



October, 2016

University of Hawaii at Manoa  
**Building Design and  
Performance Standards**

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## **ACKNOWLEDGMENTS**

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## **INTRODUCTION::**

### **How to Use These Standards**

The UHM Building Design and Performance Standards are developed to help achieve the goals set by state and University policies, such as net zero performance by 2035 (ACT 99), while responding to the climate and environmental priorities of the region of Hawaii. They apply to all projects (new buildings, whole-building renovations, partial retrofits, system upgrades and interior remodels) and should be included in all Requests for Proposals issued for new projects and referenced in contracts for design consultants and construction managers.

These Standards assist the University, design teams and contractors to use a more holistic, iterative and integrated approach to the design process and design outcomes. This includes the building siting, envelope, materials, systems and long term building operations as well. In Hawaii's moderate climate with access to sun, wind and water, many low technology and low cost options exist for high performance building design. These Standards ensure that UHM projects actively consider and incorporate them in as many design decisions and construction processes as possible.

These Standards are organized in three volumes to address the different project phases and teams involved in each of them.

Volume 1, "Project Definition", focuses in pre-design information to be mostly used by the University staff as a resource to define and develop procurement documentation for new projects. It describes the different project groups that the University will develop and the integrative process that needs to be followed in order to successfully implement these Standards. It gives an overview of the requirements by project group, including checklists to help with the review process. In addition, it emphasizes the need for benchmark-based energy performance targets and measuring progress toward achieving the goals of the UH Executive Policy on Sustainability (EP 4.202).

## INTRODUCTION (Continued)

Volume 2, “ Design + Construction” articulates building design strategies and includes standards for building performance, water conservation, environmentally responsible material choices, and other principles of sustainable operational models. Consultants reporting to the Office of Capital Improvements (OCI) and the Office of Planning and Facilities (OPF) should use this volume in the design and construction of UH Manoa projects. It includes a specific set of requirements for each project group, in three separate guides, one for each University project group depending on the scope of work. For new buildings and whole-building retrofits, for example, the standard identifies the LEED credits required to achieve a minimum of LEED Silver Certification (UHM Executive Policy EP.4.202) and also defines the level of analytics and modeling methods to achieve specific building performance goals. Design teams are requested to provide energy analysis that reflects the actual expected use of the building, rather than simply model for code compliance.

Another guide with additional Requirements only applicable to Laboratory buildings supplements the ones for Design + Construction of each Project Group.

Volume 3, “ Post-Occupancy” , forms the basis for performance diagnostic information and ongoing achievement of the expected project performance. It addresses the building operation phase and describes the framework to provide real-time information to document the progress in achieving the progressive campus sustainability goals overtime once the building is occupied, in addition to identifying and troubleshooting operation and maintenance issues. This feedback from performance measurement is then compared against the set of benchmark-based energy performance targets enforced by “Volume 1- Project Definition” of these Standards, providing an early opportunity to mitigate potential issues post-occupancy.

The UHM Building Design and Performance Standards are based on a compilation of sustainable goals extracted from a wide range of industry standard documents (from LEED v4, IECC 2015 and ASHRAE 189.1 and 90.1 standards, HI-CHPS etc...), and the results of extensive performance simulations. As a consequence, these Standards also include a Modeling Addendum (with detail of the simulation studies) and an Appendix with a thorough description of the context within which the University of Hawaii at Manoa is implementing this document, including State, UH System and UHM policies, plans, guidelines and standards.

## INTRODUCTION (Continued)

Early design decisions can have the largest impact on a building's energy use. These decisions are often made without the benefit of quantitative analysis. Later in the design process, when energy and possibly thermal comfort analyses become available, changing these initial decisions can be difficult. For this reason, the UHM BDPS- Modeling addendum includes combined climate and program analysis for classroom, offices and laboratory buildings for the local UHM microclimate. This is a "pre-design information package" to be handed out to the design team, outlining critical climate and program issues that need to be addressed throughout the design process. This information is specific to each building type in the local climate and includes a weather data analysis, daylighting and shading, HVAC autonomy and thermal comfort and energy studies. These offer a solid starting point and provide examples for design teams to pursue similar studies in their design process, comparing their design performance with the metrics required in these Standards. Also included are examples of efficient electric lighting designs for classrooms, offices and laboratories..

The goal of this pre-design information is two-fold: first it serves as a roadmap for the analysis process that design teams should follow in order to quantify building performance in different design phases and iterations. Second, it gives a context for the metrics required by these Standards and confirms that they are both achievable and reasonable in this climate.

In summary, these Building Design and Performance Standards aim to provide clarity and guidance toward the goal of sustainability, using performance-based design and decision making in an integrated building design process. They are designed as a useful resource to plan, program, design, construct, and operate UHM facilities throughout their life cycle to minimize their impact to the natural environment and provide a comfortable indoor environment for the University community. They will help in reducing energy use, pursuing climate neutrality and energy efficient operations across UHM and integrating sustainable priorities into purchasing and contract decisions.

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