Developing a High Performance Schools Protocol for Integration in Energy Efficiency Programs in the Northeast

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ABSTRACT

Various high performance school initiatives have been developed, representing a broad range of comprehensiveness, including efforts that address all areas of construction and facility operation, to those that address only energy efficiency or renewable energy. Readily known initiatives include the Collaborative for High Performance Schools and the US DOE's program, as well as specific state-sponsored efforts. While these initiatives can serve the community in describing the requirements of a high performance school facility, they typically do not establish the framework or metrics for incorporation in energy efficiency programs, either because specific technologies and measures are not compatible, or because the efficiency requirements are not strict enough. The result has been that projects developed to meet the requirements of the high performance school programs do not typically qualify for the efficiency incentives offered by programs supported through rate-payer systems benefit charges.

This paper describes a large-scale effort sponsored by the Northeast Energy Efficiency Partnerships (NEEP) to develop a framework for developing state-by-state consistency for high performance schools in the Northeastern United States, including all of New England and the states of New York and New Jersey. Such a model enables a comprehensive and achievable metric for state certification of advanced school facilities, while also specifying an approach that enables integration in energy efficiency programs.

Our paper describes the complete details of the project approach, first discussing a challenging effort to interview key state and program officials, assessing the real needs and objectives of state education departments, local school boards, and efficiency program managers/regulators. This component of our work has enabled us to understand the real commonalities and unique differences between the various parties.

Using this important data, we describe the process used for developing a core program of specific advanced school requirements that enables incorporation into existing efficiency programs. Key elements of the integrated initiative are discussed, along with an associated process for project documentation and supporting the market in applying the program.

Introduction

From the late 1800s until the 1960s school buildings were built to last, as evidenced by the fact that many of these older schools are still in use. These schools featured durable construction materials, natural light, and the introduction of fresh air through operable windows. During the 1970s, in response to an energy crisis and a fast growing student population, schools were built quickly and cheaply with substandard materials and few windows, as they allowed heat loss in the northern states and brought in too much heat in the southern U.S. The issuance of the United States Green Building Council's Leadership in Energy and Environmental Design (LEED) rating system established a tool for building designers and owners interested in

sustainable design and construction. Those involved in school construction, driven by: the recognition that building performance plays a significant role in student performance; a desire for schools to represent environmental responsibility in construction and operation; and the growing demand for energy efficiency in all sectors due to growing energy costs, quickly embraced the concept of green buildings.

This interest resulted in the formation of the Collaborative for High Performance Schools (CHPS) which adapted the LEED rating system to the needs of California schools. The CHPS guidelines were then adopted by the U.S. Department of Energy and formed the core of the DOE's Rebuild America Energy Smart Schools. At the same time, the New Buildings Institute and the Wisconsin Energy Center developed the Advanced Buildings Guidelines and the accompanying Benchmark which focus primarily on energy efficiency.

In addition to these design guidelines, ratepayer funded energy efficiency programs operated by electric and gas utilities, or governmental agencies offer a combination of financial incentives and design assistance for commercial and/or school construction throughout the northeastern United States.

The existing schools initiatives typically establish the requirements of a high performance school facility, however, they rarely establish the framework or metrics for incorporation into energy efficiency programs. As a result, school administrators and the A&E community are often faced with the task of satisfying multiple programs that contain differing criteria, yet are focused on similar goals.

In an effort to combine high performance school and energy efficiency efforts, Northeast Energy Efficiency Partnerships (NEEP) has developed a protocol for the construction and operation of high performance schools for the Northeastern United States. The protocol enables a comprehensive and achievable metric for state certification of advanced school facilities, while also specifying an approach that enables integration in energy efficiency programs.

High Performance Schools Programs in the Northeast

Five states in the Northeast have officially adopted either a voluntary or mandatory high performance schools program directed at K-12 public schools. The voluntary programs in Massachusetts and New Hampshire are associated with a financial incentive paid to the town or school district. This incentive is typically in the form of enhanced State funding for a new construction or renovation project, reducing the burden on the local taxpayers. Mandatory programs in New Jersey, Pennsylvania, and Maine are linked with State funding where the project must meet the State guidelines in order for matching grants to be issued.

The Massachusetts Department of Education, with the support of the ratepayer funded Massachusetts Technology Collaborative has been operating a pilot program using the criteria established by the Collaborative for High Performance Schools (CHPS) and periodically offers technical assistance grants for feasibility studies along with design and construction grants for renewable energy, and energy efficiency related upgrades. Eighteen pilot school projects also qualified for enhanced state construction reimbursement to the participating community. The Commonwealth is now in the final stages of establishing a Massachusetts specific version of the CHPS guidelines.

