

Northeast Energy Efficiency Partnerships, Inc.



Energy Guidelines, Codes and Standards

Analysis of Advanced Building Guidelines – Beyond Code

Report to Maine Public Utilities Commission

December-2003

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I. Introduction

A. Background

During the first session of the 121st legislative session, the Legislature considered LD 233, An Act to Promote Energy Conservation, and enacted P.L. 2003 ch. 497. Sec. 4 of ch. 497. This statute directs the Maine Public Utilities Commission (Commission) to review current state building energy standards and their enforcement, and to review other advanced building guidelines, including Leadership in Energy and Environmental Design (LEED), ENERGY STAR, California's Collaborative for High Performance Schools (CHPS), and New Building Institute's Guidelines (all four will be collectively referred to as the Guidelines).

Commission staff sought assistance from the Northeast Energy Efficiency Partnerships, Inc. (NEEP) in understanding, analyzing, comparing, and contrasting the advanced building guidelines specified in the legislation. The following is a description of tasks and steps that NEEP staff and advisors followed in studying each guideline in order to support the Commission in meeting their directive.

B. Description of Tasks

1. Compare and contrast the four Guidelines contained in the legislation.

NEEP, with assistance from the New Building Institute and advisor Doug Baston, collected data associated with the key features and requirements addressed by each of the guidelines. With this data, NEEP established a written matrix comparing these features and requirements along with a commentary that will compare and contrast these guidelines.

This document contains sufficient details to aid both the Commission and the Legislature in understanding the differences among the guidelines, without sacrificing perspective on the most important decision-making features.

2. Analyze the advantages and disadvantages of the four Guidelines in Maine.

NEEP worked with its advisors and the Commission staff to identify a listing of important criteria that a guideline needs to address due to the geography, economy, political and administrative requirements, and climate of Maine.

NEEP reviewed the significant features of each guideline and compared them to the criteria listing for Maine in order to identify significant advantages and disadvantages of each of the guidelines. NEEP created a written summary of its findings, highlighting the most significant points.

3. Research advanced guidelines in other states.

NEEP, with the assistance from its advisors including the New Building Institute, collected data on and summarized other states' activities and practices regarding advanced building guidelines.

NEEP summarized each state effort in encouragement and support of each of these guidelines whether through government incentives and other financial support or through utility/ regulator support.

4. Provide technical assistance to Commission staff.

On request, NEEP Project Manager Doug Schanne and NEEP Advisor Doug Baston provided technical assistance to the Commission staff, helping to clarify the Guidelines' features and advantages and aid Commission staff in developing its recommendations pursuant to the legislation.

These tasks will be completed mostly through the use of secondary research - working from information developed by or in the possession of NEEP staff and advisors.

C. ACKNOWLEDGEMENTS

Special Acknowledgements to:

**Marjorie R. McLaughlin, Legislative Liaison
Maine Public Utilities Commission, Technical Analysis Division**

**Denis Bergeron,
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**Cathy Higgins, Program Manager
New Building Institute**

**Doug Baston, NEEP Commercial/Industrial R&D and Building Energy Code Advisor
Northeast by Northwest**

II. Details and Description of Guidelines

This section provides details and descriptions of the four guidelines that are analyzed within this report. The guidelines are listed in random order and include LEED, E-Benchmark, Energy-Star and CHPS.

A. LEED (Leadership in Energy and Environmental Design)

Background

Launched in March 2000, LEED (Leadership in Energy and Environmental Design) Green Building Rating System™ is a national program developed by the United States Green Building Council that offers a voluntary alternative to mandatory standards, covering not only the energy systems in the building, but also the material components related to indoor air quality and worker productivity. LEED covers new construction and major renovations (LEED-NC).

LEED addresses the many facets of the building besides energy as shown by the LEED Point Distribution within the Green Building Rating System:

- Indoor Environmental Quality 23%
- Sustainable Sites 22%
- Water Efficiency 8%
- Energy & Atmosphere 27%
- Material & Resources 20%

Energy and Atmosphere Requirements and Credits

The LEED Energy and Atmosphere credit category has three required prerequisites and six optional credits.

Prerequisites:

1. Fundamental Building Systems Commissioning
2. Minimum Energy Performance – Meet ASHRAE 90.1-1999 or local code (if more stringent)
3. CFC Reduction in HVAC&R Equipment

Optional Credits:

1. Optimize Energy Performance – 1-10 points for energy costs saving of 15-60% for new buildings and 5-50% for existing buildings compared to the energy cost of an ASHRAE 90.1-1999 building.
2. Renewable Energy – 1-3 points for supplying 5-20% of the building energy requirements through renewable self-supplied energy.
3. Additional Commissioning – 1 Point
4. Ozone Protection - 1 Point
5. Measurement and Verification – 1 Point
6. Green Power – 1 Point

Certification

LEED offers certification at four levels as shown below:

CERTIFICATION LEVEL	POINTS
Certified	26 to 32
Silver	33 to 38
Gold	39 to 51
Platinum	52 or more

All LEED certified projects must pick up at least one point of the 17 points available in the Energy and Atmosphere category. The Energy and Atmosphere requirements allow buildings that only meet ASHRAE 90.1-1999 or local energy codes. Typically this is seen at the Certified or Silver level. Buildings seeking certification at the Gold or Platinum level will usually pickup additional Energy and Atmosphere points and increase the building efficiency beyond code.

Fees

Achieving LEED certification requires that the project first be registered. After completion of the project, certification can then be applied for. Project fees depend upon the building size. For LEED members, project registration varies from \$750 to \$3,000 and certification varies from \$1,500 to \$6,000. For non-members, project registration varies from \$950 to \$3,750 and certification varies from \$1,875 to \$7,500.

Existing State Level Usage

According to the USGBC the following states use LEED¹:

California	New York
Maryland	Oregon
Massachusetts	Pennsylvania
New Jersey	

(source: www.usgbc.org/AboutUse/whybuildgreen/IntroductoryPresentation)

¹ The “use” of LEED is not defined but our research shows that states “promote, reference or recommend” LEED but it is not usually a “requirement”.

B. E-Benchmark

Background

The E-Benchmark is a resource on the energy components of high performance buildings. The E-Benchmark provides a roadmap for designing and constructing highly energy-efficient buildings that significantly exceed national energy codes and standards. This is accomplished by requiring an integrated design process that starts during the pre-design process and continues through post-occupancy. The E-Benchmark can be used to supplement the energy requirements of comprehensive design rating systems in other green building programs such as LEED.

The E-Benchmark was developed by the New Buildings Institute working with a Criteria Review Committee consisting of code officials, utility new construction program staff, and interested parties representing the design, construction, real estate and manufacturing communities.

Energy

The focus of the E-Bench is a high performance building. This can be achieved prescriptively by meeting the criteria presented in the guideline or through a combination of criteria and building simulation. Typical building performance is 20-30% beyond code depending upon the building sector and climate zone.

The table below shows some of the areas covered by the E-Benchmark toward improved energy and indoor environmental quality (IEQ):

Design Documentation	Building Envelope
Controls	Electrical
Lighting – Interior and Exterior	IEQ
Mechanical Systems	Energy Production
Building Commissioning	Cool Roofs & Eco-Roofs

Certification & Fees

E-Benchmark does not have fees or costs. The entity adopting and implementing the guideline determines any required costs for certification and fees.

