

**OFFICE OF THE STATE ARCHITECT  
STATE BUILDINGS PROGRAMS  
POLICIES AND PROCEDURES**



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**HIGH PERFORMANCE CERTIFICATION PROGRAM  
FOR NEW CONSTRUCTION AND SUBSTANTIAL RENOVATIONS**

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# SECTION I – INTRODUCTION

## THE EFFECTIVE DATE OF THIS POLICY IS SEPTEMBER 1, 2007.

### 1) Intent

This policy establishes the standard that governs the design and construction of state-assisted facilities funded for new buildings or substantial renovations as part of the Colorado High Performance Certification Program (HPCP). The policy covers the building process from initial facility master planning to final long-term operation and maintenance of buildings. The policy is designed to be compatible with national standards while maintaining regional values, priorities and requirements. Controlled maintenance projects and similar narrowly focused repair projects are exempt from registration/certification per this policy but each project should be designed and constructed per this policy's goals.

High performance building design is still an evolving field with rapid advances in design knowledge, construction procedures, and methods and technology to measure outcomes. Rating systems and standards continue to be developed, altered, and improved over time. This policy is intended to familiarize decision-makers and others involved in facility planning, design, construction and operation of buildings with the concepts to achieve high performance buildings. This policy attempts to address some of the fundamental requirements of high performance buildings. It is organized to present theory, concepts, and practice in order to present the subject without dictating solutions. It is not meant to be a prescriptive document. Instead, it is understood that once state agencies become acquainted with the issues presented, they will pursue high performance design and utilize the creative talents and resources of the project team that will result in original, cost-effective, long-term solutions.

This policy intends to coordinate and track through documentation the efforts of the various state agencies with respect to the initial strategic planning goals through registration and certification, to the final occupancy of new or renovated buildings. Because compliance is a multi-disciplined effort involving many individuals and departments, each state agency has the responsibility for ensuring that its construction projects comply with applicable standards.

Energy management programs for existing buildings are part of the Office of the State Architect (OSA) policy, Energy Management of Existing Buildings. The requirements of the Governor's Executive Orders on Greening of State Government are explained in the existing buildings policy. This policy is available from the OSA web site, Energy Management Programs.

The policy is divided into eight sections: Section I – Introduction; Section II – Authorities Having Jurisdiction; Section III – High Performance Building Design Goals; Section IV – High Performance Building Design Process; Section V – High Performance Premium Cost; Section VI – References, Section VII – Exhibits.

### 2) High Performance Certification Program Requirements and Definitions

#### Requirement

**USGBC LEED™-NC (U.S. Green Building Council, Leadership in Energy and Environmental Design – New Construction) Gold is the targeted standard of the High Performance Certification Program (HPCP) as per section 24-30-1305, C.R.S. and Senate Bill 07-051.** *The Office of the State Architect, or an analogous successor office in the department, shall, in consultation with the Colorado Commission on Higher Education, adopt and update from time to time a high performance standard certification program (HPCP). A certification is attainable if the increased initial costs of substantial renovation, design, or new*

construction, including the time value of money, can be recouped from decreased operational costs within 15 years. If the state agency estimates that such increased initial cost will exceed five percent of the total cost of the substantial renovation, design, or new construction, the Capital Development Committee shall specifically examine the estimate before approving any appropriation, section 24-30-1305 (9) (a), (b), (c), C.R.S. The HPCP Premium cost shall be tracked on the LEED™ Checklist and will indicate by credit, the initial and final cost as explained in Section V.

The Office of the State Architect recognizes that there are circumstances in Colorado that are not reflected in national high performance standards and, therefore, will review individual project planning strategies with a consideration to Colorado goals, values, and laws.

The concept of “what you meter, you can manage” is important with a high performance building. The minimum requirement of the HPCP is that each new facility should meter all utilities and have the ability to submeter selected systems. Each building shall attain a US EPA Energy Star Rating, pursue environmental preferred purchasing of all appropriate equipment, and, in the post occupancy timeframe, continue to maintain and track the performance of the building.

Buildings that are exempt from the HPCP include as specified in the statute any building without a heating, cooling, or air conditioning system; buildings that are smaller than 5,000 square feet; historically designated buildings; and temporary structures. Agencies should apply all the standards and principles of the HPCP as cost-effective and practicable as possible for all new construction and substantial renovations, regardless of the building type.

