GREENING THE PUBLIC SECTOR, MAXIMIZING ENERGY EFFICIENCY

Regional Policies Mandating High Performance State-Funded Public Buildings and How to Maximize Their Energy Efficiency

Northeast Energy Efficiency Partnerships
October 2012

TABLE OF CONTENTS

LIST OF TABLES

ACKNOWLEDGEMENTS

Northeast Energy Efficiency Partnerships' High Performance Buildings Project provides strategic guidance and technical assistance to states and municipalities seeking to implement cost-effective energy efficiency measures for new and existing buildings in the public sector.

This report was developed in collaboration with NEEP's High Performance Schools and Public Buildings Leadership Groups to identify, assess and make recommendations regarding state or local policies that mandate high performance construction in state and school facilities and to provide a set of recommendations for the Northeast and Mid-Atlantic to consider.

The development of this report was led by Susy Jones, Manager of NEEP's High Performance Schools and Public Buildings project. Thanks to NEEP staff who also contributed to this report: Carolyn Sarno, Jim O'Reilly, Josh Craft, Allison Webster, Natalie Hildt, Don Vigneau, and Alicia Dunn.

NEEP would like to recognize and thank the High Performance Schools and Public Buildings Leadership Groups for their invaluable contributions and participation in the development of this report. Special thanks to:

- Craig Smith of the Connecticut Department of Construction Services
- Karen Verrengia of Cranston Public Schools
- Robert Cerio of Ocean State Energy Resources
- Walter Hoefer of Long Island Power Authority
- Scott Brown of the Maine Department of Education
- Chris Armstrong of RGB / AIAri COTE
- Chris Skoglund of the New Hampshire Department of Environmental Services;
- Ed Murdough of the New Hampshire Department of Education
- Karl Brown of the Massachusetts School Building Authority
- Linda Darveau of US Environmental Protection Agency
- Bruce Bockstael of the Connecticut Department of Construction Services
- Dennis Maloskey and Libby Dodson of the Pennsylvania Department of Environmental Protection
- Mark Stafford of National Grid
- Aimee Powelka of the Massachusetts Department of Energy Resources

ABOUT NEEP

NEEP transforms the way we use and think about energy. We are a non-profit organization that builds partnerships among the efficiency industry, communities, businesses and policymakers in the Northeast and Mid-Atlantic states. Through advocacy, collaboration and education, we accelerate energy efficiency and make visible its impacts on the region, the economy, the planet, and future generations.

Cover Photo Credit - Clockwise from left: New York State Office of Parks, Recreation and Historic Preservation, Ai3 Architects, DiMella Shaffer, Truex Cullins

EXECUTIVE SUMMARY

The majority of Northeast and Mid Atlantic states have policies in place to ensure that publicly funded building projects reduce their energy use, lighten their carbon footprint, and save money by lowering operating costs. At a time when the economic climate has slowed new construction in many states around the region, we have an opportunity to take a step back and reflect on these policies, so that we are better equipped to move forward in the future.

Based on a review of the region's policies mandating the construction of high performance state-funded buildings, this report provides a set of recommendations for Northeast and Mid Atlantic policymakers on how to maximize energy efficiency as part of their comprehensive high performance building policies. These recommendations are as follows:

DEFINING "HIGH PERFORMANCE"

A high performance building is commonly defined as a building that integrates and optimizes, on a life cycle basis, attributes such as: energy conservation, environment, safety, security, durability, accessibility, cost-benefit, productivity, sustainability, functionality, and operational considerations.

The term "high performance" is often used interchangeably with the term "green." While buildings labeled as "green" may have many environmentally sustainable elements, they do not always prioritize energy performance. The term "high performance" implies a high level of energy efficiency.

1. Establish aggressive energy savings goals of at least 20 percent beyond energy code for public buildings
2. Make zero net energy public buildings the long-term goal
3. Implement statewide policies and practices that ensure buildings perform as designed, such as building commissioning and energy tracking and benchmarking
4. Reduce cost barriers associated with high performance buildings and incentivize high performance school construction with additional state aid
5. Promote training of building operators and education for occupants regarding energy use
6. Take steps to clarify the relationship between building energy codes and high performance building guidelines
7. Engage with the development and implementation of green codes

NEEP encourages states to maintain strong partnerships and learn from each other. Sharing knowledge and implementing strong policies based on lessons learned will help push the envelope on energy efficiency and sustainability in our public buildings.

INTRODUCTION

While NEEP applauds the region's status as a leader in high performance—often called "green"—building policies, NEEP also recognizes that not all "green" buildings prioritize energy efficiency. NEEP's work in the area of high performance buildings is focused on helping states lay the groundwork for a future in which all new buildings are constructed to consume no more energy than they can produce, or are "zero net energy" buildings. In order to achieve zero net energy buildings in the future, states must set policies today that require buildings to meet aggressive energy savings targets. The recommendations in this report will help states prioritize energy efficiency as part of their comprehensive high performance building policies.

Since 2001, the majority of Northeast and Mid Atlantic states have established high performance building policies requiring public buildings funded with taxpayer dollars to achieve higher levels of energy effcieincy and environmental sustainability than required under basic building codes. These goals are generally consistent with the EPA's guiding principles for high performance buildings:

- Reduce the total ownership cost of facilities;
- Improve energy efficiency and water conservation;
- Provide safe, healthy, and productive built environments; and,
- Promote sustainable environmental stewardship.

States are also motivated by the opportunity to "lead by example." A strong high performance building policy demonstrates a state's environmental leadership, helping to raise public awareness of the benefits of clean energy technologies, improve energy supply and reliability, and foster markets for energy saving and environmentally preferable products.

Most state governments in the Northeast and Mid Atlantic require the new construction of state-funded public buildings to meet a set of guidelines to achieve energy and environmental goals. However, each state has taken a slightly different approach to meeting these goals, utilizing an array of design tools and requirements.

PROJECT SPOTLIGHT
NORTH SHORE COMMUNITY COLLEGE
HEALTH & STUDENT SERVICES BUILDING
DANVERS, MA

Rendering: DiMella Shaffer

Project Highlights:

- Massachusetts' first state-owned zero net energy public building
- Broke ground in 2009 - completed in 2011
- South-facing horizontal design
- LED lighting and occupancy sensors
- 27 kBtu per square foot per year energy use for the building ("average" building would require approximately 60 to 80 kBtu)
- Onsite clean energy technologies
- Save an estimated $142,000 per year in energy costs

Source: North Shore Community College

OVERVIEW OF STATE POLICIES IN THE NORTHEAST AND MID ATLANTIC STATES

All of the states in the region (excluding Vermont) have mandated the construction of high performance public buildings by enacting policies in the form of executive orders, laws and/or state construction regulations. The policies typically outline which state-funded buildings fall under the mandate according to their size, cost or type. For example, policies will often only apply to large buildings that utilize a significant amount of state funding, i.e. buildings that cost over $2 million and are greater than 25,000 square feet. States often set different policies for their state agencies and public schools, although sometimes the policies apply to both. For school-specific policies, some states actually incentivize the construction of high performance schools with additional state aid, recognizing that the initial incremental cost of green, high performance building practices can be a barrier to implementation.