C. ENERGY STAR

Background

ENERGY STAR is widely known for its successful area of Appliance labels (ENERGY STAR computer monitors, refrigerators, clothes washers etc.). To advance commercial building performance, ENERGY STAR has created benchmark tools specific to new and existing construction. These tools assess a building's intended or existing performance relative to other buildings, rather than relative to a target for the building. These tools are not "advanced guidelines" but do influence changes in energy performance by providing comparative feedback to the owner or operator. The US EPA and the US DOE sponsor the Appliance labels program while only the EPA sponsors the building program.

The ENERGY STAR criterion is based on benchmarking building energy consumption on a 1 to 100 scale. A building scoring 75 or higher indicates that the building is in the top 25 percent nationwide in terms of energy performance for its building type and qualifies for the ENERGY STAR label. In addition to a minimum benchmark score of 75, the building's indoor environment must conform to industry standards. The ENERGY STAR program can be used to supplement the energy requirements of comprehensive design rating systems in LEED.

Energy

ENERGY STAR offers two tools to measure building performance:

- Portfolio Manager is used to manage the energy performance of existing buildings.
- Target Finder is used to determine the annual energy goal of a new building design, compare the target with the simulated energy use of the proposed design and monitor the performance of the design and the building plans progress.

No direct correlation exists between a buildings performance score and energy code compliance or better-than-code building features. The ENERGY STAR program is independent of design and instead focuses on performance. Because of the lack of a correlation between installed efficiency measures and building performance, the ENERGY STAR program to date has primarily been used to benchmark existing buildings. The EPA is currently developing a process to make the program more valuable for new construction.

Certification & Fees

There are no required fees to apply for an ENERGY STAR award but the use of an energy consultant is recommended.

D. Collaborative for High Performance Schools (CHPS)

Background

CHPS is an acronym for Collaborative for High Performance Schools. CHPS was developed for use in California and is based upon California energy codes and climates. It was developed as the result of a California Energy Commission objective in November 1999 to improve the performance of California's schools. CHPS has been the basis of several other state efforts, namely MA, WA and HI, to improve school performance by creating a custom version for their area.

Much as in LEED, CHPS encompasses the entire project. Project categories include:

- Site: 14 points
- Water: 5 points
- Energy: 24 points
- Materials: 11 points
- Indoor Environmental Quality: 17 points
- District Resolutions: 10 points

The minimum requirement for a CHPS School is 28 points with at least 2 points in the Energy category.

Energy

The Energy category has the prerequisites that

- 1) the minimum energy performance is 10% better than California Title 24-2001, or
- 2) prescriptively apply efficient lighting with occupancy controls and economizers on packaged equipment.

Additional credits can be achieved with six optional credits:

- 1) Superior Energy Performance
 - 2-10 points available for a 15% to 35% energy use reduction compared to Title 24-2001, or
 - prescriptively add daylighting and controls on 40% of lights and add radiant barrier or increased roof insulation to base prescriptive requirements.
- 2) Natural Ventilation: 1-3 points
- 3) Alternative Energy Sources: 2-6 points
- 4) Commissioning and Training - Prerequisite
- 5) Commissioning: 2-3 points
- 6) Energy Management Systems: 1 point

At a minimum, a CHPS school is approximately 10% better than California Title 24-2001, which is a higher energy performing code than ASHRAE 90.1-1999.

Certification & Fees

CHPS has one level of certification and requires a minimum of 28 points, of which at least 2 points must be from the Energy category.

III. Technical Report Section

Task 1. Compare and Contrast the Guidelines

This task presents information and comparisons on the characteristics and key features of four building performance guidelines. Each guideline is listed below with a brief description.

All of the guidelines have a common goal to improve the performance², and reduce the resource impact of buildings for the benefit of the owner, occupant and the environment. All of the approaches are voluntary mechanisms that may be used as the basis for programs, directives, policies, requirements or mandates.

Brief Descriptions:

1. The **LEED** (Leadership in Energy and Environmental Design) Green Building Rating System™ is a voluntary, consensus-based national rating system for developing high-performance, sustainable buildings³. The LEED rating system covers a full range of resource areas, material components, indoor air quality, and worker productivity. LEED was developed by the United States Green Building Council and first launched in March 2000.
2. The Advanced Buildings *Energy Benchmark for High Performance Buildings* (**E-Benchmark**™) is a comprehensive energy specification reference manual that provides criteria for design professionals, contractors, building operators, and owners on the energy components of high performance buildings. It is a comprehensive specification manual on best practices for energy efficiency in design, technologies and practices for commercial buildings that significantly exceed national codes and standards. E-Benchmark was published in October 2003, and was developed by the New Buildings Institute and a national criteria review committee.
3. **ENERGY STAR** is a voluntary program focused on helping businesses reduce the pollution associated with building construction and operation that causes global warming while enhancing their financial value. The ENERGY STAR Program provides energy management, analysis and benchmarking tools to assess energy improvement potential. ENERGY STAR was developed by the Environmental Protection Agency (EPA).

² Performance - as the integration of building systems, thermal, mechanical and lighting to optimize the combined function.

³ Building that produces minimal environmental impact both within the interior and the exterior building spaces.

4. **The Collaborative for High Performance Schools (CHPS)** created a combination of resources aimed to increase the performance of California schools. The resources cover a full range of activities that influence school performance, including energy, indoor air quality, daylighting, acoustics and waste reduction. The CHPS Best Practices Manual provides a set of technical design guidelines, a point rating system for defining performance, and a decision maker guide. CHPS was formed in 2000 and is a non-profit public corporation in California.

The comparison information is presented in four sections:

- Comparison Summary
- Comparison table of the key characteristics
- Details per Guideline
- Appendix of specific requirements, criteria and/or recommendations

Comparison Summary

Design Focus: The four guidelines can be divided into two main areas of focus:

1. **Green Building / Sustainable Guidelines:** Both LEED and CHPS are green building focused and cover many areas that influence the design, construction and operation of a sustainable building. They are comprehensive in nature and are intended to improve the overall resource efficiency of the design and construction of buildings. Energy efficiency is one of several components necessary to accomplish compliance with the guideline.
2. **Energy and Indoor Environmental Quality Guidelines:** Both E-Benchmark and ENERGY STAR focus on the energy and indoor environmental quality (IEQ)⁴ components of a building. They are supported by organizations that have a specific agenda and funding objectives to improve these two areas of building performance. They can serve as stand alone guidelines or be used as a complement with green building programs or guides.

Building Types: All of the guidelines target new construction and major renovation for the commercial sector with CHPS being specific to only the schools sector. ENERGY STAR has both a new construction analysis tool (Target Finder) and an existing building benchmark tool (Portfolio Manager).

Building Size: There are no size restrictions for LEED, E-Benchmark or CHPS. ENERGY STAR requires that buildings be a minimum of 5000 square feet (sf), with convenience stores being eligible at 1000 sf, and hospitals at least 10,000 sf.

⁴ IEQ associated with, or impacted by, the building design or energy technologies such as the supply of outdoor air to the building by the mechanical (HVAC) system. This does not include indoor material selection.