### **Definitions**

#### **(a) HIGH PERFORMANCE BUILDING**

A high performance commercial building is energy efficient, has low short-term and long-term life-cycle costs, is healthy for its occupants, and has a relatively low impact on the environment. High performance buildings use key resources such as energy, water, materials and land much more efficiently than buildings simply built to code or through a standard design process. An agency's facility master plan needs to incorporate high performance building goals as a fundamental initial step. The design process starts with cooperation among building owners, facility managers, users, designers and construction professionals through a collaborative team approach. Each design decision regarding site orientation, design, window location and treatments, lighting, heating, air conditioning, ventilation, insulation, material selection, and controls must be integrated throughout the design, construction and operation in order to create a high performance building. The project considers the true cost of a building through the life cycle assessment of each individual building component. The project is developed to minimize demolition and construction wastes and the use of products that minimize waste in their production or disposal. The building can be easily reconfigured and reused as the use of the building changes. The process will educate building occupants and users to the philosophies, strategies and controls included in the design, construction and maintenance of the project.

#### **(b) STATE-ASSISTED FACILITY**

*"State-assisted facility" means a facility constructed, or a major facility constructed or renovated, in whole or in part, with state funds or with funds guaranteed or insured by a state agency, section 24-30-1301 (13) C.R.S. A "STATE -ASSISTED FACILITY" does not include: (i) a facility specified in section 23-1-106 (9), C.R.S.; (ii) A facility financed by the Colorado Housing and Finance Authority pursuant to part 7 of article 4 of title 29, C.R.S., or the Division of Housing in the Department of Local Affairs; or (iii) a facility the source of funding for which is section 39-29-110 (1) (b), C.R.S.*

#### **(c) SUBSTANTIAL RENOVATION**

*"Substantial Renovation" means any renovation the cost of which exceeds twenty-five percent of the value of the property; section 24-30-1301 (15) C.R.S.*

### 3) Coordination with Approved Building Codes

The High Performance Certification Program does not supersede the Office of State Architect policy and procedures on building codes. The code consultants are required to conduct plan reviews per the OSA building code policy [Building Codes](#). They are not approved to certify buildings as per this HPCP policy.

The Department of Local Affairs/Division Of Housing has statutory responsibility over Factory-Built Nonresidential Structures and such buildings are not subject to the policies within this document. However, all agencies should consider the High Performance Certification Program strategies in all aspects of the location, specification, construction, and ownership of factory-built structures.

### 4) Statutory Responsibilities/Executive Orders (related to this HPCP policy)

(a) Colorado Revised State Statutes:

24-30-1301-1307	State Buildings, Department of Personnel
24-30-2001-2003	Utility Cost Savings Measures
24-82-601-602	State-Owned Facilities – Energy Conservation
24-82-901-902	Outdoor Lighting Fixtures

(b) Executive Orders

**Energy Performance Contracting to Improve State Facilities**, Executive Order D014 03 (July 16, 2003)

Directive: Each state agency responsible for state-owned facilities shall investigate the feasibility for an energy performance contract.

**Greening of State Government**, Executive Order D005 05 (July 15, 2005)

Directive: Directs the Executive Directors of all state agencies to evaluate their current business operations and develop and implement policies and procedures to promote environmentally sustainable and economically efficient practices.

**Greening of State Government: Goals and Objectives**, Executive Order D0011 07 (April 16, 2007)

Directive: Directs state agencies to reduce state energy consumption, increase state use of renewable energy sources, increase the energy efficiency and decrease the environmental impact on the state vehicle fleet, and implement an environmental purchasing standard.

**Greening of State Government: Detailed Implementation**, Executive Order D0012 07 (April 16, 2007)

Directive: Establish policies and procedures to achieve the goals and objectives articulated in Executive Order D0011 07. Sections: Reduction of State Energy Consumption; Materials Management and Environmental Preferable Purchasing; Greening the State Fleet; Renewable Energy Sources for State Energy Consumption.

## **SECTION II – AUTHORITIES HAVING JURISDICTION** (related to this HPCP policy)

### **1. Colorado Greening Government Council**

The Colorado Greening Government Council was established as part of Executive Order D005 05. The Council was created with representatives from the Governor's Energy Office, the Department of Public Health and Environment, and the Department of Personnel & Administration. The Council is directed to develop, implement, and augment programs, plans and policies that save money, prevent pollution and conserve natural resources throughout state government, including but not limited to source and waste reduction, energy efficiency, water conservation, recycling, fleet operations, environmental preferable purchasing, and establishing state-wide goals to save taxpayers' money and reduce environmental impacts. The Executive Orders D0011 07 and D0012 07 expanded the responsibilities of the Council and set objectives for the state that the Council will implement. The Executive Orders require an annual report from the Council.