While the United States Green Building Council's (USGBC) Leadership in Energy Efficiency and Environmental Design (LEED) rating system is often cited in these state policies, other green design and energy performance guidelines are also in legislation, such as the Collaborative for High Performance Schools (CHPS) protocol, Green Globes, state-developed guidelines such as the Connecticut Building Standard Guidelines Compliance Manual for High Performance Buildings and the New Jersey 21st Century Schools Design Manual, as well as the International Green Construction Code (IgCC). To help make sense of the variety of approaches employed by states, Appendix 1 provides a more detailed look at these protocols.

In general, states require newly constructed public buildings to follow a set of design guidelines to achieve energy and environmental goals that surpass what the base building energy code calls for. Some policies mandate the use of a design guideline such as LEED, but also require additional measures on top of that to ensure a higher level of energy efficiency or sustainability. For instance, Connecticut, Maine, Massachusetts and New York have a separate energy efficiency requirement that requires projects to be at least 20 percent more energy efficient than code. Listed below are examples of the diversity of elements found in the policies.

- Connecticut regulation (16a-38k) includes 12 mandatory requirements, such as commissioning, integrated design, and a minimum energy performance of 21 percent above energy code in addition to meeting LEED Silver requirements or an equivalent protocol.
- In Delaware, Executive Order No.18 calls for state employees to follow energy conserva-

tion practices and for the state to develop an energy benchmarking and tracking system in addition to meeting LEED Silver standards.

- Washington DC's Green Building Act requires District-owned buildings to be designed to achieve 75 points on the Environmental Protection Agency's (EPA) national energy performance rating system as determined by the ENERGY STAR® Target Finder Tool and be benchmarked annually using ENERGY STAR Portfolio Manager.

Table 1 provides a snapshot of the policies in the states. Appendix 2 provides a more extensive review of policies.

TABLE 1: STATEWIDE HIGH PERFORMANCE BUILDING POLICIES SNAPSHOT

CONNECTICUT	LEED Silver, Green Globes, NE-CHPS (schools), or CT High Performance Building Manual; 21 percent energy performance above code
DELAWARE	Meet or exceed LEED Silver
DISTRICT OF COLUMBIA	LEED Silver for District buildings; LEED Gold for schools or equivalent
MAINE	LEED standards and 20 percent energy performance above code
MARYLAND	LEED Silver or equivalent; 50 percent in extra costs until 2014
MASSACHUSETTS	MA LEED Plus 20 percent for state; MA CHPS or LEED Silver for schools with 20 percent above energy code requirements
NEW HAMPSHIRE	High performance standards for all; NE- CHPS extra 3 percent in funding schools (suspended)
NEW JERSEY	LEED Silver for state buildings; LEED/ NJ 21st Century Schools for schools
NEW YORK	LEED guidelines to extent practical; 20 percent above code
PENNSYLVANIA	Additional 10 percent funding for schools (suspended) and LEED Silver or higher
RHODE ISLAND	LEED Certified (or IGCC) for state; NE-CHPS for schools
VERMONT	Energy reduction goals, but no statewide high performance public building policy

PROJECT SPOTLIGHT
NATHAN BISHOP MIDDLE SCHOOL
PROVIDENCE, RI

Project Highlights:

- First NE-CHPS Verified historic building
- Georgian Revival style building constructed in 1928
- 100% classrooms have access to views and daylighting
- Designed building achieves 40% energy savings; 65% water savings
- Use of 20,000 gallon rainwater collection system for toilet flushing
- Projecting a savings of over $90,000 in annual operating costs
- Opened in 2009

For more information:

Ai3 Architects

http://ai3architects.com/case-studies/cs_nathan_bishop_middle_school

RECOMMENDATIONS

It is critical for states to continue to evaluate and refine their high performance building policies as projects are built and for building teams to learn what is working and what is not. In order to achieve the levels of performance outlined in these policies, states may discover the need to strengthen certain requirements, provide additional education to building professionals, or implement additonal measures to get better results.

NEEP asked stakeholders across the region to share their experiences and offer feedback on the effectiveness of their high performance building policies for state-funded buildings, so that states could begin to think critically about their policies and learn from each other. Discussions focused on barriers to implementing their state's high performance building policies and suggestions for adapting their existing policies. NEEP discussed these topics with practitioners and policymakers including:

- State building and school construction departments
- Energy managers for local school districts
- Energy professionals involved in workforce development efforts
- Utility and other energy efficiency program administrators
- Design professionals who work on public projects

Overall, the majority of respondents indicated that their state policies were "moderately" effective at producing energy efficient, environmentally sustainable state-funded buildings. The region is certainly a national leader in high performance building policy, but there are still areas for improvement that the recommendations below seek to address.

1. Establish aggressive energy savings goals of at least 20 percent beyond energy code for public buildings[1]

Realizing a high level of energy efficiency is perhaps the single most important component to achieving high performance public buildings. In addition to its environmental benefits, energy efficiency increases the value of buildings, and substantially reduce operating costs which provides long-term cost savings to taxpayers. The money saved through energy efficiency measures can also help finance other sustainability initiatives, such as recycling stations, bike racks, and non-toxic furniture and materials.[2]

As discussed earlier, some states offer multiple compliance paths to meet high performance requirements. For example, Maryland's High Performance Buildings Act requires new public

1 NEEP advocates that high performance building requirements call for greater energy efficiency of at least 20 percent beyond the current energy code, which is the 2009 IECC or ASHRAE 90.1-2007 for most states. As states adopt the next version of the energy code, which will have a more aggressive energy requirement, the energy target for high performance buildings (i.e. the percentage above energy code) should change. For instance, the new target may be 15 percent beyond the 2012 IECC or ASHRAE 90.1 2009 depending on best practices. For more information, visit: http://neep.org/public-policy/4/78/Building-Energy-Codes.

2 A state coordinator for public school construction, who has overseen many high performance school projects in his state, stressed this point when discussing the importance of energy efficiency in the design of school buildings.

buildings over 7,500 square feet to achieve LEED Silver, two Green Globes, or a comparable rating according to a nationally recognized standard. Energy requirements, however, vary from protocol to protocol. ***States should mandate an energy efficiency goal of at least 15 to 20 percent above building energy code across its public buildings, regardless of what design protocol is used***[3].

Currently, four states in the Northeast have such a requirement. Policymakers and practitioners need to maintain an ongoing dialogue with each other about realistic energy efficiency targets. As more projects are built and technologies advance, 20 percent above code may be too conservative a goal. Alternative ways of measuring energy performance, such as the Zero Energy Performance Index (zEPI), may become a better policy and design tool.

TABLE 2: STATES WITH ABOVE-CODE ENERGY EFFICIENCY REQUIREMENT FOR PUBLIC BUILDINGS

CONNECTICUT	21 percent above energy code
MAINE	20 percent above energy code
MASSACHUSETTS	20 percent above energy code
NEW YORK	20 percent above energy code

2. Make zero net energy public buildings the long term goal

While 20 percent beyond energy code may be a good short term goal for reducing energy consumption in buildings, states need to think in the long term about constructing buildings that have a small enough energy load to be met entirely by on-site renewable energy systems, or are "zero net energy." The federal government already mandates that starting in 2020, all new federal buildings must be designed to achieve zero net energy status by 2030.[4] States should consider aligning their goals with the federal zero net energy initiative. For further guidance on actions states can take now to move toward zero net energy public buildings, read NEEP's newly published report "Roadmap to Zero Net Energy Public Buildings: Recommended Steps for the Northeast and Mid-Atlantic."

