit plans, Title 24 compliance calculations, and other design documents to the SBD representative. Utility staff will analyze the documents and recommend energy efficiency enhancements.
7. After the selection and design of the recommended energy efficiency enhancements is finalized, the SBD Representative issues an Incentive Agreement to the Team delineating the proposed project details, estimated incentive amounts, and terms and conditions
8. The team signs, dates, and returns the Agreement to the SBD Representative. By signing the Agreement, the team acknowledges that they have read and agree to all program eligibility requirements. The team must agree that they will not apply for or receive any other incentive offered by local or state entities or utilities for measures covered under Savings By Design.
9. Once construction is substantially complete, the team must must contact a SBD representative to request an on-site verification.
10. Allow access to the completed facility for on-site verification and, if selected, participate in measurement and evaluation studies. SBD Representative may request integrated design analysis reports, manufacturer's specifications, equipment cut sheets, and incremental cost verification to verify completed project matches the design proposed in the Agreement.

If the project is built as agreed and the project meets all the program requirements, the incentive will be paid.

New Construction project (SBD - Whole building approach)

Purpose:

- To take advantage of Savings By Design (SBD) is California's nonresidential new construction energy efficiency program, administered statewide and funded by Utility customers through the Public Purpose Programs surcharge applied to gas and electric services

Requirements:

For this program, **new construction** includes any one of the following:

- New building projects wherein no structure or site footprint presently exists
- Addition or expansion of an existing building or site footprint
- Addition of new load, as in the example of an existing site adding a new process

- Construction that involves complete removal, redesign, and replacement of the energy consuming systems of a building or process
- Projects that require design and selection of new systems based upon the needs of new or modified space function(s)
- Major tenant improvements that add new load

[\(FORM\) New construction - Whole System Approach](#)

Renovation project (SBD - Systems approach)

Purpose:

- To take advantage of Savings By Design (SBD) is California's nonresidential new construction energy efficiency program, administered statewide and funded by Utility customers through the Public Purpose Programs surcharge applied to gas and electric services

Requirements:

For this program, **new construction (Renovation)** includes any one of the following:

- Addition of new load, as in the example of an existing site adding a new process
- Construction that involves complete removal, redesign, and replacement of the energy consuming systems of a building or process
- Projects that require design and selection of new systems based upon the needs of new or modified space function(s)
- Major tenant improvements that add new load

[\(FORM\) Renovation - Systems approach](#)

Strategic Energy Partnership

Purpose:

- Take advantage of this energy partnership to provide a sustainable and comprehensive energy management program.

Requirements:

- Read through the [SEP information packet](#)
- http://uccsuiouee.org/MBCx_Proj_GdIns_and_Min_Req_28_Aug_2013.pdf
- http://uccsuiouee.org/Application%20and%20Calc%20Submittal%20Guideline_CR_3.10.14.pdf
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LEED Prerequisites - Required for all projects

Sustainable sites (Site management policy)

Purpose:

- Preserve ecological integrity and encourage environmentally sensitive site management practices.

Requirement:

- Create and implement a site management policy that employs best management practices.
- Must include:
 - cleaning of the building and surrounding areas
 - erosion and sedimentation control
 - organic waste management
 - Native species management
 - invasive and exotic species management
 - irrigation management.

Water Efficiency (Indoor water use reduction)

Purpose:

- Reduce indoor water use

Requirements:

- Install water reducing faucets and fixtures
- Comply with Cal Green water use faucet and fixture requirements

Product	CalGreen Standards
Toilet	1.28 gpf
Urinal	0.5 gpf
Shower head	2.0 gpm
Faucet*	1.5 gpm

*In certain cases, faucets with low-flow rates are not appropriate. In kitchens, labs or janitors closets, faucets are used to fill pots and buckets. Using low-flow faucets where the volume of water is predetermined does not save water and causes frustration.

Consider special use pot fillers.

Water Efficiency (Building level water metering)

Purpose:

- Support water reduction goals and identify opportunity for additional water savings by taking water consumption

Requirement:

- Have permanently installed water meters that measure the total potable water use for the building.

