

UCSC GBC

University of California, Santa Cruz

Green Building Checklist

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Abstract:

The University of California Green Building Checklist (UCSC GBC) is a tool designed specifically for UCSC project managers that will assist them in better incorporating sustainable design practices in the pre-design, preliminary planning, working drawings, construction and commissioning phases of project development.

3. Introduction: Problem Definition, Context & 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.

4. Project Description:

For the 2014/2015 academic year I was commissioned by the Building and Facilities Working Group (BFWG) to create a UCSC specific working draft of a green building checklist. The main goal of this 3-quarter project was to create a working draft of the University of California, Santa Cruz Green Building Checklist (UCSC GBC). This checklist will assist project managers in better incorporating more energy and water-efficient 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.

In order to create a working draft that will be effective at the University of California, Santa Cruz, it was necessary to understand the process that all building projects at the University go through. During interviews, meetings and phone calls I was able to gain a basic understand of the building process at the University of California, Santa Cruz. Additionally, I connected with campus staff who helped fill in gaps in knowledge for the technical, high-level aspects of the building process. Once I gathered University information, I began to study pre-existing green building checklists and try to understand what made them effective and gain widespread adoption within the green building community. The majority of the project time was spent organizing all of this information into an easy to use checklist that would be effective in guiding project managers through a more sustainable building process as the University of California, Santa Cruz.

The creation and use of the UCSC GBC will have huge energy, resource and sustainable impacts at the University of California, Santa Cruz and beyond. As humans we spend over 90% of our lives indoors, therefore it is essential that the buildings we occupy be safe, healthy and sustainable. This checklist aims to address those 3 things in all of the campus buildings. The University of California is a leading academic institution, thus it paves the way for others to follow. If we can be effective in creating such a checklist here at Santa Cruz, it could prompt other campuses to follow. It is these specific campus projects that are going to help the UC system meet its Carbon Neutrality goal by 2025. Large scale policy and directives have an impact, but the smaller, campus specific work will play a major role in making sure we are able to meet the Carbon Neutrality Initiative.

5. Project Timeline:

October:

20th - created initial project presentation for the BFWG
28th - First BFWG meeting, outlined project, met stakeholders

November:

3rd - Outreach to specific BFWG members, set up meetings and phone calls
17th - Collecting information on best green building practices
24th - Discussed progress with Chrissy

December:

1st - Create new UCSC GBC presentation

January:

12th - Creation of formal document to be presented at BFWG
27th - BFWG meeting

February:

23rd - Presented revisions at the BFWG meeting

March:

15th - Individual feedback on UCSC GBC

April:

20th - LEED training, started to integrate LEED into UCSC GBC

May:

25th - Final BFWG, set up individual meetings

29th - Meeting with John Barnes to discuss next steps

June:

3rd - Project due

6. Project Stakeholders, Student & Mentor Roles:

Throughout this project I sought out information from a variety of campus staff and professionals in the green building industry. However the most crucial stakeholders in the University of California, Santa Cruz Green Building Checklist (UCSC GBC) were the active members of the Building and Facilities Working Group (BFWG). Chrissy Thomure, the Climate Action Manager in the Sustainability Office, was my Provost's Sustainability Internship (PSI) project mentor and assisted me throughout the entirety of the project. Additionally, she was present during some of the UCSC GBC work sessions, working through high level ideas and concepts. Chrissy was an active member of the BFWG and facilitated introductions to other active BFWG members. John Barnes, Campus Architect in Physical Planning and Construction, helped create the idea for this UCSC specific green building checklist. John was an active member and natural leader of the BFWG meetings, and has taken on the responsibility of integrating my work into the campus building framework. We are currently meeting weekly to discuss and plan out the UCSC GBC's next steps. When we had technical energy questions we had John Steward, Director of Physical Plant, available to provide insight and direction. John Steward helped to educate me on the different incentive programs that the Pacific Gas & Electric (PG&E) provide to the university. Having these active and engaged stakeholders, not only helped guide the project throughout the entire year, but also ensured that this project will not just sit on a shelf, but will be worked into the campus building framework.

7. Measurable Results

Since this project is going to continue for years to come, there aren't any quantifiable results available to date, however, the physical checklist and supplemental documents will guide the project in the next steps. These documents include the University of California, Santa Cruz Green Building Checklist (UCSC GBC) form, UCSC GBC reference guide, the UCSC GBC research appendix and my final Environmental Studies paper analyzing the entire process. All of these documents will be uploaded to the University of California, Santa Cruz Clearing House website, stored in a cloud based Google folder, and kept on file in Barn C offices which house members of Physical Plant and Physical Planning and Construction. The future results of the UCSC GBC can be measured in a few different ways. First, they can be measure for success based on the percentage of total projects using the checklist. Second, they can be measured based total resource savings (i.e electricity, gas and water.) This would require pre and post project audits plus standardized metrics to compare the total impact the checklist provided to specific projects.

8. References:

"Green Building Facts | U.S. Green Building Council." *Green Building Facts | U.S. Green Building Council*. N.p., n.d. Web. 31 May 2015.

"Presidential Initiatives." *Carbon Neutrality Initiative*. N.p., n.d. Web. 31 May 2015.

"Sustainability." / *UCOP*. N.p., n.d. Web. 31 May 2015.