### **2. Governor's Energy Office**

The Governor's Energy Office (GEO) is Colorado's lead state agency on energy efficiency issues. GEO supports cost-effective programs, grants and partnerships that benefit Colorado's economic and natural environment. The agency's primary objective is to serve the people of Colorado through education, technical and financial assistance. GEO is federally funded; no Colorado state tax dollars are used to support its activities. GEO encourages residential and commercial energy standards; offers grants to assist recycling, compost, wetlands and fuel cell projects; promotes weatherization services to low-income households; and advocates energy efficiency programs statewide. GEO is the primary leader of the Colorado Greening Government Council as stated in the Executive Orders and provides staff support to the Council.

### **3. Colorado Department of Public Health and the Environment**

The Colorado Department of Public Health and Environment (CDPHE) is committed to protecting and preserving the health and environment of the people of Colorado. Its role is to serve the people of Colorado by providing high-quality, cost-effective public health and environmental protection services. The Colorado Department of Public Health and Environment focuses on evidence based best practices in the public health and environmental fields and plays a critical role in providing education to citizens so they can make informed choices. In addition to maintaining and enhancing core programs, CDPHE continues to identify and respond to emerging issues that could affect Colorado's public and environmental health.

### **4. Department of Personnel & Administration/Office of the State Architect**

Department of Personnel & Administration (DPA) is the executive branch department that serves as the business center for Colorado's state government. DPA is responsible for managing state facilities and real estate through the Office of the State Architect (OSA). The OSA has responsibility for capital construction administration, controlled maintenance request prioritization, code compliance, facilities condition tracking, emergency maintenance funds approval, energy conservation and leasing and real estate transaction approval and oversight. OSA has sole responsibility to establish this HPCP policy.

## **SECTION III – HIGH PERFORMANCE BUILDING DESIGN GOALS**

### **1. Agency/Department Long-term Strategic Plans**

Agencies facility master plans and other long-term strategic planning processes shall incorporate the concepts of high performance buildings.

### **2. Site Design and Planning**

Building location is critical since the site location can affect the building and the building can affect the site environment. Decisions made early in the process can often have a significant impact on many aspects of the design and the site development. The greatest opportunities for project success rest in the initial stages of goal and strategy determination. The site location and design process will impact the surrounding land and local watershed, limit storm water runoff, prevent erosion, and reduce impacts on local wildlife and wetlands. The site location should attempt to restore previously used sites, locate in urban settings, and, if possible, utilize existing buildings and infrastructure. The landscape design should consider sustainable practices that promote biodiversity and efficient water requirements. The site location should encourage transportation alternatives such as walking, bicycling, mass transit and other options to minimize automobile use. The building design should minimize the development footprint of all roads, sidewalks, and construction activities. The design should minimize light trespass from the building and site. Attention to the building location is an important initial consideration to achieve a high performance building.

### **3. Building Energy Use**

An energy efficient design can reduce the energy use of buildings by 50% or more than the energy use of a building designed to comply with the minimum requirements of the International Energy Conservation Code. A computer simulation of the building modeling all potential design and equipment options is indispensable to adequately determine the most effective and efficient mix of building elements. The energy aspects of a building can be broken down to a few basic elements: the envelope, the lighting system, the heating/cooling/ventilation system, the electrical plug loads, and the connection to the utility provider. The orientation of the building can have a major impact on the energy characteristics of a building through the year and on the occupancy comfort during the day. The integration of the multiple elements is the key to controlling the energy usage of a building while achieving an indoor work environment that is productive and a building that is efficient to operate in the future. Renewable energy technologies should be considered as a potential energy source. Colorado has the potential for solar power in many locations. Wind power, biofuels, and geothermal have potential in certain Colorado locations. The final building design requires the combined efforts of all the members of the design team. Generally, Colorado buildings are not designed within the ASHRAE comfort zone. In Colorado, humidity is not added to the supply airflow. In Colorado some locations use the winter 99% design dry-bulb temperature.

