University of California, Berkeley
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Name of Policy: Energy Use

Responsible Executive:	Vice Chancellor, Administration
Responsible Office:	Facilities Services
Contact:	Energy Office, Facilities Services, energyoffice@berkeley.edu, 510-664-4871

Policy Statement

The University of California, Berkeley (UC Berkeley) will manage its operations so that energy and carbon is used in the most sustainable manner possible while providing a safe and comfortable environment for teaching, research, and public service.

Scope of Policy

This policy affects UC Berkeley students, faculty, and staff as well as external consultants and contractors.

Why We Have This Policy

The University of California and UC Berkeley have made an enduring commitment to energy efficiency, clean energy, carbon neutrality, green building and operations, and sustainable design principles as exemplified through relevant policies and planning. This policy provides a UC Berkeley specific framework to support energy and carbon-efficient decisions in accordance with the University of California Sustainable Practices Policy and including the UC Berkeley campus Long Range Development Plan and Environmental Impact Report (LRDP/EIR), Campus Master Plan, and Climate Action Plan. The intent of the policy is to create campus leadership in energy and climate stewardship congruent with the campus's standing in education, research, and public service. Implementation of this policy requires cross-department collaboration and communication to help achieve the most energy efficient campus possible. Primary offices responsible for the implementation of this policy are the Energy Office, Building Department, Maintenance Operations, and Capital Projects. Additional responsible parties and their roles are outlined in the Responsibilities section.

The policy outlines energy requirements and guidelines for:

- Existing Building Operations

- New Construction
- Large, Medium and Small Renovations
- Clean Energy Supply
- Supply Chain Management & Information Technology
- Laboratories

The policy aligns with previously adopted campus environmental and sustainability goals and campus workplace safety and accommodation policies as well as Campus Design Standards.

Nothing in this policy is intended to conflict with or contravene, and shall not be applied so as to contravene, any applicable federal or state law or regulation, or any other University or campus policy or applicable consensus standard. Specifically, this policy will not be interpreted so as to compromise the campus's interest in or obligation to protect the safety or disability accommodation of employees, students, or the public.

The Procedures section of the policy creates new requirements for campus departments. Local implementation of all energy savings and energy supply measures should be reviewed by each department's safety committee to ensure safe operations.

Procedures

EXISTING BUILDING OPERATIONS

A. Energy Efficiency

1. Per the University of California Policy on Sustainable Practices Policy Section on Clean Energy, UC Berkeley will reduce the campus' energy use intensity (EUI) by an average of at least 2 percent annually. All building modifications will support this goal as described in the Section on New Construction and Renovations.

2. Per the University of California Policy on Sustainable Practices Procedures Section on Clean Energy, UC Berkeley's percent reduction in EUI will be reported annually based on the sum of weather-adjusted energy use divided by the sum of the maintained gross square footage (OGSF50). The average annual reduction will be calculated using an established baseline as detailed in the UC EUI Tracking Methods and References. UCOP will use energy usage data from the systemwide purchased utility database for reporting campus energy use intensity, based on the campus-specified set of utility accounts and associated maintained gross square footage.

    i. UC Berkeley has selected the three-year period from 2014-2016 to be the baseline for EUI calculations in support of the UCOP Energy Efficiency Policy.

B. Sustainable Building Operations

1. Per the University of California Policy on Sustainable Practices Section on Green Buildings, UC Berkeley will submit for certification one pilot building at LEED Operations and Maintenance "Certified" level or higher or pilot another accepted building operations certification program to be completed by the end of 2023.

2. Per UC Sustainable Practices Policy Section on Sustainable Water Systems, new equipment requiring liquid cooling will not use once-through or single-pass cooling systems. The Energy Office will conduct a full assessment of existing units in laboratories by the end of 2021 and recommend retrofit or replacement of units, where feasible.

C. Heating, Ventilation and Cooling (HVAC)

1. Per Campus Design Standards, buildings with heating systems will target a temperature of 68 degrees Fahrenheit in cold weather, and buildings with mechanical cooling (i.e., air conditioning) will target a temperature of 75 degrees Fahrenheit in warm weather. Exceptions are allowed for mechanical failure, power failure, heat spells and cold snaps, and shutdowns such as winter break. Research laboratories, archives (including libraries), and assembly spaces such as lecture halls may develop program-specific temperature and humidity standards.