9. Appendices:

Figure 1. LEED certified buildings by year

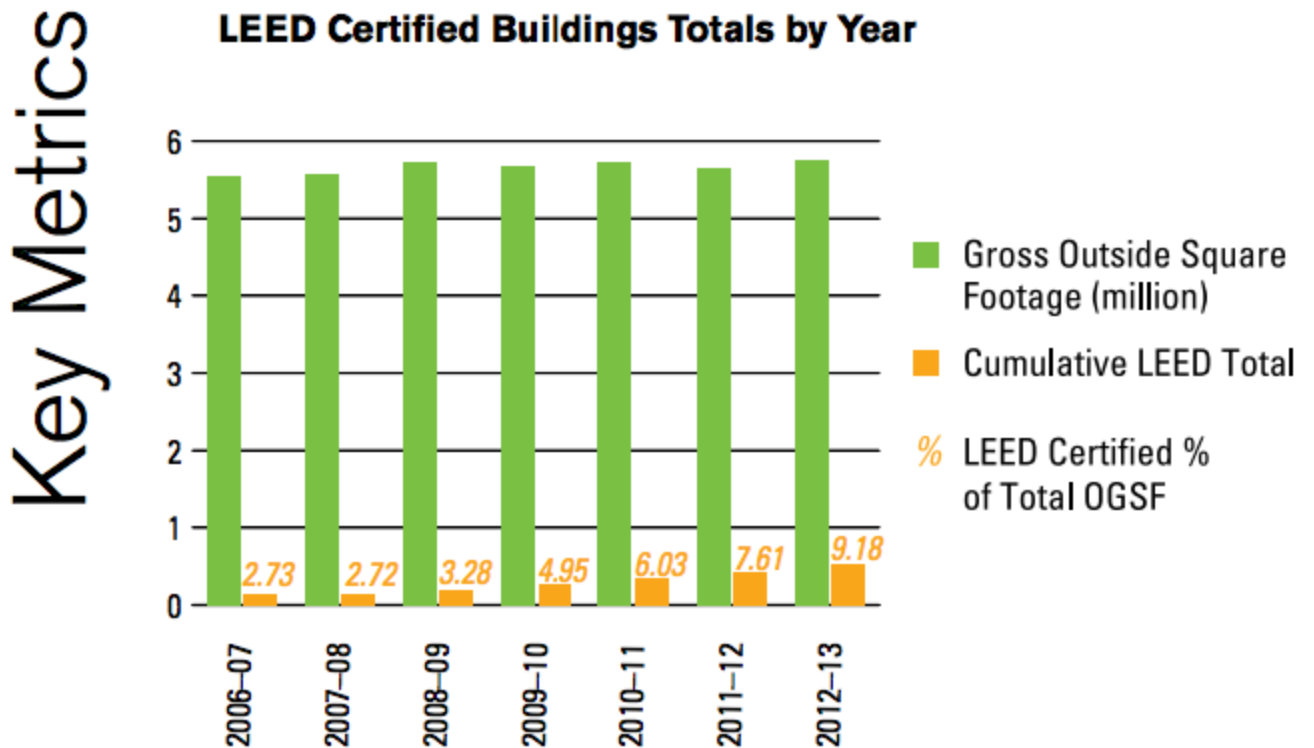


Figure 2. UCSC LEED certified buildings

UC Santa Cruz LEED Certified Buildings			
BUILDING	O-GSF	LEED CERT	YEAR
Engineering Building 2	151,550	EBOM-Silver	2007
Cowell College Commons	35,667	CI-Cert.	2009
Porter College House B	94,691	NC-Silver	2010
Cowell Student Health Center			
Addition	11,310	NC-Gold	2011
Renovation	23,724	NC-Gold	2011
Porter College Dining Common	28,293	CI-Silver	2011
Porter College House A	85,494	NC-Gold	2012
Bio Medical Facility	97,864	NC-Gold	2013

528,593 TOTAL built under LEED

(187,217)

341,376 TOTAL currently certified

Figure 3. UCSC GBC form

University of California, Santa Cruz - Green Building Checklist		
Y/N		Notes
Pre-Design Phase		
	Design Charette	
	Request for Qualifications	
University of California Green Building Policy		
	Procurement of green appliances and water saving fixtures	
	New construction OR Renovation Energy Efficiency	
Savings by Design / Strategic Energy Partnership Program		
	Saving by Design (SBD) incentive program	
	Strategic Energy Partnership (SEP) incentive program	
LEED Prerequisites		
	Sustainable Sites - Site management policy	
	Water Efficiency - Indoor water use reduction	
	Water Efficiency - Building level water metering	
	Energy and Atmosphere - Energy Audit	
	Energy and Atmosphere - Energy efficiency best practices	
	Energy and Atmosphere - Minimum energy performance	
	Energy and Atmosphere - Building level energy metering	
	Energy and Atmosphere - Fundamental refrigerant management	
	Energy and Atmosphere - Fundamental commissioning of building energy systems	
	Materials and resources - Facility maintenance and renovation policy	
	Materials and resources - Storage and collection of recyclables	
	Indoor Environmental Quality - Minimum IAQ performance	

The UCSC Green building checklist assists project managers in better incorporating sustainable design practices into all campus projects