The efficiency of a building is directly related to the integration of the numerous elements: the orientation of the building, the window/wall ratio and visible/thermal properties, the efficiency of the components of each element, the choice of materials and their ventilation requirements, and the balancing of the heating and cooling requirements of each element. The design team needs to address early in the process the integration of the building orientation and envelope components with the heating, cooling, ventilating, and lighting requirements. The size, location and properties of the windows have a direct effect on the lighting requirements and heating and cooling loads of the building. The choices of certain windows can enhance the quality and quantity of the lighting system while reducing the cooling and heating loads. The cost of higher quality windows can reduce the cost of the lighting system and the heating/cooling components such that there is no resulting cost impact to the construction budget. The total insulation value of the walls, windows, roof, and basement areas is an important design determination. Insulating values are very dependent on building location. The building design and construction process needs to address and control the infiltration of the outside air. Indoor comfort is very dependent

on the reduction of cold or hot air drafts. A complete understanding of all the elements and aspects of a building is important for an energy efficient building.

Intelligent decisions made during the building envelope design and appropriate computer modeling can result in equipment sized to closely match the heating and cooling load without excessive capacity and additional cost. Heating and cooling systems operate at part-load during most hours and seldom operate at their peak design capabilities. The selection of the heating and cooling equipment should also be based more on its part load efficiency than its full load efficiency. The equipment should be selected with consideration to its annual run time, associated operation and maintenance cost, and not just first cost. A full life cycle cost analysis could be necessary during equipment selection, but is not required. The heating and cooling systems need a well-designed control system to accurately maintain the building indoor environmental condition while controlling the efficiency of the building. A high performance building design can substantially reduce the size, and therefore, the cost of the heating and cooling equipment.

#### **4. Material and Product Selection**

Colorado based manufacturers should be emphasized during the product and equipment selection. The selection of the materials and products installed will determine the long-term energy and water usage and the long-term maintenance of a building. The materials selected for durability include the wall and floor finishes, the fixtures, and other equipment. The products selected will affect the energy plug loads, the water consumption, and other goods and services. The materials and products need to be evaluated based upon their energy impact, their indoor air quality impact, their operation and maintenance impact, and upon a variety of environmental concerns. The environmental concerns include but are not limited to: recycled content, locally/regionally produced, renewable, local and state environmental goals and targets, and the ability to be reused/recycled. As in the energy design process, the material selection process needs to be evaluated as to its long-term effects to the building and the occupants.

Life cycle assessment (LCA) is the preferred method to determine the appropriate choice for a product or a particular material. LCA is a technique to assess the environmental aspects and potential impacts associated with a product, process, or service, by compiling an inventory of relevant energy and material inputs and environmental releases, evaluating the potential environmental impacts associated with identified inputs and releases, and interpreting the results to help make a more informed decision. However, a complete life cycle assessment of all products and materials is not always available or feasible and, therefore, a prescriptive selection method such as that as outlined in LEED™ may currently be the best procedure available. LCA does not need to be determined for every item purchased; instead, LCA should be determined for the top 10 to 20 items selected on volume, cost, or value. The LCA calculation may not always be necessary as part of a decision, but should be used when appropriate. The EPA Energy Star program is an alternative source of information to help determine an appropriate product. Refer to the reference section for information on life cycle cost and life cycle assessment methods.

#### **5. Indoor Environment**

Indoor environmental quality includes the overall comfort and health of a building's occupants. It is important to design for good air quality, efficient and effective lighting, and comfortable temperatures, acoustic and aesthetic qualities. It is also important to allow occupants some ability to control individual indoor conditions. Lighting design and control of a space should reflect the usage of the space, the potential occupants of a space and their particular requirements, and the amount and quality of natural light. The choice of materials for finishes, fixtures, and equipment needs to consider potential off-gassing, acoustic properties, and their aesthetic qualities. The indoor environment is directly related to the choice of materials and products and their potential impact to the building's air quality. The design and construction of the building should focus on the occupants and their ability to work and be productive.

#### **6. Water Efficiency and Management**



Water use in Colorado is a significant issue. Colorado has experienced drought conditions that have directly affected the quantity and quality of water available to users. The quality and quantity of water leaving the state is important since the river basins that originate in Colorado directly affect seven states and indirectly affect another five. The use of water in the construction process and long-term ownership of a building concerns not just utility bills, but also, impacts the availability of water for downstream users. Water laws in Colorado influence and eliminate some of the strategies identified in the national standards on high performance buildings.