2. Building systems operation will maximize the use of operating schedules and setback features. When specific occasions or activities require that building operations vary from scheduled operating hours, the department using the space must seek approval from the Energy Office to adjust the building operating schedule.

3. Portable air conditioning units must be ENERGY STAR® rated and may not be used without prior approval from the Energy Office.

4. When campus buildings rise above 75 degrees in hot weather, occupants are permitted to use an energy-efficient personal fan for comfort, ideally attached to an occupancy-controlled device. Installation of ceiling fans and/or room fans is encouraged. Building occupants are encouraged to close blinds when direct sunlight contributes to high room temperature, to open interior doors to promote cross-ventilation, to power down equipment not in use, and to open windows when consistent with security considerations.

    i. Requests to use portable air conditioning units must be made in writing to the Energy Office through the Building Manager. Requests must outline the following:

        a. Room/s number/s

        b. Brief description of conditions when space overheats (time of day, occupancy, equipment load etc.)

        c. Strategies per those listed above that have been attempted but have not sufficiently improved comfort

        d. Proposed equipment to be installed

        Determinations will be made by factoring in whether other efforts have been attempted to improve thermal comfort, energy efficiency of equipment, and potential impact on overall building performance.

5. When campus buildings fall below 68 degrees in cold weather, building occupants may use personal heating device for personal comfort after consulting with the building manager (where available) and/or the Energy Office about equipment selection.

6. Building controls should have load-tracking ability (such as variable air volume (VAV) features) so building ventilation rates can be reduced during periods of light occupancy. Minimum ventilation rates irrespective of current building occupant load should be established to enable safe, acceptable air quality while exhausting common contaminants (e.g., odors from food spills or dry erase markers). Where possible and in compliance with codes and regulations, demand control strategies should be implemented, basing ventilation on actual occupancy rather than projection or heat loads as a proxy for high occupancy. New fume hood installations must have variable air volume capabilities to enable the incremental changeover of laboratory environments, except in retrofit projects where the fume hood density is so low that exhaust requirements are less than the minimum air change rates defined by code. The installations of fume hoods will be coordinated with the Office of Environment, Health and Safety and with the Energy Office through the review process for design and construction projects. Fume hoods should be closed when not in operation to mitigate demand for conditioned air.

7. Operations will maximize the use of temperature and ventilation setbacks in all times of unoccupancy, while maintaining safe ventilation rates and temperature and humidity ranges as required by research, medical facilities, or special collections. Above and beyond this standard practice, special programmatic consideration will be given to efficient systems operation during holiday and class session breaks.

D. Lighting

1. Acceptable lighting levels should be based on guidelines from the most recent edition of the CBC energy-efficiency standards and applicable campus safety guidelines (UCPD, Disability Office, Path to Care).

2. Lighting controls, including daylight harvesting, should be employed to the fullest extent possible.

E. Behavioral Energy Saving Strategies

1. All community members can take an active role in reducing the campus energy consumption through individual actions ranging from turning off lights in communal spaces, to unplugging equipment when not in use, to monitoring building energy dashboards and reporting issues. See the Energy Office website for more strategies.

NEW CONSTRUCTION AND RENOVATIONS

Projects will pursue potential funding for energy rebates or energy performance scope financing through PG&E Savings by Design or the campus Strategic Energy Partnership. The Energy Office can advise on current applicable programs. All major and medium modifications of existing buildings will need to meet the requirements described below including demonstrating that **medium modifications create "No Net Increase"** in energy use

and that **major modifications decrease the affected space's estimated annual energy use intensity (EUI) by 2% minimum.** The Energy Office will provide the existing building energy use baseline and will review projects for compliance.

Projects will meet the following requirements by scope as defined by the Campus Building Department Permit Project Types.