Some states are already making progress toward a zero net energy future. For instance, Delaware passed a law in July 2009, SB 59, which requires all new residential and commercial buildings to be zero net energy capable starting in 2026 and 2031, respectively. The Architecture 2030 Challenge also overlaps with efforts to move toward zero net energy, setting an immediate goal of reducing greenhouse gas emissions for new buildings by 60 percent below the regional average for that building type. To date, the 2030 Challenge has been adopted by four states (Illinois, Minnesota, New Mexico, and Washington), and several cities and counties, all of which now require certain building types to meet Architecture 2030's energy use targets.

3 Twenty percent more efficient than the building energy code was the standard recommendation for states with the 2009 IECC/ASHRAE 2007 building energy code in place. As states move to adopt the latest version of the code, 2012 IECC/ASHRAE 2010, states should aim to construct their public buildings approximately 15 percent more efficiently than the latest baseline energy code. For more information, visit: http://neep.org/public-policy/4/78/Building-Energy-Codes

4 Executive Order (E.O.) 13514; Federal Leadership in Environmental, Energy, and Economic Performance; was signed on October 5, 2009. It expanded upon the energy reduction and environmental performance requirements of E.O. 13423. http://www1.eere.energy.gov/femp/regulations/eo13514.html

3. Implement statewide policies and practices that ensure buildings perform as designed, such as building commissioning and energy tracking and benchmarking

Building Commissioning:

Commissioning is a rigorous quality assurance program administered by a knowledgeable third party that ensures the building performs as expected. Many states require independent third-party commissioning of public buildings built to high performance standards, but this needs to be prioritized across all states. While commissioning is required in protocol such as LEED, some states only require public buildings to meet as many requirements of LEED "as is cost-effective" or "practical" – which often means commissioning gets left out.

Commissioning should be a requirement across all publicly funded construction projects. States should also follow the lead of Massachusetts, Connecticut and those utilizing NE-CHPS for school buildings (such as New Hampshire and Rhode Island), all of which require training for building staff on the operation and maintenance of the building systems identified in the commissioning report.

BEST PRACTICE: COMMISSIONING

Massachusetts requires and funds commissioning of school buildings

The Massachusetts School Building Authority (MSBA) requires and pays for the entire cost of building commissioning for all MSBA-funded projects. MSBA commissioned buildings undergo an intensive quality assurance process that begins during design and continues through construction, occupancy, and operations. Commissioning ensures that the new building operates efficiently and as the owner intended. Commissioning also prepares the building staff to operate and maintain building systems and equipment.

http://www.massschoolbuildings.org/programs/commissioning

Massachusetts School Building Authority

Funding Affordable, Sustainable, and Efficient Schools in Partnership with Local Communities

BEST PRACTICE: UTILITIES PARTNERING WITH STATES TO TRACK ENERGY USE

Utility bills downloaded directly using Mass Energy Insight for public buildings

States are beginning to collaborate with utilities to create user friendly energy data tracking methods for customers. Massachusetts, for instance, partnered with its gas and electric utilities and the EPA to administer a tracking and benchmarking system for municipalities called Mass Energy Insight. This system automatically downloads utility data, so that customers do not have to manually enter it. For more information:

http://www.massenergyinsight.net/home

Track and benchmark energy usage:

If you ask an energy manager for two simple and cost effective strategies to maximize energy efficiency in your buildings over the long-term, you will hear time and again: track your energy bills and benchmark your buildings' energy use against other buildings of similar size and type. ***States should enact policies that require all public buildings, both new and existing, to track and benchmark their buildings using a tool such as ENERGY STAR Portfolio Manager.***[5]

As an example, Washington DC's Clean and Affordable Energy Act of 2007 requires government buildings to be benchmarked annually using ENERGY STAR Portfolio Manager and requires the disclosure of benchmarking results.

Providing the right tools to track and benchmark buildings should also be a statewide priority. An energy manager interviewed for this report highlighted the need for a "standardized system for tracking and documenting sustainability" in her public buildings. States such as Massachusetts have begun to implement such programs.

4. Reduce cost barriers associated with high performance buildings and incentivize high performance school construction with additional state aid

Cost is a frequently cited barrier to building high performance public buildings. In the current economic climate, states and municipalities have limited or frozen capital budgets to build new projects. When there ***is*** money in the budget to build a new building, the incremental cost of building to high performance standards can still be a barrier.

Although data on cost is limited in this area (another barrier to high performance buildings), studies indicate that there is an additional upfront cost of about 2 percent to build "green," but that this extra investment can result in life cycle savings of 20 percent of total construction

5 EPA's Portfolio Manager enables buildings to assess their energy performance over time and against national benchmarks in order to develop a comprehensive and cost effective plan for energy reduction.

Financial Benefits of Green Buildings
Summary of Findings (per ft^2)

Category	20-year Net Present Value
Energy Savings	$5.80
Emissions Savings	$1.20
Water Savings	$0.50
Operations & Maintenance Savings	$8.50
Productivity & Health Benefits	$36.90 to $55.30
Subtotal	**$52.90 to $71.30**
Average Cost of Building Green	(-$3.00 to -$5.00)
Total 20-year Net Benefit	**$50 to $65**

Source: Capital E Analysis

Gregory Kats' report from 2003 concluded that for every $3-$5 per ft^2 extra cost spent on green design, there was $50-$65 ft^2 savings over 20 years.

costs (see analysis at left).[6] More efficient building systems, commissioning, integrated design efforts including design charettes, and the cost of documenting and certifying projects to a third-party high performance building standard may cost more than a building built to the baseline energy code.

Many states acknowledge these incremental costs in their policies, especially the cost of third-party certification. States frequently soften the requirement for third-party verification if costs are too high. For example:

- Delaware's Executive Order No. 18 states that: "third-party certification must be pursued for such projects **if it can be accomplished at a reasonable cost**."
- Washington DC's Healthy Schools Act of 2010 states that "the District shall meet LEED for Schools certification at the Gold level or higher **if sufficient funding for the construction or renovation is provided**."
- New York's Executive Order No. 111 states that new state buildings over 20,000 square feet must follow LEED green building guidelines "**to the maximum extent practicable**."

As states move forward, they need to tighten these requirements. An alternative to requiring costly LEED certificiation could be to develop a state-specific compliance path such as the Connecticut Compliance Manual for High Performance Buildings. Using this manual, state projects do not need to seek a costly verification from a third party, but do need to prove to the Connecticut Department of Construction Services that they have met the state's requirements. This approach, however, requires dedicated staff at the state level to oversee projects. One state employee expressed how overwhelming it is to have a staff of two overseeing nearly $700 million in public building projects. Adequate staffing, therefore, is necessary for this approach to be successful.