The landscape design should minimize the disruption to existing vegetation as much as is practical. The design should incorporate native and drought-resistant plants and low-water landscape principles to minimize irrigation requirements. The design should reduce or eliminate the requirements for potable water for irrigation. The capture of rainwater for irrigation is not currently allowed in Colorado, but the design should control the flow of surface water to support the vegetation. Working with the local water provider to review the possibility of a "green roof" being utilized as part of the storm water retention requirement is encouraged.

Water efficiency is based upon the equipment used in the heating and cooling system as well as the bathroom and kitchen equipment. All heating and cooling components and systems should be both energy and water efficient. The water system quality is an important aspect and the choice of materials and products needs to limit or eliminate the introduction of potentially harmful chemicals into the water system.

## **7. Construction Administration**

The construction phase is critical to the success of a high performance building in order for the design intent to be realized. It is necessary that the site be managed to reduce water run-off, to control dust migration, to control construction waste, and limit other environmental impacts. To control construction waste, the construction materials need to be organized to extract reusable items, recyclable items, compost items, and hazardous items. Depending on the experience of the contractors, firms new to high performance buildings will require education on all aspects of site management, waste collection, verification of installed items, collection of material data on all items, and their importance to the final quality of the building.

## **8. Commissioning**

Commissioning of a new or substantial renovation of a building is a prerequisite to verify that the design intent is accomplished. Commissioning should be an identified project cost and not something to be eliminated when budgets are tight. Within the design and construction of a high performance building there are many levels of commissioning. The level of commissioning varies with the type of building, the size of the building, the complexity of the building's thermal conditioning elements, and the activities conducted within the building. A thoroughly commissioned building is important to integrate all systems to operate properly and control long term cost and consumption. Refer to the resources section for additional information.

## **9. Operations and Maintenance**

The goal of the operation and maintenance program is to operate the building at maximum efficiency, provide a healthy working environment, and control long term cost. The operations and maintenance manuals need to be written in a language understandable to the individuals in the field performing the maintenance. The commissioning manual needs to explain what was commissioned, the building operation parameters, and the on-going commissioning program. The maintenance manual needs to explain the high performance materials utilized and the steps and procedures to be implemented for future cleaning, repair, and replacement work orders. The maintenance staff needs initial training on all the systems and continuous training to maintain the quality of the high performance building. LEED™-EB (Existing Buildings) is an excellent program to initiate to control long term operation costs

## SECTION IV – HIGH PERFORMANCE BUILDING DESIGN PROCESS

Refer to the attached flowchart. Items underlined are information submitted to OSPB, CDHE, or OSA.

### 1. Programming, Site Selection and Budget

Programming processes shall incorporate the High Performance Certification Program (HPCP) requirements at the earliest possible phase. Designing and constructing a high performance building begins with the statement of design intent. The statement of intent should clearly set forth the goals and strategies of the project. The initial step to achieve the goals is to review the LEED™-NC (New Construction) checklist or LEED™-EB (Existing Buildings) checklist and determine which strategies are achievable or are agency goals, which strategies require additional information and therefore will be determined during the design phase, and which strategies are not achievable. (See exhibits for LEED™ checklists) This initial strategic planning checklist is submitted as part of the capital construction request package to either Colorado Department of Higher Education (CDHE) or Office of State Planning and Budgeting (OSPB) to indicate intent. CDHE and OSPB will forward to OAS the initial checklist with attached HPCP clarifying documents. Credits determined as not achievable will require a document clarifying the reasons. Initial determination of strategies should be based upon attributes unique to the building or its site. OSA recognizes that some LEED™ points are not obtainable in all areas of the state and therefore the agency may receive support of their strategic planning goals even if LEED™-Gold is not the achievable performance level. New construction should use the NC checklist while substantial renovations should examine both NC and EB checklist to determine the appropriate strategies. The budget should be reviewed to determine the impact of achievable and potential strategies recognizing that life cycle cost and life cycle assessment should drive budget figures and not first costs.

### 2. Project Start-up

The inclusion of high performance standards is an integral part of the project rather than a separate design step. The design process should include the various stakeholders as early as possible. The design team should include appropriate members from the agency, architects, engineers, commissioning agents, and other consultants as considered necessary depending on the type and size of the building. Minimum requirements should include a LEED™ certified professional on the design team to act as the HPCP coordinator. The design team members should be experienced with cost estimating, life cycle cost and life cycle assessment, local construction knowledge, and building energy modeling. The final building is a direct reflection of the experience of the design team.