F. Major Modifications (including New Construction):

All projects considered "Major Modifications" per campus Building Department will collaborate with the Energy Office to discuss the project's anticipated energy impacts. Energy Office staff will assist in the development of strategies to reduce or mitigate the impacts. Large and/or complex projects should have additional meetings early in project planning and should also include the Office of Sustainability in project eco-charrette and LEED meetings during project planning, design and construction.

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

In accordance with the University of California Policy on Sustainable Practices, new construction and major modifications will meet the following:

1. All new construction and major modifications will be designed, constructed, and commissioned to meet the whole-building energy performance targets (WBPTs) listed in Table 1 or outperform the CBC energy-efficiency standards by at least 20%.

   WBPTs become progressively more stringent every two years and are based as a percent of campus benchmarked energy use per the UC Policy on Sustainable Practices. When a project does not fit in one of the default project types, design teams will submit a custom whole-building energy use benchmark and target to the Energy Office for review.

   Design teams must prepare energy models to confirm compliance with targets. Models are to be developed beginning at schematic design, updated with building program and material changes at end of design and end of construction administration, and represent the best estimate of as-operated building energy use and peak demands, before accounting for on-site energy generation. Targets are intended to be verifiable in actual operation. Additional guidance on setting and implementing whole-building performance targets is provided by the Energy Office.

2. Major modifications to an existing building will reduce the affected space's EUI per square foot by 2% or meet policy requirements per item 1 above, whichever is more stringent.

3. No new construction or major modification will connect to the existing campus thermal infrastructure except those projects approved by the Vice Chancellor of Administration.

Any project that wishes to connect to central thermal infrastructure must prepare a written request in collaboration with the Energy Office who will submit it on the project's behalf to the Vice Chancellor of Administration. The request will include the following:

i. Description of building systems and business case for connecting to central thermal system

ii. Estimated annual and peak load

Determinations will be made based on central plant capacity, performance, and carbon emissions of existing infrastructure.

4. Per UC Policy on Sustainable Practices section on Green Buildings, no new building or major modification will use onsite fossil fuel combustion (e.g., natural gas) for space and water heating. In addition, UC Berkeley projects will not use onsite fossil fuel combustion for laundry or cooking. Any project unable to meet this requirement must prepare a written request in collaboration with the Energy Office who will submit it on the project's behalf to the Vice Chancellor, Administration. The request will include the following:

   i. An estimate of annual electricity and gas use for the project as well as the project's target design energy use in thousand British thermal units (kBtu) per square foot.

   ii. An explanation of why fossil fuel combustion is required for the project, what other alternatives were evaluated, and how the design accommodates for future supply switch to non-fossil fuel.

   iii. An analysis explaining why fossil-fuel combustion is the most cost-effective energy source for the identified project specific applications.

   iv. A plan to mitigate the associated greenhouse gas emissions in accordance with UC Berkeley's Climate Action Plan (such as carbon offsets and options/timeframe for converting the equipment to a non-fossil fuel source).

5. Interval metering is required to confirm as-operated building performance. Meters are to be integrated into an electronic system that will allow ongoing monitoring of metered data. Meters and sub-meters will be integrated into the current campus-operated metering management system (Obvius or replacement). See Campus Construction Design Standards for metering requirements (Division 33), and systems for which sub-metering is required.

6. Exceeding UC Policy on Sustainable Practices section on Green Buildings, all new buildings and major modifications will be designed, constructed, and commissioned to achieve a minimum of LEED "Gold" certification, including achieving the minimum threshold of available points under the Enhanced Commissioning credit.

G. Medium Modifications:

1. Medium modifications that impact energy use will result in **"no-net increase"** in the affected space's energy use, meaning that the proposed project will not result in an

increase in the building's metered energy use, or, if it necessarily results in a net increase, that energy conservation measures, on-site renewable energy generation, or participation in the Cal Energy Offset Program will offset the expected increase.

2. All renovation projects will include a review of the project's anticipated energy impacts with the Energy Office, and if required by the review, will provide documentation from the design professional (architect or engineer) explaining how the project meets the "no-net increase" goal. This should occur during the project schematic design phase to enable sufficient time to assure that the project meets the campus energy performance goals. The Energy Office can help identify project strategies to reduce or mitigate anticipated energy impacts.