The State of Maine requires all newly constructed publicly funded buildings to outperform the State Commercial Energy Conservation Code by 20%. The State also offers design/construction grants for design teams participating in the Maine High Performance

Schools program. New schools being built under this program are to meet the energy performance criteria established by the New Buildings Institute's Benchmark/Advanced Buildings Guidelines.

The State of Rhode Island is currently updating the construction regulations for K-12 schools to include high performance "green" standards. An interim regulation calls for all new schools to be constructed to an energy efficiency level equivalent to the energy efficiency requirements that must be met to achieve a "Silver" level certification under the LEED program.

With funding from the Kendall Foundation, the Connecticut Green Buildings Council is operating a pilot program titled the High Performance Schools Initiative. The program is educational in nature and is promoting and supporting the construction of high performance schools throughout the State. The Connecticut legislature is currently considering legislation that will require new schools be built to, yet to be determined, high performance standards provided cost/benefit ratios are met.

New Hampshire has enacted legislation providing 3% additional state reimbursement to schools designing to high performance standards. The Department of Education has developed a state specific version of the CHPS criteria that has been adopted as an interim protocol awaiting the final development of the NEEP regional approach outlined in this paper.

New York has been working on a simplified, state specific version of the CHPS model to provide design guidance for schools. Additionally, NYSERDA operates a program called the Energy Smart Schools Program that provides educational assistance on energy efficiency, and provides benchmarking for the public school systems. The benchmarking utilizes the EPA Portfolio Manager tool allowing schools to be ranked for energy performance. The program also coordinates the efforts of NYSERDA's range of commercial building efficiency programs for school construction and renovation projects. NYSERDA also offers online training for high performance school design at: www.hpschooldesigntraining.com.

New Jersey requires all school construction projects to be designed to the LEED silver standard. The Department of Education and the New Jersey Institute of Technology have partnered to develop specific school design criteria under a program titled 21st Century School Design Criteria.

The Pennsylvania has adopted high performance school standards as a part of the design and construction specifications for new K-12 school construction projects.

Clearly there are a variety of high performance schools programs being developed throughout the region. Some of these programs focus primarily on energy efficiency, while others, including the CHPS based programs and LEED, put more emphasis on environmentally friendly construction and maintenance practices with energy efficiency playing a less significant role.

Recognizing Program Disconnects

The Northeastern United States has taken a leading role over the last 20 years in the development of energy efficiency programs funded by utility ratepayers through systems benefit charges. Each state in the region maintains a suite of programs promoting energy efficiency through a variety of delivery mechanisms. Some of the programs offered provide specific services and incentives for public schools, while others include school buildings in their commercial/industrial programs.

Because these programs focus almost exclusively on energy efficiency, they have not served as models for the development of the various high performance schools programs. Instead LEED and CHPS have served as the main templates for the development of these programs. This unfortunately has led to some confusion and misunderstandings for the design community as well as public school officials.

Since the various high performance school and building programs include energy efficiency requirements, it has been logical for school administrators and architects to assume that building to these standards would, by default, qualify projects for efficiency program incentives. In many situations, this has not been the case.

The efficiency programs in the region generally follow two approaches: prescriptive paths, and custom or performance paths. Prescriptive approaches typically specify particular types, and efficiency levels, of equipment that must be installed in order to obtain incentives. The custom, or performance, approaches model the performance of the building, or building systems/sub-systems, paying incentives for performance that outperforms energy code requirements, or other target levels.

With few exceptions, high performance buildings and schools programs do not prescriptively specify particular types of equipment to be installed. Even where they do, the specifications do not necessarily match up well with the prescriptive criteria of efficiency programs covering the same jurisdiction. Likewise, custom approaches also tend to not be well matched, and although similarities exist program criteria often vary greatly creating confusion and frustration for project owners and designers. Two examples of program conflicts are presented in the following paragraphs:

Conflicts with prescriptive approaches. The State of Maine provides a good example of the issue of high performance schools programs not coordinating well with prescriptive efficiency programs. Efficiency Maine's prescriptive lighting program for commercial buildings does not pay incentives for lighting fixtures equipped with standard electronic T8 ballasts. However, prescriptive incentives are available for lighting fixtures equipped with high performance "Super" T8 lamps and ballasts that meet the Consortium of Energy Efficiency's (CEE) standards for "High Performance" T8 lamps and ballasts. Enhanced incentives are paid for lighting fixtures that additionally exceed specific overall performance levels. In contrast, the High Performance Schools Program does include eligibility for standard T8 equipment, provided energy code mandated lighting power density levels are outperformed. Design teams that have worked within the guidelines of the Maine High Performance School Program have often been disappointed to learn that school renovations and commercial building projects designed along the path established by the High Performance Schools Program do not qualify for the prescriptive lighting incentives for commercial/institutional buildings under the Business Program.