The design team will develop the building performance plan to incorporate the initial LEED™-NC or EB project checklist. The building performance plan objective is to document the overall approach to integrate all the parameters of the project. The plan sets the performance targets for renewable energy, rapidly renewable materials, amount of recycled content in construction materials, products purchased from local manufacturers, and other HPCP goals. A design charrette can help all stakeholders develop and agree upon the high performance building goals. For a new building, the design team should review and incorporate appropriate LEED™-EB requirements. The design team should review these targets frequently to ensure the project goals are being met and the budget and project cost benefits are being evaluated based on life cycle cost or life cycle assessment criteria.

The agency's HPCP coordinator will register the project with the U.S. Green Building Council (USGBC). Notify OSA of the registration of the project; include project title, total project cost, and gross square feet renovated and/or new. Per the online registration process, the design team will be assigned credits to track. Credits that were undecided during the initial strategic planning checklist will require additional research during the design phase to determine appropriateness and cost effectiveness. Task responsible parties for preliminary feasibility studies on potential

credits to collect design issues, cost information, and set-up a method to decide the status of each unresolved credit.

### **3. Schematic Design/ Design Development**

During the schematic and design development phases the design team reviews the initial strategic checklist and refines the selected credits. Each credit is assigned an estimated cost. The potential credits are resolved during the design phase. The decision on the credits should not be based upon first costs, but on the potential returns and long-term benefits.

The design team will develop the computer energy model that will determine the appropriate equipment size and efficiencies. The commissioning plan is developed and implemented early in the design phase. The LEED™-NC or EB checklist should be reviewed and updated continuously while completing the design development documents.

### **4. Construction Documents/ Bid Phase**

The final construction documents will incorporate all the LEED™ credits under consideration. All credits should be resolved at the end of construction documentation and the agency's HPCP coordinator has confirmed all required LEED™ design documentation is included in the 100% CD drawings and specifications. The construction documents will finalize all materials specifications and construction methods. The commissioning authority will finalize the commission plan during the completion of the construction documents.

The pre-construction LEED™-NC or EB checklist should be filled out to indicate by credit the estimate design/construction cost, benefit/savings, LLC/LCA (Y/N) requirement and any comments. This OSA modified final construction ready LEED™ checklist is submitted to OSA as part of the authorization to bid documents. (See exhibits for OSA modified LEED™ checklists)

The agency's HPCP coordinator will initiate the design document information for review with USGBC through their LEED™ online certification process. USGBC will review and mark each credit as either "Credit Achievement Anticipated" or "Credit Denied". No certification awards or building ratings will be given at this phase. As with any review, any denied credits can be appealed. Some credits may be marked as pending construction completion.

### **5. Construction Phase**

Prior to commencement of the construction the design team, the HPCP coordinator, and the contractor(s) will meet to discuss roles and responsibilities related to this HPCP process. As per USGBC reference standards, the contractor will manage the site and track the waste generated, control the site disturbance, and vehicle access and parking. The contractor will monitor, track, and document the materials used in construction. The commissioning agency will monitor and administer the commissioning plan. The LEED™ NC or EB checklist should be reviewed and updated during the construction phase.

### **6. Final Acceptance/Occupancy**

The HPCP coordinator will verify that all the required information necessary for certification has been collected and entered into the online submittal process. The HPCP coordinator will verify that the commissioning agent has verified that the commissioning plan was completed and the final report presented and accepted by the agency. The agency's HPCP coordinator will verify that all operation and maintenance manuals have been provided to the agency and that the maintenance staff has been trained on all the systems. The agency's HPCP coordinator submits the Application for Construction Credits at the owner occupancy phase. The project shall be submitted to USGBC for certification at the highest achievable level. The OSA modified final LEED™ NC or EB checklist with final design/construction costs for each attempted and awarded credit is submitted to OSA. The agency will document and forward to OSA the final certification results.

## 7. Six and Eleventh Month Walkthroughs

The agency will verify compliance with both the commissioning plan and the operation and maintenance requirements. The agency will review and compare the annual and monthly utility consumption and cost with the measurement and verification plan. The agency will discuss with the design team and contractor any outstanding certification issues. If final USGBC certification was not submitted to OSA at occupancy, then the agency will document and forward to OSA the final certification result.