- Record meter data on a monthly basis and compile in a data base.
- Monitor data, and make sure that there are not drastic changes in total water use. If there are, take measures to identify where the excess water is going.

Energy and Atmosphere (Energy Audit)

Purpose:

- Assess the energy use in the existing building

Requirement:

- Conduct an energy audit that meets both the requirements of the ASHRAE preliminary energy use analysis.

Energy and Atmosphere (Energy efficiency best practices)

Purpose:

- To ensure that energy efficient operating strategies are maintained and provide a foundation for training and system analysis.

Requirement:

- Prepare and maintain a current facilities requirements and operations and maintenance plan that contains the information necessary to operate the building efficiently. Must include:
 - Current sequence of operations for the building
 - Building occupancy schedule
 - Equipment run-time schedule
 - Setpoints for all the HVAC equipment
 - Setpoints for lighting levels throughout the building
 - Minimum outside air requirements
 - Any changes in schedules or setpoints for different seasons, days of the week, and times of day
 - System narrative describing the mechanical and electrical systems and equipment in the building

- preventive maintenance plan for building equipment described in the systems narrative.

Energy and Atmosphere (Minimum energy performance)

Purpose:

- reduce the environmental and economic harms associated with excessive energy use by establishing a minimum level of operating energy performance.

Requirement:

- Energy Star Buildings or use UC benchmarking system
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Energy and Atmosphere (Building level energy metering)

Purpose:

- Support energy management and identify additional opportunities for energy saving by tracking building level energy use.

Requirement:

- Install new building-level energy meters or submeters that can be aggregated to provide building-level data representing total building energy consumption

Energy and Atmosphere (Fundamental refrigerant management)

Purpose:

- Reduce stratospheric ozone depletion

Requirement:

- Do not use chlorofluorocarbon (CFC)-based refrigerants in heating, ventilating, air-conditioning, and refrigeration (HVAC&R) systems

Energy and Atmosphere (Fundamental commissioning of building energy systems)

Purpose:

- To verify that the project's energy-related systems are installed, calibrated and perform according to design.

Requirement:

- Designate an individual as the commissioning authority (CxA) who will lead the review and oversee the completion of the commissioning activities.
- Develop and implement a commissioning plan, that verifies the installation and performance of the energy systems
- Commissioned systems include;
 - Heating, ventilation, air conditioning and refrigeration (HVAC&R) systems and associated controls
 - Lighting and daylighting controls
 - Domestic hot water systems
 - Renewable energy systems

Commissioning Plan Outline

- Commissioning program overview
 - Goals and objectives
 - General project overview
 - Systems being commissioned
- Commissioning team
 - Team members, roles and responsibilities
- Commissioning Process Activities
 - Project requirements
 - Basis of design
 - Developed systems functional test procedures
 - Verifying system performance
 - Reporting deficiencies and the resolution process
 - Accepting the building systems

Materials and Resources (Ongoing purchasing and waste policy)

Purpose:

- to reduce the environmental harm from materials purchased, used and disposed of in the operations within the building.

Requirement:

- Have in place an environmentally preferable purchasing (EPP) policy for products purchased during regular operations of the building. Create a waste management strategy for future waste. Refer to the table for items to include.

Materials and Resources (Facility maintenance and renovation policy)

Purpose:

- to reduce the environmental harms from materials purchased, installed and disposed of during construction and renovation.

Requirement:

- create policy, refer to table.

Materials and Resources (Storage and collection of recyclables)

Purpose:

- Facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills

Requirement:

- Provide an easily-accessible dedicated area for the collection and storage of recyclables.

Indoor Environmental Quality (Minimum IAQ performance)

Purpose:

- Establish minimum indoor air quality (IAQ) performance to enhance indoor air quality in buildings, thus contributing to the comfort and well-being of the occupants.

Requirement:

- Mechanically ventilated spaces must meet the minimum requirements of Section 4 - 7 of ASHRAE Standard 62.1