Conflicts with custom approaches. Two New England utilities, NSTAR Electric and National Grid, have been operating custom, new construction, efficiency programs for several years. Most of these programs pay a portion of the incremental cost involved in installing systems, or constructing buildings, that outperform the particular State's (Massachusetts, Rhode Island, and New Hampshire) Energy Efficiency Code and "accepted standard practice." Five years ago the companies added a program for public school projects called Schools Initiative. Schools Initiative pays custom (non-prescriptive) incentives for projects that outperform the State Energy Efficiency Code by at least 20%. Many architects in Massachusetts have become LEED rated,

and several new schools in the state have been constructed to a LEED Silver standard. Performance modeling of these projects has demonstrated an energy performance level averaging about 10% better than energy code mandated levels. As a result, there has been confusion and disappointment within the design community and school administrations that projects qualifying for LEED Silver ratings do not qualify for incentives under the utility sponsored efficiency programs promoting energy efficient schools. The development of Massachusetts CHPS and the Regional Protocol will likely serve to reduce the number of school project built to a LEED rating.

Working with the States

When NEEP began work on a New England High Performance Schools Protocol, it was recognized that the effort had to be well coordinated with educational administrators, the design community, and efficiency program operators if the disconnects described here were to be resolved. NEEP enlisted working groups in each of the participating states to help establish and review the criteria that would form a new regional approach.

Included in each state working group are:

- State Education Department Administrators
- Energy Efficiency Program Administrators
- Architects and Engineers involved in high performance schools design and LEED projects
- Schools Facilities Directors
- Town or District School Administrators
- Other interested parties

In the fall of 2005, NEEP contracted with Energy & Resource Solutions (ERS) to work with the state working groups and formulate the Regional High Performance Schools Protocol. Together ERS and NEEP solicited and catalogued the existing efforts related to high performance school construction and the needs for criteria and guidance as defined by each state working group.

Early on it became obvious that the process would not escape the trait that is so strong in New England, best described in the quote, "Things are different here in _____." However, there were many recurring themes, and it was agreed that the regional Protocol would include at least the following areas of focus:

The top priority would be student performance. It was felt throughout the region that the priorities are not clear for most high performance schools programs. Direct environmental impacts, energy efficiency, student performance, and renewable energy promotion were all seen as program priorities, yet it was never clear if the primary goals for the programs were student performance or environmental performance. All state groups were in agreement that improved student performance should be the top priority of the Protocol and that all other priorities should be complimentary.

Energy efficiency with its embodied environmental benefits would be second on the priority list. With the incredible strain that increasing energy costs have placed on school budgets, it was

agreed that energy efficiency had to play a very major role. Although there was much interest in direct environmental impacts of such policies as using recycled and recyclable materials, low impact land use, and community environmental education, the point was strongly made that the environmental impacts of energy efficiency are huge and likely have a greater impact over the life of the building than other environmental factors.

The energy efficiency criteria would be compatible with utility sponsored programs. The energy efficiency criteria should be strict, yet flexible enough so that energy using systems could be readily designed to meet the Protocol requirements as well as local efficiency program requirements. It was further decided that the Protocol should have few, if any, prescriptive requirements so that design creativity is not stifled and so that the requirements do not conflict with local prescriptive programs.

Daylighting should be an essential part of the protocol. It was universally felt that the student educational performance and the energy efficiency advantages of daylighting are so well documented that daylighting should be a mandatory element for the construction of new high performance schools and pursued whenever possible for school renovation projects.

Renewable energy and the use of alternative transportation fuels should be, at a minimum, demonstrated. Most programs offer points for renewable energy projects and bus fleets that use alternative fuels such as bio-diesel. It was agreed that at least demonstration level projects should be included in high performance schools and that the Protocol should also encourage larger projects through the awarding of additional credit points.