Adoption Methods: LEED’s and ENERGY STAR’s primary market adoption method is directly with the building design, construction and management industry, although both work with all market methods. E-Benchmark is supported by and works through utilities, governments, public benefits agencies, and market transformation organization as “carriers” of the guideline into their area, programs and standards. CHPS’s target market consists of many entities involved in school design and construction including states, school districts, utilities and design firms.

Energy: LEED does not require improved energy performance over code (a rating can be met through other accomplishments although improved energy efficiency is normal for the higher ratings). ENERGY STAR does not compare to code but rather to the performance of other similar buildings. CHPS requires 10% beyond local code. E-Benchmark criteria are a minimum of 20-30% beyond national standards.

Compliance: LEED is based on the acquisition of points in five resource areas and compliance is the accomplishment of points at one of four levels – certified, silver, gold or platinum. LEED is a rating system and does not provide specific specifications needed to meet the target points. E-Benchmark has two methods of compliance – prescriptive and simulation. The prescriptive approach provides specific criteria to accomplish design and construction significantly beyond code. The simulation approach allows custom assessment of intended performance and accomplishment of the criteria. A combination of criteria is required for all buildings to be deemed “high performance,” and additional credits for performance are at the discretion of the adopting agency or program. ENERGY STAR and CHPS compliance are based on a pass/fail system of meeting the level of achievement defined within their guide or program.

The following table provides an overview of these key characteristics per guideline.

Comparison Table of Key Characteristics

REFERENCE	LEED	E-BENCHMARK	ENERGY STAR	CHPS.
Owner	US Green Building Council, Inc.	New Buildings Institute, Inc.	U.S. E.P.A.	CHPS, Inc
Focus	“Green” Multiple Resources Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials and Resources and Indoor Environment.	Energy Efficiency and Indoor Environmental Quality	Energy Efficiency and Indoor Environmental Quality	“Green” Multiple Resources: Daylighting, Energy Efficiency, Indoor Air Quality, Maintenance, Commissioning and Training, Acoustics, Sustainable Materials, Waste Reduction.
Building Types	New construction and major renovations. All commercial buildings as defined by standard building codes. Future release to include residential and multiple buildings.	New construction and major renovations. All commercial buildings except only partial compatibility with grocery stores, hospitals, laboratory and research, restaurants	New construction and major renovations. All commercial buildings.	New construction and major renovations. Public Schools K-12
Building Size	No size restrictions	No size restrictions	Min. 5,000 sf for most building types, 10,000 sf for hospitals, 1,000 sf for convenience stores	No size restrictions
Adoption Methods	Directly by owners, developers, A & E firms and construction firms	Market transformation organizations, government agencies, utilities	Directly by owners, developers, A & E firms and construction firms	CA Division of the State Architect

REFERENCE	LEED	E-BENCHMARK	ENERGY STAR	CHPS.
Energy Component Comparison				
Climate Zone	Entire US.	Entire US. New US DOE 15 climate zone system for entire US	Entire US	16 CA Climate Zones
Energy Code Basis	ASHRAE/IESNA Standard 90.1-1999	ASHRAE 90.1-2001	Not Applicable	CA Title 24-2001
Performance Beyond Code	Not required. From none to 50%	Average 20-30%	Not specified but must perform in top 25% of it's class	Minimum 10%
Other Codes		ASHRAE Standard 62-2001	ASHRAE Standard 55-1992 (thermal comfort), and IESNA Lighting Handbook 9 th Edition (lighting quality).	
Compliance	Four levels of compliance: Certified, Silver, Gold, Platinum	Two levels of compliance: Prescriptive, Simulation	Single pass/fail system	Single pass/fail system

TASK 2: Analysis Of the Advantages and Disadvantages of the Four Guidelines in Maine.

In the development of a summary of significant advantages and disadvantages for each of the guidelines as it would operate in the geographic and climate of Maine, a list of relevant criteria was developed and includes:

- a. Does the guideline allow for Maine's Climate and Heating Requirements?
- b. Does it level the playing field to allow for incorporation of higher energy efficiency measures in construction?
- c. Does it promote equity in energy efficient construction?
- d. Does it reduce the need for public investment in efficiency?
- e. Does it allow for the enforcement or compliance verification to its requirements?

A more detailed description of the above criteria follows:

- ***Does the Guideline Allow for Maine's Climate and Heating Requirements?***
The Guideline should cover items such as the design and construction of the building envelope for adequate thermal resistance and low air leakage along with the design, selection and installation of mechanical, electrical and water heating equipment for appropriate energy efficiency.
- ***Does the Guideline Level the Playing Field?***
Architects and engineers often report that they would prefer to incorporate high efficiency measures into their initial designs, but in a cost-competitive commercial marketplace, owners will pencil out any options that exceed code to reduce first costs in construction. Likewise, in a competitive bid situation, designers are reluctant to add measures that may save energy but have a higher first cost for fear of losing the bid. When high efficiency measures are required by code, these pressures are diminished. Would the adoption of the guideline have a similar result?
- ***Does the Guideline Promote Equity?***
The largest, most aware, or most progressive "high end" builders and developers tend to specify and build energy-efficient buildings. Projects intended as rental property and property built on speculation tend to be built to code minimums because the developer will never bear the operating costs of his or her design decisions. If higher standards are required by law, then the whole market must comply.

- ***Does the Guideline Reduce the Need for Public Investment in Efficiency?***
Efficiency Maine is providing incentives to induce design and construction of high performance buildings. A progressive code provides a baseline against which to establish standard practice and measure incentives. Also, when the program succeeds in changing standard practice, the code can be amended and elevated to reflect this fact. If these now-higher common building practices are required by law or regulation, Efficiency Maine can end or redirect their financial subsidy.

- ***Does the Guideline allow for Enforcement or Compliance Verification?***
Two core problems exist with enforcement of a nonresidential energy code in every state. First, by its very nature such a code is both complex and different in kind than codes that deal with familiar features of a building (structure, plumbing, wiring, etc.). Second, it is not always considered central to the life and health safety issues that all code enforcement officials will say are the central focus of their jobs. In rural states with part time or non-existent local code officials, and often no local building codes at all, the problem is particularly acute. In Maine, there is the additional complexity of the constitutional prohibition against “unfunded mandates” from the state level down to municipalities. While residential codes are less complex, the latter problem is as relevant to their effectiveness as to commercial code enforcement.

Advantage/Disadvantage Analysis Table of Key Characteristics

REFERENCE	LEED	E-BENCHMARK	ENERGY STAR	CHPS.
Owner	US Green Building Council, Inc.	New Buildings Institute, Inc.	U.S. E.P.A.	CHPS, Inc
Focus Identification:	“Green” Multiple Resources Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials and Resources and Indoor Environment.	Energy Efficiency and Indoor Environmental Quality	Energy Efficiency and Indoor Environmental Quality	“Green” Multiple Resources: Daylighting, Energy Efficiency, Indoor Air Quality, Maintenance, Commissioning and Training, Acoustics, Sustainable Materials, Waste Reduction.
Comments on Focus	With Green Building focus LEED addresses issues beyond energy conservation of a structure.	Focus is in line with energy conservation of a structure.	Focus is in line with energy conservation of a structure.	With a Green Building Focus CHPS addresses issues beyond energy conservation of a structure.
<i>Does the Guideline Allow for Maine’s Climate and Heating Requirements?</i>				
Climate Zone	Entire US.	Entire US. New US DOE 15 climate zone system for entire US	Entire US	16 CA Climate Zones
Comments		Uses latest US DOE climate zone system		Limited to CA Climate Zones Would require adjustment for Maine’s Climate Zones.