Another strategy to overcoming cost barriers is for states to dedicate funding to cover the incremental cost of high performance design and construction. This is particularly relevant for public school construction, in which communities use local taxpayer dollars to fund a portion,

6 Kats, Gregory et al. "The Costs and Financial Benefits of Green Buildings: A Report to California's Sustainable Building Task Force." Report developed for the California Sustainable Building Task Force, October 2003 1-134. 06.

if not the majority, of school construction. Below are examples of such state policies that help school districts cover the incremental cost:

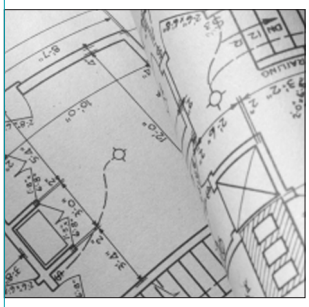
TABLE 3:

STATES WITH POLICIES TO COVER INCREMENTAL COST OR INCENTIVE GREEN BUILDING PRACTICES

MARYLAND: Maryland High Performance Buildings Act (S.B. 208)	For fiscal years 2010-2014, state will pay 50 percent of local share of extra costs incurred in constructing a new school to meet the high performance building requirements.
NEW HAMPSHIRE: N.H. Rev. Stat. Ann. § 198:15-b	New schools that use the NE-CHPS protocol as a building standard receive additional state grant funding equal to 3 percent of the total construction costs. (Suspended)
PENNSYLVANIA: Act 46 of 2005 House Bill No. 62	An additional 10 percent in state reimbursement for new construction, additions and renovations receiving a LEED for Schools certification at the Silver level or higher, through the PlanCon funding process administered by the Department of Education (currently suspended).
RHODE ISLAND: RIDE School Construction Regulations	Projects which meet NE-CHPS requirements and go above the RI Building Energy Code receive reimbursement funds: 2 percent additional reimbursement funds for building 30 percent above the code; 3 percent additional reimbursement funds for building 40 percent above the code; and 4 percent additional reimbursement funds for building 50 percent above the code.

BEST PRACTICE:

WORKING WITH YOUR UTILITY OR EFFICIENCY PROGRAMS FROM THE START



Local utilities and efficiency program administrators provide a variety of incentives for technologies used in high performance buildings, such as advanced lighting strategies and efficient boilers. All publicly funded project teams should contact their local utility or efficiency program as early as possible to see what incentives are available to help implement your high performance building guidelines.

For more info: http://www.dsireusa.org/

VERMONT'S INNOVATIVE APPROACH TO ENERGY SAVINGS IN PUBLIC SCHOOLS AND BEYOND

Vermont does not require new public buildings to meet a high performance design protocol. However, it continues to be a leader in energy efficiency, with some of the highest per capita investments in the nation and robust programs. Efficiency Vermont—the nation's first statewide energy efficiency utility—provides technical assistance and financial incentives to Vermont households and businesses, to help them reduce their energy costs. Programs have yielded significant results, saving millions of kilowatt hours of electricity and reducing utility bills.

Brattleboro Union High School has reduced its energy usage by about 20 percent due to recent improvements and has a biomass plant and a greenhouse that uses harvested rainwater.
Source: Truex Cullins

Vermont is also a leader in the region when it comes to creating partnerships between efficiency programs and energy education programs. Efficiency Vermont realizes that energy efficiency is largely impacted by the occupants of the buildings and has created a holistic pilot program in its schools. Efficiency Vermont partnered with the Vermont Superintendent's Association's School Energy Management Program (SEMP) and the Vermont Energy Education Program (VEEP) to launch the Whole School Energy Program. What began as a pilot program in 2011 in five schools in now expanding to 20 schools.

The program challenges participating schools to reduce their energy use by 10 percent through improved operations and maintenance, behavior strategies, and equipment replacement. Schools are benchmarked and provided with a "roadmap" of energy saving opportunities based on a walkthrough site assessment. The school then forms an action team, sets goals and receives technical support from Efficiency Vermont.

5. Promote training of building operators and education for occupants regarding energy use

Facilities staff and building occupants alike play a critical role in maintaining energy efficiency and sustainability in public buildings. The best designed building will not live up to expectations if it is not maintained and occupants do not practice energy-saving behaviors.

Training of Facilities Staff

Training building operators on the new—and often complicated—systems in buildings is critically important to the performance of public facilities. Effective training translates into dollars and energy saved. Each participant who completes the Building Operator Certification program, for instance, can expect to save, on average, 172,000 kWh per year, equivalent to $12,000 annually at average national electricity rates. ***States can promote training of building staff through requirements in their construction regulations***. As an example, Rhode Island's school construction regulations require all facilities staff employed by districts to achieve a certain level of training.[7]

Education for Occupants

When discussing the barriers to implementing high policies in her schools, an energy manager working in a school district said: "I believe a long term solution to many of these issues is energy education, such as the incorporation of energy education into the daily K -12 lesson plans currently taught in our schools. There is a place within every educational discipline for energy education." ***States should make sure that the green design protocol used in their school district mandates education for building operators as well as students***. The CHPS protocol for instance requires districts to use their schools as teaching tools and to provide training for operations and maintenance, which sets it apart from other criteria such as LEED.

Energy education is not only a potential "solution" for students, but is also an effective strategy for people of all ages occupying buildings. Delaware's state policy includes language about energy education for state employees. Executive Order No. 18 requires the state to:

- "Develop a program to educate state employees about strategies and tactics to achieve the six goals:
  - Energy conservation and efficiency
  - Use of clean, renewable energy
  - Environmentally responsible and energy conscious construction
  - Recycling
  - Clean transportation
  - Environmentally preferable products and services

7 Section 1.11-2 of the Rhode Island Department of Education's School Construction Regulations requires facilities managers to have a at least two years experience; have been certified as an educational facilities manager through an industry accepted certification; pr have a college degree in facilities management.

The program shall emphasize the benefits to managing energy consumption in both the workplace and at home and shall be provided to the Cabinet Committee on Energy. ”

As Delaware begins implementing this requirement to educate its state employees, other states should consider adopting similar measures and share best practices.

6. Take steps to clarify relationship between building energy codes and high performance buildings guidelines

Put simply, energy codes and high performance “beyond code” guidelines are confusing to many policymakers and practitioners. Every three years, national model energy codes, such as the International Energy Conservation Code (IECC) or the ASHRAE Standard 90.1, are revised to correspond with advances in building science and construction practices. Voluntary design programs, such as LEED and CHPS, are also updated every three years – but not at the same time as the model codes. The result is a continuously shifting landscape of mandatory and voluntary requirements, which can be difficult to understand even for some experts. Confusion in the policy world and the marketplace can make enforcement ***and*** compliance of energy codes and their “above code” counterparts very problematic.

Code experts and high performance building advocates need to work together to reduce confusion surrounding energy codes and high performance guidelines. A clear understanding of the building code is a good place to start. This will help put “above code” guidelines into perspective and promote better policy decisions. DOE’s Building Energy Codes Program makes the following recommendation: “Designers, builders, plan reviewers, inspection staff, and interested parties need to thoroughly understand the underlying baseline energy code when working with a beyond code program.”

Participating in regional forums, such as NEEP’s Building Energy Codes working group, can be a valuable opportunity for state offices, utility partners, advocates and others to come together and share knowledge and resources.

7. Engage with the development and implementation of green codes

The confusion surrounding building codes and voluntary guidelines discussed in the previous section may eventually be alleviated by the latest development in high performance building policy: green codes. Because tools such as LEED and Green Globes are not written in code-enforceable language, they can be difficult to enforce. Green codes would codify high performance strategies, making them part of the state building code.

Discussions with state employees and practitioners working on high performance public building construction indicate a great hopefulness that green codes will someday replace rating systems as a public policy tool. Comments included:

- “I would prefer that the state mandate one specific policy based upon and existing proven system that is code compliant.”
- “Eventually high performance will become part of codes and then we’ll see better buildings in general.”