Allowances for rural/urban locations should be incorporated. It was felt by many members of the working groups that the current high performance schools programs have been designed with urban environments in mind. Some felt that the "points" based programs (LEED, CHPS) favored urban environments and didn't recognize the environmental benefits that rural areas might offer. Some participants requested state specific sections to deal with this issue, while others proposed rural/urban tracks within the Protocol.

Developing the Draft Protocol

After receiving input from each of the state working groups, ERS began to develop the regional criteria that would become the new Protocol. Because so much quality work has been done on high performance schools, high performance commercial buildings, and energy efficiency, many established and developing programs were consulted in developing the Protocol.

The main programs and documents consulted include:

- **Collaborative for High Performance Schools (CHPS)** – The recently developed Massachusetts version of CHPS forms the basis for much of the protocol. The CHPS model has been fairly widely adopted, and its reliance on LEED and ASHRAE standards helps to make it compatible with many programmatic efforts. Because CHPS was originally developed for California schools, some of the energy efficiency details are inappropriate for the New England Climate. Additionally, the prescriptive energy efficiency path offered through the CHPS points system does not deal with building

envelope issues. This is problematic for the Northeast as there are some areas where energy efficiency codes are not aggressive and/or not well enforced.

- **LEED –** Although documenting LEED compliance has earned a reputation for being difficult and expensive, the rating system has gained wide acceptance and is understood by many members of the design community. Although LEED was a great help in establishing direct environmental impact criteria, the guidelines were felt to be too weak on energy efficiency to be used for developing efficiency guidelines.
- **ASHRAE Standard 90.1 –** The ASHRAE standard 90.1 has formed the basis for the energy efficiency criteria for virtually every high performance building program and energy efficiency code in the country as well as the International Energy Efficiency Code. Care was taken to make certain that Protocol criteria were compatible with 90.1 doctrine, while taking steps beyond the efficiency levels outlined in the relevant versions of the standard.
- **Benchmark/Advanced Buildings Guidelines –** This combination of performance criteria and design assistance documents was developed jointly by the New Buildings Institute and the Wisconsin Energy Center. Similar to LEED and CHPS in many ways, the emphasis is more concentrated on energy efficiency. Benchmark is gaining rapid acceptance as criteria for participation in new construction energy efficiency programs and care was taken to ensure Protocol and Benchmark compatibility.
- **Efficiency Program Documentation –** The prescriptive and custom programs of the following organizations were reviewed in order to establish common themes across the programs: Cape Cod Light Compact; Connecticut Light and Power; Long Island Power Authority (LIPA); National Grid; NSTAR Electric; NYSERDA; Public Service of New Hampshire; United Illuminating, Western Massachusetts Electric.

Incorporating the best aspects of the above programs, along with the ideas generated through our consultation with the working groups, ERS developed a draft version of the Protocol. The Protocol is designed to be straightforward and easily understandable with each individual topic having its own section. The criteria are divided into "required" and "optional credit" elements. The required elements are those that the working groups deemed to be at the core of the design, construction, and maintenance of a high performance school. Optional credits fall into two categories: performance levels beyond the required levels; and categories that were not considered to be essential elements of high performance schools.

The draft Protocol is now in the process of being reviewed by the state working groups.

Protocol Compatibility with Energy Efficiency Programs

In order to avoid conflicts and confusion with energy efficiency programs, several provisions were included in the Protocol that are designed to encourage an integrated approach that utilizes all appropriate available resources in designing, constructing, and maintaining schools.

Requirements directly aimed at encouraging cooperative energy efficiency efforts include:

Integrated design approach. A core requirement of the Protocol is that the participating school district must create a high performance design advisory committee to oversee the implementation

of an integrated design approach and ensure that the high performance standards and the overall goals of the protocol are met.

Mandatory efficiency program participation. In order to participate in the Protocol documentation process, school districts must participate in available energy efficiency programs funded through systems benefits charges in their service territory. Mandating early (design phase) program participation will help to eliminate confusion and conflict between programs.

Alternative paths for criteria compliance. Because there are a variety of efficiency program models in the market, and in order to encourage creativity a variety of compliance paths are offered, including: compliance with Benchmark energy efficiency requirements; modeled performance 20% better than ASHRAE 90.1 2001; modeled performance 20% better than State Energy Efficiency Code requirements.

Optional credit points for energy efficiency. For each of the above listed paths, optional points are available for demonstrated performance beyond the minimum 20% improvement.

Required commissioning and training. Many programs throughout the region now offer incentives for systems commissioning and operator training. This requirement is designed to be compatible with the requirements of these programs.