## 8. New Construction Long-Term Performance

For a LEED™-NC building, the agency should consider the LEED™-EB program as a process to maintain the long-term performance of the building. Refer to the OSA policy on energy management of existing buildings.

# SECTION V – HIGH PERFORMANCE PREMIUM COSTS

The High Performance Certification Program Premium cost line-item on the CC-C Capital Construction request form is the anticipated additional costs necessary to achieve a high performance building. SB07-051 allows for up to five percent of additional funds to design and construct a high performance building if those costs can be recouped in operational savings within 15 years. This premium is not part of the project's contingency line item, but is a separate project line item. The cost to achieve a high performance building shall be tracked by LEED credit by the agency. The final cost for each credit attempted or certified shall be reported to OSA and any excess premium dollars shall be reverted.

# SECTION VI – REFERENCES

## STANDARDS

US Green Building Council – LEED™, <http://www.usgbc.org/>

The Leadership in Energy and Environmental Design (LEED™) Green Building Rating System™ is the nationally accepted benchmark for the design, construction, and operation of high performance green buildings. LEED™ gives building owners and operators the tools they need to have an immediate and measurable impact on their buildings' performance. LEED™ promotes a whole-building approach to sustainability by recognizing performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality. Review state chapters for information, in particular the Rocky Mountain local chapters.

Proposed ASHRAE standard, **SPC 189P** - Proposed Standard authorized 1/26/06. *Standard for the Design of High-Performance, Green Buildings Except Low-Rise Residential Buildings.* [www.ashrae.org](http://www.ashrae.org)

## SOFTWARE

The Department of Energy, through the Office of Energy Efficiency and Renewable Energy's (EERE) Building Technologies Program provides Building Modeling and Compliance Tools/Software on their website. [http://www.eere.energy.gov/buildings/tools\\_directory/](http://www.eere.energy.gov/buildings/tools_directory/)

Building Life Cycle Cost (BLCC) is a program developed by the National Institute of Standards and Technology (NIST) to provide computational support for the analysis of capital investments in buildings. The Department of Energy, through the Office of Energy Efficiency and Renewable Energy's (EERE) Federal Energy Management Program (FEMP) provides the free program from their web site. [http://www1.eere.energy.gov/femp/information/access\\_tools.html](http://www1.eere.energy.gov/femp/information/access_tools.html)

## GENERAL INFORMATION

The Building Commissioning Association (BCA) promotes building commissioning practices that maintain high professional standards in accordance with the owner's project requirements. <http://www.bcxa.org/>

ENERGY STAR is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy helping us all save money and protect the environment through energy efficient products and practices. <http://www.energystar.gov/>

[Green Construction Guide for Federal Specifiers](#), by the Office of the Federal Environmental Executive and the multiagency-sponsored Whole Building Design Guide.

Green Seal provides science-based environmental certification standards that are credible, transparent, and essential in an increasingly educated and competitive marketplace. <http://www.greenseal.org/>

Life Cycle Assessment: Principles and Practice by Scientific Applications International Corporation (SAIC), EPA/600/R-06/060 May 2006, National Risk Management Research Laboratory Office Of Research And Development U.S. Environmental Protection Agency.