Policymakers and practitioners must become involved and educated about the green code process. While green codes may provide a more simplified approach in theory, they should not be adopted without broad stakeholder involvement and thorough consideration of the requirements.

Currently, the green code to watch is the International Green Construction Code. The IgCC is a tool designed for jurisdictions to adopt into law reducing the environmental impact of construction projects while keeping construction safety measures intact and enforceable. An architect who was surveyed for this report commented: "The IgCC has the promising future of raising the floor for high performance building which will allow LEED, Green Globes, etc. to return to raising the ceiling and encouraging new and innovative strategies for high performance building."

Some states have begun to incorporate the IgCC into policy. Rhode Island's Green Building Act of 2009 cites the IgCC as a compliance path to meeting green building standards, which also include NE-CHPS, LEED and Green Globes. In May 2011, Maryland passed the IgCC as an optional requirement for new construction. Its adoption is effective in March 2012 and will apply to all commercial buildings as well as residential properties more than three stories high.

BEST PRACTICE: ALIGNING STRETCH BUILDING ENERGY CODES WITH HIGH PERFORMANCE BUILDING GUIDELINES

Building codes and high performance requirements working together in Massachusetts schools

The Massachusetts "stretch energy code" is an optional appendix to the state energy code, created by the Massachusetts Board of Building Regulations and Standards (BBRS), which results in buildings that are 20 percent more efficient than base code. Massachusetts communities can adopt the stretch code if they wish to attain greater efficiency.

In 2010, Massachusetts School Building Authority (MSBA) adopted regulations that ensure that every school is built to high performance standards. Projects can opt to use either MA-CHPS or LEED for Schools, but must meet certain energy and sustainability requirements regardless of what criteria they use. The MSBA chose to utilize the stretch code as part of their high performance requirements for new schools, as well as for their Green Repair Program. The stretch code has provided a uniform set of requirements for policymakers to use across programs and communities. A coordinator at MSBA noted: "The stretch code has been very helpful to green school programming."

For more information: http://www.massschoolbuildings.org/programs/green_schools

PROJECT SPOTLIGHT
NEW YORK STATE PARKS TACONIC REGIONAL HEADQUARTERS
STAATSBURG, NY

Project Highlights:

- Adapted school building
- First public building in New York State to achieve LEED Platinum
- Received $128,000 in energy efficiency incentives from NYSERDA, anticipated to reduce energy costs by nearly $40,000 annually
- Estimated to perform 53 percent above building energy code

Source: New York State Office of Parks, Recreation and Historic Preservation

CONCLUSION

The recommendations in this report are intended to guide policymakers as they consider future commitments to advance high performance building strategies in their public buildings. States are encouraged to:

- **Set high energy goals** with a target of building net zero facilities in the future.
- **Make sure that energy-saving strategies are mandatory**—not optional—components to the high performance building policy. For instance, states should require that all buildings are commissioned and that there is a statewide system for tracking and benchmarking energy usage of public buildings. States should mandate training for building operators and education for building occupants.
- **Keep an open dialogue between policymakers, building professionals and code experts** to reduce confusion in the marketplace. Stakeholders must understand the building energy code as the basis for "above code" requirements for public buildings, as well as stay up to date on the future of green codes. Green codes may very well replace protocol such as LEED and Green Globes as a policy tool for states in the future.

The knowledge base within the region is a valuable resource, as states test out new strategies, make mistakes, and experience success. We should look across state lines for lessons on how to develop systems to track our utilities, how to train our building professionals effectively, and how to design educational curricula that ensures the next generation of taxpayers are savvy environmental stewards. Maintaining strong regional partnerships is essential as we continue to push the envelope on energy efficiency and sustainability in our public buildings.

Lastly, NEEP facilitates working groups in the areas of high performance schools, public buildings, and building energy codes and strongly encourages state leaders and other interested stakeholders to join the conversation. For more information, visit www.neep.org.

PROJECT SPOTLIGHT

WASHINGTON DC'S LIBRARY BUILDING PROGRAM

DC Public Library is building and renovating libraries across the city, seeking LEED Certification of at least Silver for all new buildings. As part of the design process, the library hosted a series of Community Design Meetings to seek input from residents. Specific energy efficient features vary by location, and include elements such as:

- Energy efficient lighting
- Bike racks and easy access to public transportation
- Vegetative green roofs or white reflective roofs
- Materials with high recycled content
- Low-flow and "smart" plumbing fixtures
- Drought-resistance landscaping

Source: DC Public Libraries

APPENDIX 1 - OVERVIEW OF DESIGN PROTOCOLS

OVERVIEW OF THE TYPES OF DESIGN PROTOCOLS CITED IN STATE POLICIES

This section provides an overview of five types of high performance design guidelines referenced in state policies mandating high performance construction of public buildings: LEED, Collaborative for High Performance Schools (CHPS), state-developed guidelines, green codes, and Green Globes.

1. Collaborative for High Performance Schools (CHPS)

For high performance school construction policies, Connecticut, Massachusetts, New Hampshire, and Rhode Island also reference the Collaborative for High Performance Schools protocol as a pathway to meet building requirements or as way to achieve additional state funding for school construction. CHPS addresses site and materials selection, energy and water efficiency, indoor environmental quality and sustainable policies—and is regionally or state-adapted to meet the needs of that particular state.

Throughout the U.S., 13 states have state or region-specific versions of the CHPS protocol, including California, Washington, New York, Massachusetts, the New England States (Maine, Vermont, New Hampshire, Connecticut, and Rhode Island), Texas, Colorado, Virginia and Hawaii. In Rhode Island, Northeast-CHPS is mandated for all new schools buildings. Projects are given additional funds from the Rhode Island Department of Education for achieving higher levels of energy efficiency and sustainability. Projects are also verified in-house by the Department of Education, avoiding costly administrative fees and streamlining the process.

2. LEED, LEED plus, "or equivalent":

The USGBC's LEED rating systems are the most frequently cited protocol within these state policies. LEED for New Construction is a third party rating system for buildings, in which projects earn points for meeting certain criteria in five categories ranging from "energy and atmosphere" to "materials and resources." LEED for Schools is based on the New Construction requirement but also addresses specific design areas of the school environment such as classroom acoustics.

According to the USGBC, government owned or occupied LEED buildings make up 27 percent of all LEED projects. All states with policies except for New Hampshire either require buildings to achieve a certain level of LEED, such as Silver or Gold, or utilize LEED as the basis for a more nuanced set of requirements. For example, some states use LEED as a starting point and add additional requirements. Massachusetts, for example, established "Mass LEED Plus" as a requirement for new state facilities. Mass LEED Plus addresses shortcomings with standard LEED certification, specifically mandating certain LEED points for energy performance, building commissioning, achievement of smart growth objectives, and water conservation (http://www.mass.gov/envir/smart_growth_toolkit/pages/glossary.html).

It is also common for states to require LEED at the Silver level "*or equivalent*." You will see "*or equivalent*" or a similar phrase listed in many policies, such as those in Connecticut, New Jersey and Rhode Island. New Jersey's high performance building law, for example, states that new state facilities must achieve LEED Silver, two Green Globes or "a comparable numeric rating according to a nationally recognized, accepted, and appropriate numeric sustainable development rating system, guideline, or standard." Offering different pathways for design teams to meet state requirements may provide more flexibility for design teams, but it also may result in buildings that do not live up to the aggressive energy and environmental goals of the state.