3. Per the University of California Policy on Sustainable Practices Section III.A.9., Renovation projects with a project cost of $5 million or greater (CCCI 5000) that do not constitute a Major Modification shall at a minimum achieve a LEED-ID+C Certified rating.

H. Minor Modifications:

1. Minor Modifications that may have an impact on building energy use, such as system upgrades and limited scope tenant improvement projects, should also aspire to achieve the "No Net Increase" Energy Goal per policy item G.1. The Energy Office is a resource to help identify project strategies to reduce or mitigate anticipated energy impacts.

Table 1: UC Berkeley Whole-Building Energy Performance Targets

	UC Berkeley Targets Site Energy (kBtu/yr/GSF)	**Annual Electricity**[1]	**Annual Thermal**[4]	**Max. Power**[2]	**Max. Chilled Water**[3]	**Max. Thermal**[4]
		kWh/yr/GSF	therms/yr/GSF	W/GSF	tons/kGSF	therms/hr/GSF
		Including Prorated Part of Plant Use and Site Lighting	Including Prorated Part of Plant Use	Includes Prorated Part of Small Peak (Pumping) Load at Plant	Load on Plant	Including Prorated Part of Plant Use
Academic/Administrative Non-complex Space						
Benchmark	**59**	11	0.21	2.1	1.53	0.12
2019-20 Compliance Target (55% of Benchmark)	**32**	6.2	0.11	2.1	1.53	0.12
2021-22 Compliance Target (50% of Benchmark)	**30**	5.6	0.10	2.1	1.53	0.12
2023-24 Compliance Target (45% of Benchmark)	**27**	5.0	0.09	2.1	1.53	0.12
2025 Compliance Target (40% of Benchmark)	**24**	4.5	0.08	2.1	1.53	0.12
Stretch Target Compliance Target (35% of Benchmark)	**21**	3.9	0.07	2.1	1.53	0.12
Housing Non-complex Space						
Benchmark	**57**	7.8	0.30	1.50	1.07	0.18
2019-20 Compliance Target (55% of Benchmark)	**31**	4.3	0.16	1.50	1.07	0.18
2021-22 Compliance Target (50% of Benchmark)	**28**	3.9	0.15	1.50	1.07	0.18
2023-24 Compliance Target (45% of Benchmark)	**25**	3.5	0.13	1.50	1.07	0.18
2025 Compliance Target (40% of Benchmark)	**23**	3.1	0.12	1.50	1.07	0.18
Stretch Target Compliance Target (35% of Benchmark)	**20**	2.7	0.10	1.50	1.07	0.18
Lab/Complex Space						
Benchmark	**306**	36	1.83	5.3	3.8	0.43
2019-20 Compliance Target (55% of Benchmark)	**168**	20	1.01	5.3	3.8	0.43
2021-22 Compliance Target (50% of Benchmark)	**153**	18	0.92	5.3	3.8	0.43
2023-24 Compliance Target (45% of Benchmark)	**138**	16	0.82	5.3	3.8	0.43
2025 Compliance Target (40% of Benchmark)	**122**	14	0.73	5.3	3.8	0.43
Stretch Target Compliance Target (35% of Benchmark)	**107**	13	0.64	5.3	3.8	0.43

Building-Specific Adjustments

[1] These values may be slightly lower than previously published values (i.e. for UC Merced) because they reflect load on the building meter instead of at the campus meter. To reflect load on campus meter, increase value by 1.05 (to account for distribution and transformation losses).

[2] These values may be slightly lower than previously published values (i.e. for UC Merced) because they reflect load on the building meter instead of at the campus meter. To reflect load on campus meter, increase value by 1.05 (to account for distribution and transformation losses). For campuses with district chilled water, if a specific building has a chiller instead, increase value by (1/0.7).

[3] In the case where a chiller is in the building, add the maximum chilled water value to the maximum power value by multiplying the chilled water value times 0.6 kW/ton.