REFERENCE	LEED	E-BENCHMARK	ENERGY STAR	CHPS.
Energy Component Advantage/Disadvantage				
<i>Does the Guideline Level the Playing Field?</i>	<p>Whether mandatory or voluntary: does not level energy efficiency playing field; designers retain significant flexibility in energy measures (including none above code) they must implement.</p> <p>Gives designers a marketing tool to promote efficient buildings.</p>	<p>If mandatory: Creates level energy efficiency playing field based on a percentage better than ASHRAE 90.1.</p> <p>If voluntary: does not level playing field. However, gives designers a marketing tool to promote efficient buildings.</p>	<p>If mandatory: Creates level energy efficiency playing field by evaluating all buildings' performance based on other buildings within its classification.</p> <p>If voluntary: does not level playing field. However, gives designers a marketing tool to promote efficient buildings.</p>	<p>If mandatory: This guideline would have to be modified to reference to a statewide building code including Maine's current ASHRAE Standard 90.1 in order to level the energy efficiency playing field.</p> <p>If voluntary: does not level energy efficiency playing field. Gives designers a marketing tool to promote efficient buildings.</p>
<i>Does the Guideline Promote Equity?</i>	Same comments as in previous row.	<p>Would provide an energy efficiency baseline that would promote equity.</p> <p>Same comments as in previous row.</p>	Same comments as in previous row.	Same comments as in previous row.
<i>Does the Guideline Reduce the Need for Public Investment in Efficiency?</i>	Difficult to establish since increased energy efficiency is not always required to qualify for Certification.	Would allow for reduction in need because buildings would be constructed based on an average 20-30% beyond ASHRAE 90.2001	If the average increase of energy efficiency within a building classification increases, would allow for a reduction in need.	If guideline is adjusted to Maine's geographic area requirements would show a reduction in need.

REFERENCE	LEED	E-BENCHMARK	ENERGY STAR	CHPS.
Energy Component Advantage/Disadvantage				
Does the Guideline allow for Enforcement or Compliance Verification? (following items)				
Adoption Methods	Directly by owners, developers, A & E firms and construction firms	Market transformation organizations, government agencies, utilities	Directly by owners, developers, A & E firms and construction firms	CA Division of the State Architect
Energy Code Basis	ASHRAE/IESNA Standard 90.1-1999	ASHRAE 90.1-2001	Not Applicable	CA Title 24-2001
Comments	Based on less than ME adopted ASHRAE 90.1-2001	Meets Maine's current adopted ASHRAE 90.1 Standard		Based on CA Building Code
Performance Beyond Code	Not required. From none to 50%	Average 20-30%	Not specified but must perform in top 25% of it's class	Minimum 10%
Guideline Compliance	Four levels of compliance: Certified, Silver, Gold, Platinum	Two levels of compliance: Prescriptive, Simulation	Single pass/fail system	Single pass/fail system
Maine Enforcement and Compliance Verification	Certification through the LEED organization for a fee.	Would require establishment of a state review and inspection procedure.	Would require establishment of an enforceable base standard due to the comparison nature of the guideline. Would require establishment of a state review and inspection procedure.	Would require establishment of a review and inspection procedure.
Other Codes		ASHRAE Standard 62-2001	ASHRAE Standard 55-1992 (thermal comfort), and IESNA Lighting Handbook 9 th Edition (lighting quality).	

Task 3. Advanced Building Approaches by State

This report presents research performed on the approaches and guidelines used by states to encourage advanced performance buildings. Many other entities are involved in influencing the improvement of energy and resource efficiency in buildings such as utilities, non-profits, environmental organizations, public benefit organizations, trade associations, and the building industry itself. In general, these other entities, particularly utility companies, have been the primary promoters and implementers of energy efficiency technologies and practices.

States have historically focused on codes and standards to bring building efficiency and performance up to a baseline of standard practice. Public Utility Commissions at the state level have likewise influenced building performance through their regulatory oversight of utility tariffs and program offerings. Now many states are taking on the efficiency and resource use of buildings as a policy or legislative agenda and leading by example through more aggressive requirements for state and public buildings.

Energy savings of 30% or more over standard practice or code in most states can be gained in new construction. For public buildings, advanced requirements and the resulting savings reflect political attention to the cost and operations of taxpayer-funded facilities as well as attention to occupant and environmental impacts of buildings. Capital investments to achieve these savings are increasingly being demonstrated as minimal or none with the return on investment easily competitive with other financial options. Public awareness of energy and environmental impacts of buildings has grown significantly and the rate of private sector attention to these areas is also increasing.

State Survey: In reviewing the practices of states throughout the U.S., there are many variations and subtleties in the approach and language used to advance building performance. There are many references, promotions, or requirements to “analyze, consider or develop a plan for” advanced efficiency and/or sustainable “green” practices, but there are only a few examples of a legal requirement to build to those standards. The reasons for this are most likely to a) reduce opposition to the requirement from state and public entities responsible for the design and construction by allowing them the final evaluation, and b) ensure that the economic and environmental benefits are considered with the assumption that the analysis results will be educational and sufficiently compelling.

The absence of a construction requirement in a majority of the approaches is problematic to energy and resource efficiency advocates trying to move the market beyond code to practices and technologies that are readily available, well understood, and already being adopted by advanced architects and designers. By adopting real legislative requirements for advanced performance of state and public buildings, the state helps to increase this market group and dramatically advance standard practice for new construction while reducing its own cost of facility operations.

Sources: Methods of research included review of materials, Web sites, staff discussions, and phone and email inquiries with the following organizations: American Council for an Energy Efficient Economy (ACEEE), the National Conference of State Legislators, Consortium for Energy Efficiency (CEE), National Association of State Energy Officials (NASEO), U.S. Green Buildings Council (USGBC), State Energy Offices, and State General Administration Agencies. The *“Energy Efficiency’s Next Generation: Innovation at the State Level”* (Prindle et. al. ACEEE November 2003) was particularly helpful. The information presented does not include system benefit funding and mechanisms associated with those funds.

The following table is based on the research and surveys and is not a complete representation of all state activity or approaches.

Note: “ENERGY STAR” was frequently noted at the state level in reference to appliance label recommendations or purchasing specifications. When included in the following table it refers specifically to the ENERGY STAR commercial building sector tools.