3. State-Developed Guidelines:

States such as Connecticut and New Jersey developed alternative design guidelines, which are a hybrid of LEED and other protocol such as CHPS, as pathways to achieve high performance building requirements. The Connecticut Building Standard Guidelines Compliance Manual for High Performance Buildings was developed as an alternative compliance path for schools and state facilities, and the New Jersey 21st Century Schools Design Manual was developed for public schools. Both of these manuals provide design teams with a method to meet state requirements without necessarily achieving third party certification from the USGBC, which can add unwanted administrative costs to projects. They also allow states to customize their sustainability guidelines, rather than rely solely on a national set of guidelines. Connecticut's guidelines, for instance, specify that all projects must achieve 21 percent greater energy efficiency than the base building energy code, whereas LEED requires 10 percent greater efficiency at the Silver level.

New Jersey's 21st Century Schools Design Manual is a comprehensive 300-page document that provides schools with a framework for achieving high performance buildings that go beyond LEED requirements. The manual states that schools should complete a LEED checklist illustrating that the project has met all LEED prerequisites and scored at least 29 points, but that certification by the USGBC is not required because of the associated costs. The manual truly embraces the concept of integrated design, including sections with titles such as "Catalyst for Economic Development." In this section, the manual recognizes that a new school project provides an "unusual opportunity to encourage reinvestment in neighborhoods surrounding schools" and gives recommendations for how planning teams can ensure communities benefit from the school development.

4. Green Codes

Green Codes—as opposed to third party rating systems like LEED—are written to be codified, and enforced at the local level. They provide minimum requirements for the siting and design and construction of high performance, green buildings.

There are currently two national efforts by the International Code Council (ICC) and ASHRAE to release the nation's first green codes for commercial buildings:

- International Green Construction Code (IgCC)
- ASHRAE 189.1, Standard for the Design of High-Performance, Green Buildings Except

Low-Rise Residential Buildings.

Rhode Island is the first state in the country to adopt the IgCC as a compliance path for meeting its green building requirement for publicly funded buildings. The state hopes that it will be an easy to follow alternative to LEED or Green Globes, as well as put the state on the path to zero net energy. The IgCC utilizes the Zero Energy Performance Index (zEPI) for its energy requirements, which establishes zero net energy as the absolute goal.

States should keep their eyes on Rhode Island as it takes this innovative approach to high performance building policy. Green codes may eventually replace rating systems as a simpler, more enforceable public policy tool.

For more information on green codes:

- State of Rhode Island Building Code Commission: Proposed Rules & Regulations for The Green Buildings Act - http://www.ribcc.ri.gov/gba/
- U.S. Department of Energy: Green Building Codes - http://www.energycodes.gov/GreenBuildings/resources/programs.stm

5. Green Globes

Green Globes is an online assessment and rating tool operated by the Green Building Initiative (GBI) that is used in Canada and the USA. It is frequently cited in state policies but is not heavily used by Northeast and Mid Atlantic public building design teams. To find out more, see http://www.greenglobes.com.

APPENDIX 2 - CHART OF NORTHEAST AND MID ATLANTIC STATES' HIGH PERFORMANCE BUILDING POLICIES FOR NEW STATE-FUNDED PUBLIC BUILDINGS

State	Policy	Year Enacted/ Effective	Applicability			What It Mandates
			State Buildings & Schools	Schools Only	State Buildings	
Connecticut	House Bill No. 7432 Public Act No. 07-242 An Act Concerning Electricity and Energy Efficiency	2007	✓			Requires new construction of state-funded facilities, including public schools, (costing $5 mil of which $2 mil or more is state funding) as well as renovation projects (of which $2 mil or more is state funding) to comply with regulations equivalent to LEED Silver, two Green Globes, or NE-CHPS for Schools. The regulation (16a-38k) includes 12 mandatory requirements, such as commissioning, integrated design, and a minimum energy performance of 21 percent above CT energy code. Also requires projects to meet 26 of 60 optional strategies. Schools are required to meet 12 mandatory requirements plus 6 additional mandatory measures. Schools then must meet 28 of 59 optional strategies. The CT Building Standard Guidelines Compliance Manual for High Performance Buildings was developed to assist in complying with the regulations.
	Senate Bill No. 1243 Public Act No. 11-80	2011	✓			Moved responsibility of above policy from Office of Policy and Management to the new Department of Energy and Environmental Protection. Requires development of plan by July 2012 to reduce energy consumption of public buildings by 10 percent (from current consumption) by 2013 and addt'l 10 percent by 2018. Also authorizes state agencies and municipalities to enter into performance contracts and requires the development of energy efficiency standards for buildings leased by the state.
Delaware	House Bill 435	2004	✓			Requires state agencies to purchase ENERGY STAR qualified products if they are available competitively, can be acquired in a reasonable time frame, and the product meets appropriate performance standards. In 2004, the Governor signed a partnership with the ENERGY STAR Program; and includes Purchasing and Procurement Training for State and Local Government and Schools.
	Executive Order No.18	2010	✓			Requires executive branch state agencies and departments to reduce energy consumption by 30 percent by 2015 (baseline of FY 2008), with interim targets of 10 percent by 2011 and 20 percent by 2013. Energy conservation practices are also prescribed for state employees to follow. Also requires the Office of Management and Budget (OMB), in consultation with the Department of Natural Resources and Environmental Control (DNREC), to develop a system for benchmarking, monitoring and tracking energy use and carbon emissions in state facilities. New construction and major renovation projects shall be designed to USGBC LEED Silver standards; third-party certification must be pursued for such projects if it can be accomplished at a reasonable cost.

APPENDIX 2 - CHART OF NORTHEAST AND MID ATLANTIC STATES' HIGH PERFORMANCE BUILDING POLICIES FOR NEW STATE-FUNDED PUBLIC BUILDINGS

State	Policy	Year Enacted/ Effective	Applicability			What It Mandates
			State Buildings & Schools	Schools Only	State Buildings	
District of Columbia	Green Building Act of 2006	2006	✓			Requires District-owned buildings to be designed to achieve 75 points on the EPA national energy performance rating system as determined by the ENERGY STAR Target Finder Tool and be benchmarked annually using Portfolio Manager for buildings over 10,000 square feet of gross floor area. Also requires district-owned buildings to be verified at the LEED Silver level.
	The Clean and Affordable Energy Act of 2007	2007			✓	Requires government buildings to be benchmarked annually using ENERGY STAR Portfolio Manager, and requires the disclosure of benchmarking results.
	Healthy Schools Act of 2010	2010		✓		Expands green building provisions for public schools. Requires District to meet LEED Gold certification or higher if sufficient funding for the construction or renovation is provided.
Maine	Executive Order 8	2003			✓	Buildings must incorporate LEED standards as long as it is cost-effective over the life of the building. School administrative districts and municipalities are not subject to the requirements.
	MRSA Title 5 1764-A	2004	✓			New or substantially renovated state-funded buildings over 5000 sq. ft. required to meet energy use target of 20 percent beyond code and perform life-cycle cost analysis. Water efficiency measures required for some building types; enables state-funded facilities enter into energy service or 3rd party financing company for energy conservation improvements.
Maryland	Senate Bill 267	2006			✓	Requires the Department of General Services to set reductions in energy consumption for State buildings: 5 percent by 2009 and 10 percent by 2010. This bill excludes the Department of Transportation's buildings.
	Maryland High Performance Buildings Act (S.B. 208)	2008	✓			New construction and major renovations 7,500 sq. ft. and greater must meet at least LEED Silver, two Green Globes, or comparable rating according to nationally recognized standard. For fiscal years 2010-2014, state will pay 50% of local share of extra costs incurred in constructing a new school to meet the high performance building requirements.