[4] These benchmarks are directly applicable to buildings with boilers in the building or connected to (low-loss) district hot water systems (non-steam). These benchmarks can be applicable to building design for buildings connected to district steam systems with the understanding that additional losses characteristic of steam systems will impact actual building energy performance during operations. For example, 50% extra use from trap/exchanger losses within the building plus 50% extra use from trap/leakage losses in distribution systems has been commonly observed.

CLIMATE PROTECTION AND CLEAN ENERGY

I. Per the University of California Policy on Sustainable Practices on Clean Energy, UC Berkeley will install additional on-site renewable electricity supplies and energy storage systems whenever cost-effective and/or supportive of the location's Climate Action Plan or other goals.

J. Exceeding the University of California Policy on Sustainable Practices Policy section on Clean Energy, UC Berkeley will obtain/procure 100% clean electricity for all new and updated electricity accounts effective 2020 except those associated with the central campus energy system.

K. All new construction and major modifications shall evaluate the potential to include onsite renewable energy as part of the project.

L. Per the University of California Policy on Sustainable Practices Policy section on Clean Energy, at least 40% of the natural gas combusted on-campus will be offset by biogas by 2025.

COMPUTING - EQUIPMENT, SERVERS AND STORAGE

M. Computing Equipment:

1. Computers and peripherals: Per the University of California Policy on Sustainable Practices Section on Sustainable Procurement Guidelines, UC Berkeley will procure desktop computers, laptops, computer monitors, display devices, networked printers, stand-alone printers, and other peripherals that are a minimum bronze-level registration or higher under the Electronic Products Environment Assessment Tool (EPEAT). Departments are encouraged to leverage networked multifunction devices and reduce the number of stand-alone printers.

2. Desktop and laptop computers will use power-saving settings. Computers and peripherals will be turned off or set on standby when not in use unless teaching, research, or public service purposes require continuous operation. Departments are encouraged to leverage the Berkeley Desktop which has these settings built in.

N. Servers and Storage:

1. Campus units will maximize opportunities for server virtualization and are strongly encouraged to utilize Information Service and Technology (IST) hosted private cloud virtual servers, storage, and backup services at Warren Hall. The Energy Office can provide estimates of the electricity that can be reduced from a unit's baseline by relocating or virtualizing servers.

2. Campus units will use centralized campus resources at specialized campus data centers equipped with energy-efficient systems to handle the high heat load and electrical requirements of computer equipment. Units are strongly encouraged to place computer servers (and related equipment) in the centrally managed, secure, hardened, climate-controlled Warren Hall Data Center. If a program requires power and cooling for small

server rooms in an existing building, permission must be requested from the Vice Chancellor, Administration.

LABORATORY AND OTHER EQUIPMENT

Per UC Policy on Sustainable Practices section on Sustainable Procurement and the UC Sustainable Procurement Guidelines section on Green Spend General Criteria, ENERGY STAR® and WaterSense® certified products are required across all applicable product categories where price comparable (based on a **total cost of ownership** assessment) and when consistent with the needs of University researchers, faculty, and staff.

O. Laboratory Equipment:

1. Laboratory equipment will minimize energy and water use. Energy-saving features must be enabled whenever it is consistent with research needs and safe practice. For more information, go to the Energy Office website.

2. Per UC Sustainable Practices Policy Section on Sustainable Water Systems, new equipment requiring liquid cooling will not use once-through or single-pass cooling systems. The Energy Office will conduct a full assessment of existing units in laboratories by the end of 2021 and recommend retrofit or replacement of units, where feasible.

3. Ultra-Low Temperature freezers (ULTs) are significant energy users and require special consideration. All new ULT freezers shall be ENERGY STAR® certified. Additionally, the Energy Office will complete an assessment of existing ULTs by the end of 2021 to identify opportunities for energy savings.

4. See the UC Lab Safety Design Manual for further guidance.

P. Appliances and Other Equipment:

1. For appliance and other equipment purchases where ENERGY STAR® certification is not available, purchases should be FEMP designated, if available.