State	Approach	Mandatory	Market	Reference	Status/Notes
AL	Promote			ENERGY STAR for Equipment	
AZ	Legislation (2003)	X	New & existing State Agencies and Universities	National model codes ENERGY STAR Equip.	State energy office to set standards for new state bldgs. based on national model codes. Agencies to reduce energy use in existing bldgs. by 10% by 2008, 15% by 2011 in existing buildings.
CA	Recommend		Schools	CHPS	State support for CHPS, per district decision regarding adoption
	Recommend		Public Buildings	Custom guide based on LEED, but more aggressive in energy requirements	The state formed the CA Green Building Group which developed a “CA LEED” guideline customized for higher efficiency at 10-15% better than state energy code. Group is trying to get it “Institutionalized”.
CO	Promote		Schools	EnergySmart Schools	
	Promote		Commercial Bldgs.	Rebuild Colorado, ENERGY STAR for Equip.	Help building owners identify energy-saving opportunities. Key focus on energy performance contracting.
DC	Recommend		Public Buildings	ENERGY STAR for Equip.	Percentage of purchase of new equipment be ENERGY STAR. Also encourage reduced energy usage by 1% per year.
HI	Promote		Schools	CHPS	Working to incorporate energy as a state education spec based on CHPS
	Legislation	X	Agencies, counties and University	ENERGY STAR Equipment	Requires agencies to “evaluate and identify” EE retrofits and to implement with Performance Contracting. Sets goals for EE improvements, equipment and promotes methods.
ID	Promote		Schools	CHPS	Working with NEEA to educate architects and school administrators to design and build high-performance schools based on CHPS. May develop custom CHPS like WA.
IL	Promote			ENERGY STAR Equip.	

State	Approach	Mandatory	Market	Reference	Status/Notes
	Pilot		Public Buildings	LEED	Hopes to do a 2004 pilot applying LEED to 4-6 projects and document costs and savings. Has performed extensive audits of state facilities and implemented performance contracts in the 1990s.
IN	Promote		Public Buildings	LEED	Promoting through workshops and other events
IO	Promote			LEED	Iowa Dept. of Natural Resources is the lead agency supporting the <i>Iowa Sustainable Design Initiative</i> , with references to LEED.
	Loans		Public & Non-profits		Leader in state financing for energy efficiency since the 1980s.
KY	Promote			ENERGY STAR for Equipment	
LA	Promote			ENERGY STAR for Equipment	
MD	Tax Credit - Green Building		Commercial Bldgs.	LEED	Provides a financial incentive for commercial developers to construct or retrofit commercial buildings to make them resource and energy efficient.
	Exec. Order (2001)	X	State Bldgs.	Considering LEED	"Sustaining Maryland's Future..." Exec. Order created a commission to set criteria for constructing "Clean, Green & EE" buildings. State bldgs to reduce energy by 10% by 2005 % 15% by 2010. Maryland Green Bldgs. Council to guide the design, construction and operations of state facilities.
	Loans (1991)		State agencies		1) State Agency Loan Program (SALP) For cost effective EE improvements in state facilities, 2) Community Energy Loan Program (CELP) for local gov't and non-profits for EE.
MA	Promote		Public Bldgs.	State Developed based on LEED.	Div. of Capital Asset Mgmt. (DCAM) developed the "Sustainable Design Principles" and guidelines for sustainable design for public bldgs. Project teams look at LCA, guidelines, specs and technologies to improve EE and reduce environmental impacts. When CE – measures are incorporated.

State	Approach	Mandatory	Market	Reference	Status/Notes
	Grants		Schools		Grants to public schools for EE through the Div. of Energy Resources.
	Promote		Schools	CHPS	Customized state guideline created and promoted to schools for adoption
MN	Legislation (2001)	X		State Developed “Minnesota Sustainable Design Guide”	As part of the Buildings, Benchmarks, and Beyond (B3) Initiative the legislation requires for new bldgs. whole building efficiency 30% better than state code and LCA with an extended payback (15 years). A goal of 30% reduction of energy use in existing public bldgs was also established. Effective 1/2004
	Loans (1983)		Cities and Schools		For capital costs of EE.
MO	Promote			ENERGY STAR and LEED	DNR bldg. currently under construction is LEED
MT	Promote			ENERGY STAR	
NV	Legislation (2003)		State agencies & local governments		Allows performance contracting for EE measures.
	Pursuing			ENERGY STAR, LEED, CHPS	
NH	Education				Workshops to increase energy conservation
NJ	Promote		All	SmartStart Buildings Program partly based on CHPS & LEED	The state of NJ is working to increase EE and encourages commercial, industrial and schools to work with the SmartStart program.
NM	Pursuing			LEED, ENERGY STAR, others	Anticipate executive order by next legislative session
NY	Executive Order	X	Public Bldgs.	LEED	Meet equivalent to 26 LEED points and exceed energy code by 20%.
	Financing		State Bldgs.		The NYSERDA EnVest Pgm. is a joint partnership with state and private contractors for EE investments financed as a performance contract.

State	Approach	Mandatory	Market	Reference	Status/Notes
NC	Promote		Schools, Public Buildings	State High Performance Building Guidelines, ENERGY STAR	Targets policy makers, designers and other professionals, who design, build and manage public schools, state and local government buildings, and facilities at universities and community colleges.
OH	Promote			ENERGY STAR Equipment	Referenced on web site
	Promote		Schools	CHPS	
OK	Promote			ENERGY STAR Equipment	State contracts with an outside organization promoting ENERGY STAR
OR	Legislation (2001) Executive Order (2003)		Commercial Bldgs, Public agencies and bldgs.		“Sustainability Act” & the Governor’s “Sustainability Order” Establish statewide support and promotion of sustainable practices. Directs agencies to have Sustainability Plans.
	Tax Credits		Commercial Bldgs.	Sustainable Tax Credit - LEED	Business Energy Tax Credit (BETC) for equipment is 35% of EE measures, 10% reduction over code for new construction. Sustainable Tax credit for achievement of EE and green targets - \$ per sq. ft. based on LEED ratings.
	Statute (1991 & 1998)	X	State buildings	State Energy Efficient Design (SEED) guidelines	The Facility Energy Standards were modified to the SEED Guidelines requiring inclusion of all cost-effective efficiency measures in state buildings and emphasize successful implementation of conservation measures.
	Loans (1980)		Commercial Bldgs.		Funding for EE. Self supporting loan. Majority of funds to date have gone to public bldgs.
PA	Exec. Order (1998)		Commercial Bldgs.	LEED	Created the Governor’s Green Government Council (GGGC). Provides leadership example, encourages high-performance buildings, wide range of promotion and education, leaning heavily on LEED.
		X	State Bldgs.	LEED & Model Green Office Leasing Specs	Requires LEED silver rating and other performance standards for facilities.
RI	Promote			ENERGY STAR Equipment	

State	Approach	Mandatory	Market	Reference	Status/Notes
SC	Promote			LEED	
TX	Promote		Public Buildings, Schools,	Sustainable Building Design initiative	Provides technical support and incentives to maximize sustainable, efficient and economic use of natural resources, including renewable technologies, in public facilities.
	Loans (1993)		State & Local facilities, schools		LoanSTAR program for EE retrofits.
UT	Internal standard	X	State buildings		For state-owned facilities, the Utah Building Board adopted EE requirements of 25% beyond code and promotes a more integrated design process with little or no increase in construction costs.
WA	Legislation	X	State & Public Bldgs.	Energy Life Cycle Cost Analysis + LEED analysis for new public buildings	LEED mandatory in GA Bldgs only, consideration required in other public buildings.
	Promote		Schools	WA CHPS	Created a custom state guide based on CHPS and the state provides funding for analysis and encourages districts to apply the guide to all new construction.
WI	Legislation (2003)	X	State Bldgs.	Daylighting Design Guidelines	Sets forth minimum daylighting requirements