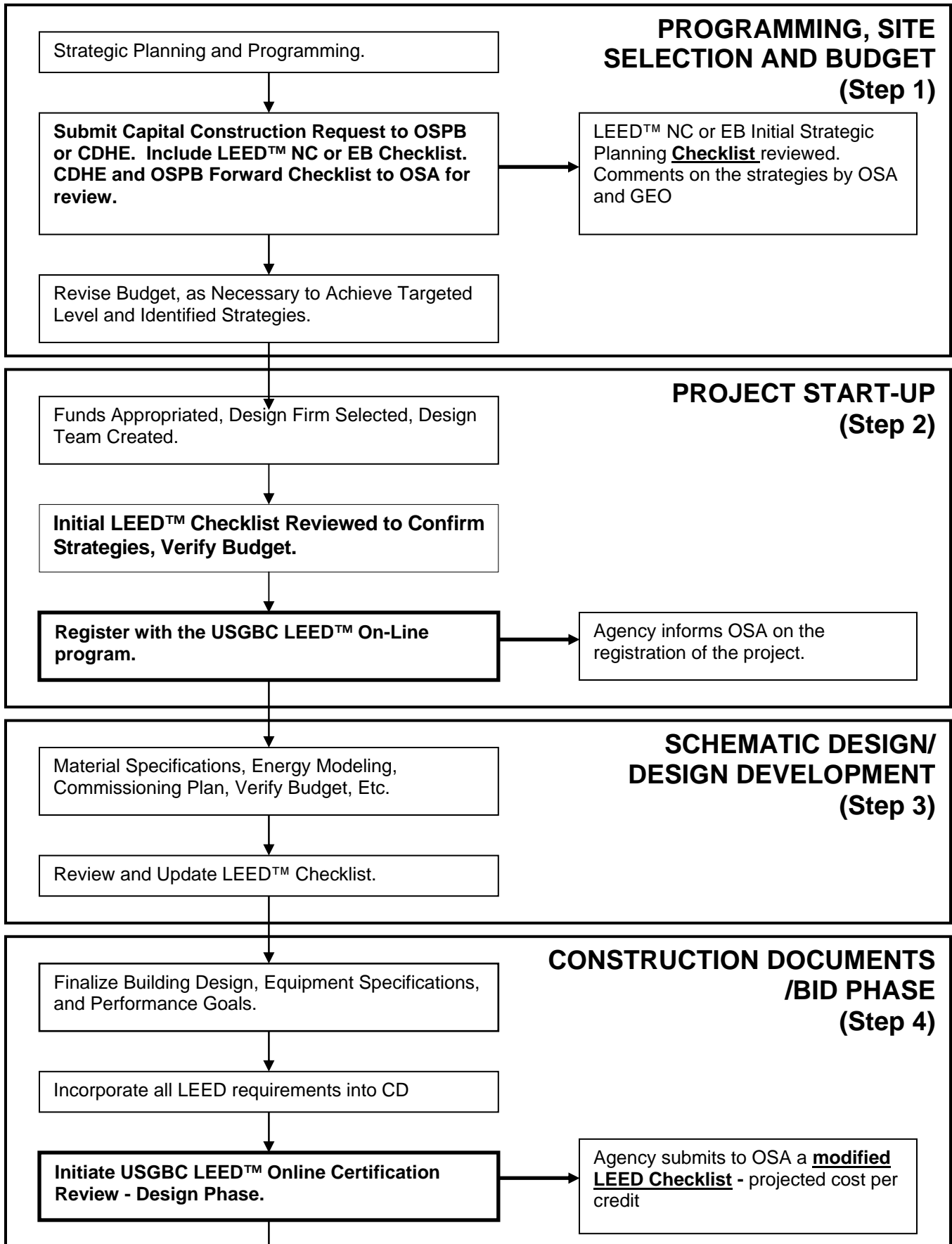
USDOE, Office of Energy Efficiency and Renewable Energy, High Performance Buildings, <http://www.eere.energy.gov/buildings/highperformance/>

## SECTION VII – EXHIBITS

- A. USGBC LEED™ - NC (New Construction) Checklist
- B. USGBC LEED™ - EB (Existing Buildings) Checklist
- C. OSA Modified LEED™-NC Checklist
  - **Design/Construction Cost:** The design fee and construction cost for this credit. At CD, this is only the estimated cost. At acceptance, this is the final cost for this credit.
  - **Benefit/Cost Savings:** Any perceived benefits from this credit (example – public transportation reduces need for parking spaces) and estimated calculated construction or long-term operation/maintenance savings.
  - **LCC/LCA (Y/N):** LCC (Life Cycle Cost) or a LCA (Life Cycle Assessment) calculation required for this credit to determine final design.
  - **Comments:** Any unresolved issues, concerns or additional researched required for this credit. Comments on the results of any LLC/LCA calculation.
- D. OSA Modified LEED™-EB Checklist
  - **Design/Construction Cost:** The design fee and construction cost for this credit. At CD, this is only the estimated cost. At acceptance, this is the final cost for this credit.
  - **Benefit/Cost Savings:** Any perceived benefits from this credit (example – public transportation reduces need for parking spaces) and estimated calculated construction or long-term operation/maintenance savings.
  - **LCC/LCA (Y/N):** LCC (Life Cycle Cost) or a LCA (Life Cycle Assessment) calculation required for this credit to determine final design.
  - **Comments:** Any unresolved issues, concerns or additional researched required for this credit. Comments on the results of any LLC/LCA calculation.

# HIGH PERFORMANCE BUILDING DESIGN PROCESS FLOWCHART

Agency responsibilities as per project phase as listed below



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