Responsibilities

Vice Chancellor, Administration:

- Acts as Responsible Executive for this policy
- Approve, deny, or return for revision requests for exception to this policy

Facilities Services/Energy Office:

- Takes administrative responsibility for this policy, interprets the policy for the campus, and revises the policy as necessary.
- Supports campus stakeholders in identifying, reviewing and implementing energy conservation measures
- Administers campus energy offset program.
- Reviews building operating/occupancy schedules; and establishes heating and cooling standards for campus buildings.
- Reviews and comments on energy implications of designs for new buildings and renovations as they relate to policy requirements.

Facilities Services/Engineering and Technical Services:

- Maintains the Energy Office
- Maintains utility and energy services contracts.
- Advises on projects with energy and water savings opportunities.

Facilities Services/Campus Building Department:

- Reviews new construction and renovation projects for policy compliance and engages the Energy Office and other responsible departments as applicable.
- Verifies code requirements in campus construction projects at design and construction.

Information Service and Technology (IST):

- Reviews computing and technology decisions for policy compliance and engages the Energy Office and other responsible departments as applicable.

Capital Strategies/Capital Projects:

- Defines, provides or procures engineering and design services for capital projects.
- Ensures that internal and external stakeholders are aware of policy requirements and engages the Energy Office and Office of Sustainability at appropriate project milestones.

Capital Strategies/Real Estate:

- Provides energy performance information for campus acquisitions and leases.

Office of Environment, Health and Safety:

- Reviews laboratories for policy compliance and engages the Energy Office and other responsible departments as applicable.

Supply Chain Management:

- Provides energy performance information and sustainability procurement requirements (ENERGY STAR® and EPEAT) in campus procurement systems and in contracts.

Office of Sustainability:

- Policy stakeholder responsible for helping align policy goals with overall campus sustainability goals.
- Provides climate action and sustainability planning.
- Facilitates on-site clean energy supply initiatives.
- Provides LEED consultation for construction and large renovations; Facilitates LEED Operations and Maintenance pilot certification.

Faculty, Staff, and Students:

- Follow this policy and strive to reduce energy consumption on campus whenever possible.

Consequences of Policy Violations

Consequences could include a delay or denial in approval of permit documents. Rejection of project/equipment submittals may also occur.

Web Site Address for This Policy

http://campuspol.berkeley.edu/policies/energyuse.pdf

Glossary

CBC, T24: California Building Code, Title 24 portion of the California Code of Regulations

Cal Energy Offset Program: a program currently being developed to provide additional options for projects to meet the no net energy increase requirements. The program will be managed by the Energy Office.

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

Eco-charrette (also sustainable or environmental design charrette): Focused meetings in which all participants in a building design project collaborate on ideas for efficient use of energy and resources in the project, and then develop strategies for accomplishing those goals.

Energy use baseline: The amount of energy consumed by a building or space annually. The energy baseline is based on historical metered data, engineering calculations, sub-metering of buildings or energy consuming systems, building load simulation models, statistical regression

analysis, or some combination of these methods. This baseline will be used to calculate a project's compliance with sections F2 (2% EUI reduction), G1 (No-Net increase), and H1 (No-Net Increase).

Energy Use Intensity (EUI): Annual energy use of a building divided by its gross square footage, measured in kBtu/SF.

ENERGY STAR®: An international standard for energy-efficient consumer products, created in 1992 by the Environmental Protection Agency (EPA) and Department of Energy (DOE). ENERGY STAR® labeled devices (computer products, kitchen appliances, etc.) generally use 20%– 30% less energy than required by federal standards.

EPEAT: The Electronic Product Environmental Assessment Tool is an easy-to-use resource for purchasers, manufacturers, resellers and others wanting to find or promote electronic products with positive environmental attributes.

FEMP Designated: Federal Energy Management Program that designates the upper 25% of energy efficient products in specific categories. Related to ENERGY STAR®.

Fume hood: Ventilation device that limits exposure to hazardous or toxic fumes, vapors, or dust. The equipment encloses five sides of a work area, the bottom located at standing work height.

Greenhouse gas (GHG) emissions: Release into the atmosphere of gases that absorb and emit radiation within the thermal infrared range, causing the greenhouse effect. The primary greenhouse gases in the Earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide, and ozone.