EE = Energy Efficiency
 Bldgs - Buildings
 LCA = Life cycle analysis
 CE = cost effective

STATES WITH MANDATES:

State	Approach	Mandatory	Market	Reference	Status/Notes
AZ	Legislation (2003)	X	New & existing State Agencies and Universities	National model codes ENERGY STAR Equip.	State energy office to set standards for new state bldgs. based on national model codes. Agencies to reduce energy use in existing bldgs. by 10% by 2008, 15% by 2011 in existing buildings.
HI	Legislation	X	Agencies, counties and University	ENERGY STAR Equip.	Requires agencies to “evaluate and identify” EE retrofits and to implement with Performance Contracting. Sets goals for EE improvements, equipment and promotes methods.
MD	Exec. Order (2001)	X	State Bldgs.	Considering LEED	“Sustaining Maryland’s Future...” Created a commission to set criteria for constructing “Clean, Green & EE” buildings. State bldgs to reduce energy by 10% by 2005 % 15% by 2010. Maryland Green Bldgs. Council to guide the design, construction and operations of state facilities.
MN	Legislation (2001)	X		State Developed “Minnesota Sustainable Design Guide”	As part of the Buildings, Benchmarks, and Beyond (B3) Initiative the legislation requires for new bldgs. whole building efficiency 30% better than state code and LCA with an extended payback (15 years). A goal of 30% reduction of energy use in existing public bldgs was also established. Effective 1/2004
NY	Executive Order	X	Public Bldgs.	LEED	Meet equivalent to 26 LEED points and exceed energy code by 20%.
OR	Statute (1991 & 1998)	X	State buildings	State Energy Efficient Design (SEED) guidelines	The Facility Energy Standards were modified to the SEED Guidelines requiring inclusion of all cost-effective efficiency measures in state buildings and emphasize successful implementation of conservation measures.
PA	Exec. Order (1998)	X	State Bldgs.	LEED & Model Green Office Leasing Specs	Requires LEED silver rating and other performance standards for facilities.
UT	Internal standard	X	State buildings		For state-owned facilities, the Utah Building Board adopted EE requirements of 25% beyond code and promotes a more integrated design process with little or no increase in construction costs.
WA	Legislation	X	State & Public Bldgs.	Energy Life Cycle Cost Analysis + LEED analysis for new public buildings	LEED mandatory in GA Bldgs only, consideration required in other public buildings.
WI	Legislation (2003)	X	State Bldgs.	Daylighting Design Guidelines	Sets forth minimum daylighting requirements

Summary of States with Approaches for Improving Building Performance

Alabama

Current Commercial Energy Code: ASHRAE/IESNA 90.1-1989 for state-owned or –funded buildings only. *The state is looking at adopting the ASHRAE/IESNA 90.1-1999 code but will probably wait until sometime next year.*

Advanced Efficiency Approach: No specific advanced guidelines over the commercial code, but does promote ENERGY STAR building requirements. ENERGY STAR is a fairly new program for the state and it is so far just working to promote it in the residential area.

Arizona

Current Commercial Energy Code: ASHRAE/IESNA 90.1-1999 mandatory for state-owned and state-funded buildings only.

Advanced Efficiency Approach: Legislation passed in 2003 (HB 2324) requires the state energy office to develop new EE standards based on national model codes for all newly constructed state buildings. Existing state-owned facilities must achieve energy efficiency targets of 10% reduction in energy use by 2008 and 15% reduction by 2011. It is expected that these reductions will be partly achieved by performance contracting. The bill also requires state institutions to purchase energy efficient equipment using standards set by the ENERGY STAR program and FEMP.

California

Current Commercial Energy Code: State developed code, Title 24, Part 6, exceeds ASHRAE/IESNA 90.1-1999 by at least 10%, mandatory statewide.

Advanced Efficiency Approach: Statewide Collaborative for High Performance Schools promotes their guideline (CHPS) throughout the state to school districts. Not required. State has a “CA Green Building Technical Group” that is attempting to institutionalize Green building practices. CA did one state building (East End Project) based on criteria developed by the CA Green Building Group (not based on LEED). LEED was used after construction as a barometer on how the building aligned with the LEED rating system. There is some momentum at the state to have LEED become the standard for public buildings but this is strongly opposed by the Energy Commission since LEED does not require any advanced energy efficiency beyond code. The CA Green Building Group also developed a “CA LEED” guideline, which is customized for higher requirements at 10-15% better than energy code and it is available to state agencies and the private sector, but not required.

District of Columbia

Current Commercial Energy Code: ASHRAE/IESNA 90.1-1989, mandatory district-wide.

Advanced Efficiency Approach: Recommend ENERGY STAR for public buildings. Recommend percentage of purchase of new equipment be ENERGY STAR related. Also encourage reduced energy usage by 1% per year.

Hawaii

Current Commercial Energy Code: ASHRAE/IESNA 90.1-1989 with modifications; adopted by all counties except on Maui. Honolulu County MEC revised in 11 areas, including adoption of ASHRAE 90.1-1999 efficiency levels of HVAC equipment. Kauai County will consider updating commercial codes to AHREA/IESNA 90.1-1999. Honolulu County is reviewing ASHRAE 90.1-2001 to update its code by the end of 2003.

Advanced Efficiency Approach: Revised Statute 196 sets broad guidelines for EE in state facilities. It sets goals for EE improvements and promotes performance contracting, the use of ESCOs, and purchasing of EE products based on ENERGY STAR standards. The legislation directs agencies to “evaluate and identify” EE retrofits for performance contracts. The state is also interested in working to incorporate energy as a state education spec based on CHPS.

Idaho

Current Commercial Energy Code: 2000 IECC is mandatory statewide effective January 1, 2003.

Advanced Efficiency Approach: Working with NEEA to educate architects and school administrators to design and build high-performance schools based on CHPS.

Illinois

Current Commercial Energy Code: State-owned buildings and city-owned buildings in Chicago must comply with ASHRAE/IESNA 90.1-1989.

Advanced Efficiency Approach: Promotes ENERGY STAR on a voluntary basis but offers no incentive program. The State Facility Program, started in 1982, has performed detailed studies of EE, operation, and maintenance opportunities and documented baseline energy use in state facilities. The Capital Development Board (CBD) hopes to do a pilot program in FY 2004 based on LEED for four to six major state projects, with a parallel effort to document costs and savings. Illinois has previous experience with performance contracting for retrofits in the 1990s.

Indiana

Current Commercial Energy Code: State-developed code that does not meet ASHRAE/IESNA 90.1-1989, mandatory statewide. *State is considering adopting a new code based on the 2000 IECC.*

Advanced Efficiency Approach: Member of Green Building Council and promotes LEED in state buildings. Indiana will be promoting LEED through workshops and events in the future.

Iowa

Current Commercial Energy Code: ASHRAE/IESNA 90.1-1989, mandatory statewide; jurisdictions can adopt a more stringent code.