APPENDIX 2 - CHART OF NORTHEAST AND MID ATLANTIC STATES' HIGH PERFORMANCE BUILDING POLICIES FOR NEW STATE-FUNDED PUBLIC BUILDINGS

State	Policy	Year Enacted/ Effective	Applicability			What It Mandates
			State Buildings & Schools	Schools Only	State Buildings	
Massachusetts	Executive Order 484 (2007)	2007	✓			New construction and major renovations over 20,000 sq. ft. must meet MA LEED Plus. Projects smaller than 20,000 sq. ft. must meet minimum energy standards established by the Commonwealth of Massachusetts Sustainable Design Roundtable. Requires state buildings to reduce energy by 20 percent by 2012 and 35 percent by 2020 (using 2004 baseline).
	Senate, No. 2768 Green Communities Act	2008	✓			Mandates that new buildings (or major renovation projects) owned or operated by the state must minimize their life-cycle costs by using energy efficiency and renewable energy.
	Executive Order No. 515 Establishing An Environmental Purchasing Policy	2009			✓	Directs the Environmental Preferable Products (EPP) Program to develop energy performance standards of products that consider lifetime energy operating costs. Requires agencies to procure cost-effective ENERGY STAR HVAC equipment, office equipment, and appliances and requires staff be trained on power saving functions and benefits.
	963 CMR 2.00 Section 2.04	2010		✓		Schools have the option of participating in MA-CHPS or LEED-S. For MA-CHPS, schools must achieve 40 points for new construction and 35 points for renovations. For LEED-S, schools must achieve 40 points with minimum energy cost savings of 20 percent for new construction and 16 percent for renovations (equivalent to LEED Silver).
New Hampshire	Executive Order No. 2011-1 (Supersedes EO 2005-04)	2011		✓		New construction or renovations exceeding 25,000 square feet or $1 million to meet high performance, energy efficient, sustainable design standard determined by Department of Environmental Services and the Department of Administrative Service. Standard will meet or exceed current IECC energy code; require energy modeling and third-party building commissioning. Also requires state facilities to reduce fossil fuel consumption by 25 percent by 2025, compared to a 2005 baseline; track and benchmark energy use; and purchase ENERGY STAR equipment
	Senate Bill 0409	2010			✓	State facilities must incorporate high performance, energy efficiency, and sustainable design. Applies to projects that will recoup incremental costs over 10 years. Public schools and universities exempt. Rules are under development.
	Executive Order No. 2004-7	2004	✓			Established a procedure for conducting audits of facilities that score between 40 and 60 on the ENERGY STAR benchmarking system and proposed new efficiency standards for new construction.
	N.H. Rev. Stat. Ann. § 198:15-b	2004		✓		New schools that use the NE-CHPS protocol as a building standard receive additional state grant funding equal to 3 percent of the total construction costs.

APPENDIX 2 - CHART OF NORTHEAST AND MID ATLANTIC STATES' HIGH PERFORMANCE BUILDING POLICIES FOR NEW STATE-FUNDED PUBLIC BUILDINGS

State	Policy	Year Enacted/ Effective	Applicability			What It Mandates
			State Buildings & Schools	Schools Only	State Buildings	
New Jersey	N.J. Stat. § 52:32-5.3 et seq. N.J. Stat. § 52:34-6.4	2008 2007			✓	Construction of buildings larger than 15,000 sq. ft. must achieve LEED Silver, a two Green Globe rating or an equivalent rating from another certification program. Requires purchase of ENERGY STAR products in state facilities.
	NJ Executive Order No. 24	2002		✓		All new school design shall incorporate LEED guidelines to achieve maximum energy efficiency and environmental sustainability in the design of schools. Note: To meet this mandate, the NJ School Development Authority (SDA) combined national best practices in education design with LEED standards to publish the 21st Century Schools Design Manual. SDA states that school projects being advanced after 2008 must meet these standards. Standards require that projects meet at least 29 LEED Credits plus all prerequisites.
New York	Executive Order No. 111	2001	✓			New construction and major renovations over 20,000 sq. ft. must meet LEED to the maximum extent possible. New state buildings must exceed energy code by 20 percent and renovations must exceed energy code by 10 percent. State agencies must select ENERGY STAR labeled products.
	Article 4-C. State Green Building Construction Act	2009			✓	Requires that the construction and substantial renovation of State buildings comply with "green" building standards established by the Office of General Services. Rules and regulations have not been promulgated.
	Executive Order No.4	2001			✓	Established a state green procurement and sustainability program in order to minimize environmental and health impacts of commodities, services, and waste in state agencies. An interagency committee approved product specifications for numerous types of equipment, i.e. light bulbs and room air conditioners. The order also requires state agencies to develop Sustainability and Environmental Stewardship programs, which includes assigning an employee to serve as a Sustainability and Green Procurement Coordinator.

APPENDIX 2 - CHART OF NORTHEAST AND MID ATLANTIC STATES' HIGH PERFORMANCE BUILDING POLICIES FOR NEW STATE-FUNDED PUBLIC BUILDINGS

State	Policy	Year Enacted/ Effective	Applicability			What It Mandates
			State Buildings & Schools	Schools Only	State Buildings	
Pennsylvania	Executive Order No. 2004-12	2004	✓			State facilities must establish efficiency requirements. They also are required to develop green building practices, train personal, develop procedures, and procure ENERGY STAR products.
	Act 46 of 2005 House Bill No. 62	2005		✓		An additional 10 percent in state reimbursement is available for new construction, additions and renovations, through the PlanCon funding process administered by the Department of Education, for new construction, addition and renovation receiving a LEED for Schools certification at the Silver level or higher.
Rhode Island	The Green Buildings Act RIGL § 37-24-1	Enacted 11/13/09	✓			New construction over 5,000 sq. ft. and renovations over 10,000 sq. ft. must meet LEED certified standard or equivalent i.e., High Performance Schools Standards, Green Globes Certification, or the International Green Construction Code.
	RIDE School Construction Regulations	2007		✓		New construction must comply with NE-CHPS. Projects which go above the RI Building Energy Code receive reimbursement funds: 2 percent additional reimbursement funds for building 30 percent above the code; 3 percent additional reimbursement funds for building 40 percent above the code; and 4 percent additional reimbursement funds for building 50 percent above the code.
Vermont	16 V.S.A. § 3448 **Suspended	N/A		✓		Schools that incorporate wood chip, geothermal, wind, or solar power into the buildings were eligible for up to 75 percent state aid. Since 2007, however, this option has been suspended by the state legislature. **It is important to note that Vermont has no mandates requiring energy efficiency in schools or public buildings. Despite this fact, Vermont continues to be one of the most progressive states in terms of energy efficiency within the Northeast.
	Executive Order No. 14-03	2003			✓	State agencies and departments to reduce greenhouse gas emissions from state government buildings and operations by twenty-five percent by 2012; fifty percent by 2028; and, if practicable using reasonable efforts, seventy-five percent by 2050.