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

HVAC: Heating, Ventilation, and Air Conditioning systems.

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

- LEED for Interior Design and Construction (LEED-ID+C) for renovation projects;
- LEED for Building Operations and Maintenance (LEED-O+M) for the ongoing operational and maintenance practices in buildings; and,
- LEED for Building Design and Construction (LEED-BD+C) for new buildings and major renovations of existing buildings.

Load-tracking: The ability of building controls to track heating, cooling, and ventilation needs in a space, and subsequently control the necessary equipment to minimize variations in set points.

Major Renovation: Per UC Policy on Sustainable Practices section on Green Buildings, Major renovations are defined as "projects that require 100% replacement of mechanical, electrical and plumbing systems and replacement of over 50% of all non-shell areas (interior walls, doors, floor coverings and ceiling systems)".

Major Modification: Per UCB Campus Building Department, a Major modification involves major renovation of space, multiple changes to systems, significant impact to building, major triggered code compliance, or new construction.

Medium Modification: Per UCB Campus Building Department, a Medium modification involves system reconfiguration or addition of new equipment in a limited area, replacement of multiple fixtures, reconfiguration of suite, or change in space use.

Minor Modification: Per UCB Campus Building Department, a Minor modification involves limited work done within a single space such as light or outlet changes, relocation of a diffuser, or casework changes.

Plug load: The energy used by a product powered by means of an ordinary AC plug (e.g., 100, 115, or 230 volts). This load excludes HVAC, lighting, and water heating systems.

Server virtualization: A method of running multiple independent virtual operating systems on a single physical computer.

Setback: A setback is an energy-saving strategy that reduces the amount of air supplied to space when that space is not in use. Heating, ventilation and air conditioning (HVAC) system setbacks may also allow temperature or humidity settings (or both) to widen during times the space is not in use.

Single Pass Cooling: Single-Pass or Once-Through cooling systems flow water through a piece of equipment to absorb heat and dispose the water down the drain without recirculation. Replacing and managing these types of systems is a recommended best practice by the International Institute for Sustainable Laboratories (I^2SL), US Office of Energy Efficiency & Renewable Energy, and the EPA. Equipment typically using this type of cooling includes hydraulic equipment, distillation condensers, refrigeration condensers, air compressors, vacuum pumps, electron microscopes, mass spectrometers, lasers, helium recovery, and electro magnets.

Strategic Energy Efficiency Partnership: Partnership between California's four large Investor-Owned Utilities, the University of California, and California State University to provide energy management support and incentives for campus energy efficiency.

Total Cost of Ownership (TCO): An analysis of cost that considers not only purchase price, but also any costs associated with the acquisition, use, and disposal of the product. These costs may include some or all of the following: freight, taxes and fees, installation, operation/energy use, maintenance, warranty, collection, end-of-life disposal or recycling, as well as social or environmental costs, such as the cost of purchasing pollution offsets or monitoring labor practices.

Variable Air Volume (VAV): A type of HVAC system.

Related Documents & Resources

University of California, Berkeley Campus Design Standards:
https://facilities.berkeley.edu/sites/default/files/ucb_campus_design_standards_2020.pdf

University of California Sustainable Practices Policy:
http://policy.ucop.edu/doc/3100155/SustainablePractices

University of California Sustainable Procurement Guidelines:
https://www.ucop.edu/procurement-services/for-ucstaff/sustainable-procurement/sustainableprocurementguidelines.pdf

University of California Policy on Management of Health, Safety, and the Environment:
http://policy.ucop.edu/doc/3500506/MgmtHealthSafetyandEnvironment

University of California, Berkeley Energy Office:
https://facilities.berkeley.edu/departments/engineering-and-technical-services/energy-office

University of California, Berkeley Office of Sustainability:
https://sustainability.berkeley.edu

University of California, Berkeley Joint Administrative Computing Standards Program:
http://procurement.berkeley.edu/buying/buying-goods/computers

University of California, Berkeley Information Service and Technology (IST)
https://technology.berkeley.edu/

University of California Lab Safety Design Manual:
https://lsdm.ucop.edu/