Advanced Efficiency Approach: No required or recommended mechanisms or financial incentives, but builders and designers are encouraged to build beyond code requirements to maximize energy efficiency. Iowa Dept. of Natural Resources is the lead agency supporting the *Iowa Sustainable Design Initiative*, with references to LEED. Iowa has been a leader in state financing approaches for public facilities since the 1980s via legislation establishing two financing options for public and state energy improvements: 1) The Iowa Energy Bank – uses energy savings to repay financing for EE in schools, hospitals, universities, non-profits and local governments, and 2) The State Facilities Program (connected to the State of Iowa Facilities Improvement Corp.) is a non-profit corporation that helps state agencies implement EE improvements through funding from energy conservation revenue bonds.

Louisiana

Current Commercial Energy Code: ASHRAE/IESNA 90.1-1989, mandatory statewide. *IBC 2000 effective January 1, 2004.*

Advanced Efficiency Approach: Encourages building energy efficiency, probably with ENERGY STAR more often than with anything else. No financial incentives.

Maryland

Current Commercial Energy Code: ASHRAE/IESNA 90.1-1989, mandatory statewide; can use COM *check* -EZ to show compliance.

Advanced Efficiency Approach: In November 2003 Maryland approved a tax credit for the construction of green building and references the LEED rating system for compliance. The credit is worth up to 8% of the total cost of the building. It provides a financial incentive for commercial developers to construct or retrofit commercial buildings to make them resource and energy efficient. Executive Order (01.01.2001.02) titled “Sustaining Maryland’s Future with Clean Power, Green Buildings and Energy Efficiency” The Executive Order created a commission to make recommendations and set criteria for constructing and maintaining energy efficient and environmentally responsible state facilities, setting goals for the purchase on green power, and outlining a comprehensive energy conservation strategy. The goal is for state facilities to reduce energy use by 10% by 2005 % and by 15% by 2010. The “High Efficiency Green Buildings Program” established the Maryland Green Buildings Council to guide the design, construction, operations and maintenance of all new of state-built facilities, as well as the renovations of existing state-owned and leased buildings. Maryland also promotes performance contracting to help facilities implement energy efficiency and has the following loan options: 1) State Agency Loan Program (SALP) for cost effective EE improvements in state facilities, and 2) the Community Energy Loan Program (CELP) for local government and non-profits for EE.

Massachusetts

Current Commercial Energy Code: MA State Building Code, based on ASHRAE/IESNA 90.1-1999, 2000 IECC, and additional state-developed amendments, mandatory statewide.

Advanced Efficiency Approach: The Division of Capital Asset Management (DCAM) developed guidelines for incorporating sustainable design into public building construction and major renovations. Project teams look at LCA, guidelines, specifications on materials, and technologies to improve EE and reduce environmental impacts. When cost effective, measures are incorporated. The state as an Energy Conservation Improvement Program that provides grants to public schools for capital improvements the reduce energy conservation. Massachusetts has also created a customized CHPS guideline for voluntary adoption by schools.

Minnesota

Current Commercial Energy Code: MN State Energy Code, exceeds ASHRAE/IESNA 90.1-1989, mandatory statewide.

Advanced Efficiency Approach: As part of the Buildings, Benchmarks, and Beyond (B3) Initiative Minnesota passed legislation requiring state funded buildings to utilize green building guidelines. The “Minnesota Sustainable Design Guide” was developed by the University of Minnesota on behalf of the state. For energy, these guidelines require whole building efficiency of 30% better than code and the achievement of the lowest possible lifetime cost for new buildings. The requirement is effective January 2004. For existing buildings, the legislation established a goal of 30% reduction in energy consumption in public buildings. The state Department of Administration and the Department of Commerce initiated the Conservation Benchmarking Initiative to facilitate the assessment of EE opportunities in the nearly 10,000

public buildings in the state. Near term focus in on collecting baseline information on targeted building types in order to identify poorly performing buildings.

Missouri

Current Commercial Energy Code: None statewide. State-owned buildings must comply with ASHRAE/IESNA 90.1-1989.

Advanced Efficiency Approach: On a voluntary basis they advocate for ENERGY STAR and LEED. The new Department of Natural Resources building currently under construction is a LEED building.

Montana

Current Commercial Energy Code: ASHRAE/IESNA 90.1-1989, mandatory statewide.

Advanced Efficiency Approach: Promotes ENERGY STAR

Nevada

Current Commercial Energy Code: 1986 MEC with state amendments; state-owned facilities must comply with the most current version of ASHRAE Standard 90.1.

Advanced Efficiency Approach: Assembly Bill 398 was signed June 2003 and allows state agencies and local governments to enter into performance contracts for EE for a term up to 15 years. For new construction no advanced guidelines are referenced. The energy office is interested in LEED, ENERGY STAR and CHPS.

New Hampshire

Current Commercial Energy Code: ASHRAE/IESNA 90.1-1999, mandatory statewide.

Advanced Efficiency Approach: Encourages, but does not require, measures over and above code. No financial incentives. Office of State Planning & Energy Programs supports a series of workshops to training building industry professionals in order to increase energy code compliance and energy conservation.

New Jersey

Current Commercial Energy Code: ASHRAE/IESNA 90.1-1999, mandatory statewide.

Advanced Efficiency Approach: The state of NJ is working to increase EE and encourages commercial, industrial and schools to work with the SmartStart program through their “Clean Energy Program”. CHPS and LEED have both been reviewed as a part of the program development and LEED and ENERGY STAR products is promoted.

New Mexico

Current Commercial Energy Code: ASHRAE 90A-1980 and 90B-1975, mandatory statewide; ASHRAE/IESNA 90.1-1989 mandatory for state-funded buildings.

Advanced Efficiency Approach: The State energy department is working with the general services department to establish through executive order programs that promote most energy efficient technologies. They haven't determined specifically how to go about it, but are considering LEED, ENERGY STAR and others. They hope to have an executive order on this matter prior to the next legislative session.

New York

Current Commercial Code: State-developed code based on the 2000 IECC w/2001 supplements, including ASHRAE/IESNA 90.1-1999, mandatory statewide.

Advanced Efficiency Approach: Executive Order # 111 (mandatory) references LEED. Public buildings must meet an equivalent of 26 LEED points and exceed energy code by 20% and specified sections of the NY State Green Building Tax credit. Also requires a 35% reduction in 1999 energy levels by 2010 in all public buildings in btu/sf. Purchasing requirements referenced ENERGY STAR and FEMP. The NYSERDA EnVest Program provides a no-cost mechanism to promote EE in state-owned buildings. It is a joint partnership with state and private contractors that provides capital for EE investments financed as a performance contract.

North Carolina

Current Commercial Code: State-developed code modeled on the 2000 IECC with NC amendments, including ASHRAE/IESNA 90.1-1999, mandatory statewide.

Advanced Efficiency Approach: The “State High Performance Building Guidelines” for schools and public buildings targets policy makers and other decision makers to build more efficient buildings. Promotes ENERGY STAR.

Ohio

Current Commercial Code: ASHRAE/IESNA 90.1-1999, mandatory statewide.

Advanced Efficiency Approach: Promotes ENERGY STAR and CHPS for schools.

Oklahoma

Current Commercial Code: ASHRAE/IESNA 90.1-1989 mandatory for jurisdictions that do not adopt their own code and for state-owned and leased facilities.