APPENDIX 3 - RESOURCE LIBRARY

TOPICS:

1. General Guidance and Best Practices on Energy Efficiency In Buildings
2. Benchmarking and Building Energy Use
3. Building Energy Codes
4. High Performance Schools
5. Utility Programs and Incentives
6. Zero Net Energy Buildings

1. GENERAL GUIDANCE AND BEST PRACTICES ON ENERGY EFFICIENCY IN BUILDINGS

NEEP's High Performance Buildings Project

The High Performance Buildings Project has been developed to promote operational energy savings in retrofit and new buildings in the region.

http://neep.org/public-policy/3/78/High-Performance-Schools-Public-Buildings

American Council for an Energy Efficient Economy (ACEEE)

A comprehensive informational resource detailing energy efficiency measures included in the American Recovery and Reinvestment Act of 2009 (ARRA), or the economic stimulus package, including the ACEEE publication, *Energy Efficiency Program Options for Local Governments under the 2009 Stimulus Package*.

http://www.aceee.org/energy/national/recovery.htm

New Buildings Institute (NBI)

Guidance for individuals and organizations on designing and constructing energy-efficient buildings.

http://www.newbuildings.org/

U.S. Department of Energy (DOE)

- **U.S. DOE Building Technologies Program**
  Technologies, techniques, and tools for making buildings more energy efficient, productive, and affordable.
  http://www1.eere.energy.gov/buildings/
- **U.S. DOE's Solution Center**
  A range of webcasts and resources developed for recipients of federal energy efficiency

grants. Topics include: financial products; buildings; electric power & renewable energy; and energy education.
http://www1.eere.energy.gov/wip/solutioncenter/default.html

U.S. Environmental Protection Agency (EPA)

- **Clean Energy Lead by Example Guide: Strategies, Resources, and Action Steps for State Programs**
  State and local examples of policies activities including the benefits and costs of taking action and resources such as state and local examples of executive orders and legislation.
  http://www.epa.gov/statelocalclimate/resources/example.html

- **EPA's State and Local Climate and Energy Program**
  Provides guidance on implementing projects with the assistance of utilities and other energy efficiency program sponsor.
  http://www.epa.gov/statelocalclimate/local/topics/municipal-utilities.html#opt5

- **EPA: Rapid Deployment Energy Efficiency Toolkit**
  The RDEE Toolkit helps all entities choose successful programs as they advance energy efficiency program funding opportunities through the American Recovery and Reinvestment Act (ARRA) of 2009. The Toolkit focuses on programs that have extensive, proven field experience, along with documentation on program design, program cost, and results.
  http://www.epa.gov/cleanenergy/energy-programs/suca/rdeetoolkit.html

2. BENCHMARKING AND BUILDING ENERGY USE

EPA's Portfolio Manager

Portfolio Manager enables buildings to assess their energy performance over time and against national benchmarks in order to develop a comprehensive and cost effective energy reduction plan.

http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager

ENERGY STAR for Buildings

Programs for energy management, design of new commercial buildings, and recognition through the ENERGY STAR label.

http://www.energystar.gov/index.cfm?c=business.bus_index

Mass Energy Insight

Massachusetts partnered with its gas and electric utilities and the EPA to administer a tracking and benchmarking system for municipalities called Mass Energy Insight. This system automatically downloads utility data, so that customers do not have to manually enter it.

http://www.massenergyinsight.net/home

Core Performance Guide, New Buildings Institute

Core Performance is a prescriptive path to small- and mid-size buildings to perform up to 30% better than model energy codes. The Core Performance program brings together over 30 criteria defining high performance in building envelope, lighting, HVAC, power systems and controls.

http://newbuildings.org/advanced-design/advanced-buildings

3. BUILDING ENERGY CODES

NEEP's Building Energy Codes Project

The Northeast Building Energy Codes Project is helping the region reduce its carbon emissions by providing states with resources to develop, implement and comply with building energy codes. NEEP has developed a Model Policy that provides Northeast states with guidelines for making sure their energy codes are up to date and implemented effectively.

http://neep.org/public-policy/4/78/Building-Energy-Codes

Department of Energy's (DOE) Building Energy Codes Program (BECP)

Provides states and local governments with comprehensive guidance on adopting and complying with advanced building energy codes.

http://www.energycodes.gov

Massachusetts Stretch Energy Code

In July 2009, Massachusetts became the first state to adopt an above-code appendix to its state code - the 120 AA 'Stretch' Energy Code.

http://www.mass.gov/Eeops/docs/dps/inf/appendix_120_aa_jul09_09_final.pdf

NEEP's Model Progressive Building Energy Codes Policy for the Northeast States

The policy offers recommendations to adopt progressively more efficient building energy codes, improve the rate at which buildings and dwellings comply with the code and measure the actual energy performance of buildings and dwellings.

http://neep.org/uploads/SOAPResources/id187/neep_building_energy_codes_policy_march%202009.pdf

The following organizations promote and provide training and education opportunities, specific to certain regions of the U.S., on building energy codes:

- NEEP (Northeast) - http://neep.org/calendarcategory/134/51-High-Performing-Buildings
- MEEA (Midwest) - http://www.mwalliance.org/calendar
- SEEA (Southeast) - http://www.seealliance.org/programs/minutes.php
- NEEA (Northwest) - http://neea.org/participate/calendar.aspx
- SWEEP (Southwest) - http://www.swenergy.org/events/default.aspx

- BCAP (National) - http://bcap-ocean.org/events

4. HIGH PERFORMANCE SCHOOLS

Collaborative for High Performance Schools (CHPS)
http://www.chps.net

- Northeast Energy Efficiency Partnerships & NE-CHPS- http://neep.org/public-policy/3/78/High-Performance-Buildings/Policy/2
- Massachusetts School Building Authority & MA-CHPS - http://www.massschoolbuildings.org/about_ektid62.aspx
- New York State Education Department & New York State Education Department & NY-CHPS - http://www.emsc.nysed.gov/facplan/news.html

EPA - Indoor Air Quality Tools for Schools

The IAQ Tools for Schools *Program is a comprehensive* resource to help schools maintain a healthy environment in school buildings by identifying, correcting, and preventing IAQ problems.

http://www.epa.gov/iaq/schools/

DOE Energy Smart Schools

The program provides information and tools on topics ranging from financing to energy curricula to school districts with the following goals: to upgrade new schools to 50% better than current energy codes and improve existing schools by 30% in the next three years.

http://www1.eere.energy.gov/buildings/energysmartschools/

5. UTILITY PROGRAMS AND INCENTIVES

Database of State Incentives for Renewables & Efficiency (DSIRE)

A comprehensive source of information on state, local, utility and federal incentives and policies that promote renewable energy and energy efficiency.

http://www.dsireusa.org

6. ZERO NET ENERGY BUILDINGS

Roadmap to Zero Net Energy Public Buildings: Recommended Steps for the Northeast and Mid-Atlantic by Northeast Energy Efficiency Partnerships (NEEP)

Zero Energy Commercial Buildings Consortium

Resources from a consortium working with DOE to achieve sector-wide market transformation.
http://zeroenergycbc.org/