Advanced Efficiency Approach: They contract with an organization promoting ENERGY STAR.

Oregon

Current Commercial Code: The Uniform Building Code, a state-developed code, exceeds ASHRAE 90.1-1989, which is mandatory statewide.

Advanced Efficiency Approach: In 2001 a Sustainable Building tax credit was established that provides a \$ per square foot tax credit for construction that meets or exceeds specific rating levels within LEED. Oregon is a leader in LEED buildings registered by the private sector. Oregon has also long had a Business Energy Tax Credit (BETC) for EE equipment in new or existing buildings. In new commercial construction, measures must reduce energy use by at least 10 percent compared to a similar building that meets the minimum requirements of the state energy code. The tax credit is 35 percent of the incremental (or addition) costs of making the project exceed energy code or standard industry practice. Legislation in 2001 created the “Sustainability Act”, and the subsequent Governor’s Executive Order (EO 03-03) in 2003, establish statewide support and promotion of sustainable practices for the economic, environmental and community benefits. State agencies are directed to have plans for improved sustainability. The State Sustainability Board was formed to make recommendations for accomplishing the EO. The Guidelines to Agencies report was prepared by the Sustainability Board in July 2003. The Department of Administrative Services has developed a “Sustainable Facilities Standard and Guideline”. External guidelines are not specifically referenced. State Energy Efficient Design (SEED) guidelines require inclusion of all cost-effective efficiency measures in state buildings.

Pennsylvania

Current Commercial Code: ASHRAE 90A-1980 and 90B-1975, mandatory statewide.

Advanced Efficiency Approach: Executive Order (1998-1) created the Governor's Green Government Council (GGGC) to work across agency jurisdictions to facilitate the incorporation of sustainable practices into the government's planning, operations, and policy making with the goal of zero emissions. The GGGC provides a leadership example, encourages high-performance buildings, and develops a wide range of promotion and education leaning heavily on LEED. The state has eight LEED-certified buildings and nearly 70 registered buildings. The order also creates Office Leasing Specifications that require a facility to receive at least a Silver LEED certification and meet performance standards from the Model Green Office Leasing Specifications.

Rhode Island

Current Commercial Energy Code: 2000 IECC amended to include ASHRAE/IESNA 90.1-1999.

Advanced Efficiency Approach: Promote ENERGY STAR.

South Carolina

Current Commercial Energy Code: ASHRAE/IES 90.1-1989, mandatory statewide. The State Engineer's Office and the SC Department of Education have adopted the ASHRAE 90.1 1999 as the energy code, for state buildings and schools and buildings under their jurisdiction.

Advanced Efficiency Approach: Promote LEED.

Texas

Current Commercial Energy Code: 2000 IECC with 2001 Supplement (ASHRAE/IESNA 90.1-1999); ASHRAE/IESNA 90.1-2001 (by rule) for state agencies and institutions of higher education.

Advanced Efficiency Approach: Adopted the "Sustainable Building Design Initiative" for schools and public buildings. The program provides technical support and incentives to maximize sustainable, efficient and economic use of resources including renewable technologies in public facilities. Not required. The LoanSTAR program has been in place since 1993 providing capital for EE retrofits to state facilities, local governments and schools.

Utah

Current Commercial Energy Code: ASHRAE/IESNA 90.1-1999, mandatory statewide.

Advanced Efficiency Approach: For state-owned facilities, the Utah Building Board has adopted an internal standard of 25 percent better than code and promotes a more integrated design process with little or no increase in construction costs.

Washington

Current Commercial Energy Code: State-developed code that meets or exceeds ASHRAE/IESNA 90.1-1989 for envelope, meets ASHRAE/IESNA 90.1-1999 for equipment, lighting, motors.

Advanced Efficiency Approach: Statute requires energy life cycle cost analysis (ELCCA) for all new buildings and major remodels and analysis (*consideration*) of LEED for all public buildings. Also requires LEED silver or equivalent for General Administration Agency (GA) buildings (which are some of the publicly funded buildings, but not all). WA recently participated in the development of the new "WA-CHPS" and encourages school districts to adopt this guideline for High-Performance Schools for all new construction. Governor Executive Order on Sustainability requires all state agencies to have a "Sustainability Plan".

Wisconsin

Current Commercial Energy Code: 2000 IECC.

Advanced Efficiency Approach: Division of State Facilities has just released its Daylighting Design Guidelines setting forth minimum requirements for incorporation of daylighting into state government facilities. It is anticipated that A&E firms will incorporate these guidelines into building bid proposals for state government facilities.

Notes on States NOT included in the table**Existing Energy Codes but no State Advanced Approaches:**

Arkansas
Florida
Georgia
Michigan
North Dakota
Tennessee
Vermont
West Virginia
Wyoming

Existing Energy Codes but no response regarding State Advanced Approaches:

Connecticut
Delaware
Mississippi
Nebraska
Virginia

No State Energy Codes = no Advanced Approaches:

Alaska
South Dakota

Summary of State Energy Codes - but do not have Advanced Approaches:**Arkansas**

Current Commercial Energy Code: ASHRAE/IESNA 90.1-1989, mandatory statewide.

Florida

Current Commercial Energy Code: State developed code, Chapter 13 of the Florida Building Code, meets or exceeds ASHRAE/IESNA 90.1-1989, mandatory statewide. *Will be moving to ASHRAE 90.1-01 in January 2005.*

Georgia

Current Commercial Energy Code: ASHRAE/IESNA 90.1-2001, mandatory statewide.

Michigan

Current Commercial Energy Code: ASHRAE/IESNA 90.1-1999 mandatory statewide, effective April, 2003.

North Dakota

Current Commercial Code: ASHRAE/IESNA 90.1-1989, voluntary.

Tennessee

Current Commercial Energy Code: ASHRAE 90A-1980 and 90B-1975 statewide, voluntary. *Adoption of a new Energy code expected in 2004.*

West Virginia

Current Commercial Energy Code: 2000 IECC.

Wyoming

Current Commercial Energy Code: 1989 MEC may be adopted and enforced by local jurisdictions.

Summary of State Energy Codes - no information regarding Advanced Approaches:**Connecticut**

Current Commercial Energy Code: ASHRAE/IESNA 90.1-1989, mandatory statewide.

Delaware

Current Commercial Energy Code: ASHRAE/IESNA 90.1-1989, mandatory statewide.

Mississippi

Current Commercial Energy Code: ASHRAE 90-1975, mandatory for state owned buildings, public buildings, and high-rise buildings.

Nebraska

Current Commercial Energy Code: 1983 MEC, mandatory statewide. State-owned and – funded buildings must comply with ASHRAE/IESNA 90.1-1989.

Vermont

Current Commercial Energy Code: *2001 Vermont Guidelines for Energy Efficient Commercial Construction* based on 2000 IECC with amendments to incorporate and exceed ASHRAE/IESNA 90.1-1999, mandatory for state funded new construction, ACT 250 projects and within the City of Burlington.

Virginia

Current Commercial Energy Code: ASHRAE/IESNA 90.1-1989, mandatory statewide.

No State Energy Codes = no Advanced Approaches:**Alaska****South Dakota**