Key Energy Efficiency and Renewable Energy Related Provisions of the Protocol

The draft Protocol includes prerequisites and optional credits for: policy and operations; indoor environmental quality; site selection; materials selection; water efficiency; and innovation in addition to the energy efficiency and renewable energy provisions.

The key provisions related to energy efficiency and renewable energy are listed below:

Prerequisites

- **PO PR.1** Create a high performance design advisory committee to oversee the implementation of an integrated design approach and ensure that the high performance standards and the overall goals of the protocol are met.
- **PO PR.5** Districts must pass a resolution that requires that all newly purchased equipment and appliances to be used in the school be ENERGY STAR® -compliant. Additionally the policy must prohibit the purchase of low efficiency products, including incandescent task lights, halogen torchieres and portable electrical resistance heaters.
- **PO PR.6** Adopt a no idling policy that applies to all school buses used to transport the students of the school.
- **IEQ P 1.** Access to Views - Provide direct line of sight to view glazing from 70% of the floor area of classrooms and administration areas.
- **IEQ P 2.** Classroom Daylighting - 75% of the classrooms in the school must receive significant daylighting that is designed to provide low-glare lighting eliminating or reducing the need for electric lighting for at least 40% of the daytime hours the

classrooms will be in use. Automatic daylight controls must be used to turn-off or dim the electric lighting.

- **IEQ P 3.** Install electric lighting system to enhance occupants' visual performance with pendant or ceiling mounted high performance lighting fixtures. The lighting fixtures must incorporate High Performance "Super" T8 or T5 technology and include glare control features.
- **IEQ P 4.** Install interior electric lighting systems with lamp efficacy ratings of a minimum of 85 mean lumens per watt, and color rendering index (CRI) ratings of 80 or higher
- **IEQ P 5.** Meet the minimum ventilation rate requirements of ASHRAE Standard 62.1-2004, Ventilation for Acceptable Indoor Air Quality.
- **IEQ P 13.** Install only electric ignitions for all gas-fired cooking appliances.
- **EE P 1(A, B, or C).** Design a school that performs significantly better than schools built to current standard practice.
- **Option A** - Meet the "Required" Criteria of Benchmark™
- **Option B** - Demonstrate that the Design Outperforms the Prescriptive Criteria of ASHRAE 90.1 2001 (or State Energy Code) by at Least 20%.
- **Option C** – Using a Building Simulation Approach, Demonstrate that the Design Outperforms the "Building Performance" Criteria of ASHRAE 90.1 2001 (or State Energy Code) by at Least 20%.
- **EE P 2.** Employ best practice HVAC design techniques to improve system performance and meet ASHRAE Standard 55.
- **EE P 3.** Commission all energy using systems.
- **EE P 4.** Provide effective and complete training and documentation on the operation and maintenance of the building systems identified in the commissioning report.
- **EE P 5.** Participate in energy efficiency incentive and technical assistance programs that are available through applicable utility and governmental programs.

Optional Credits

- **PO EC.2.1** Commit for a period of two years to purchasing, at either the municipal or school district level, Renewable Energy Certificates (RECs) or clean renewable electricity for the equivalent of at least 25% of the school's projected annual electricity needs.
- **PO EC 2.2** Commit for a period of two years to purchasing, at either the municipal or school district level, Renewable Energy Certificates (RECs) or clean renewable electricity for the equivalent of at least 50% of the school's projected annual electricity needs.
- **PO EC 3.1** Alternative Fuel Demonstration Project - Establish an alternative fuel project that demonstrates the viability of alternative fuels to the school district, the community and the region.
- **PO EC 3.2** Alternative Fueled Buses - At least 20% of the buses serving the school must use alternative fuel such as compressed natural gas or utilize clean technology buses with hybrid electric-diesel engines. This credit may be also be achieved by committing to use B-20 diesel fuel in all the buses serving the school for a period of 2 years.

- **PO EC 3.3** Alternative Fueled Maintenance Vehicles and Equipment - If purchasing maintenance vehicles and equipment as part of the capital budget for the school project, specify alternative fuel power such as electric, propane, or natural gas. To achieve the credit, 50% of the cost for the above maintenance equipment must go toward the purchase of alternative fuel powered items.
- **IEQ EC6.** Install high intensity fluorescent lighting fixtures instead of HID fixtures in the gymnasium and other high ceiling areas.
- **EE EC 1 (A, B, or C).** Demonstrate superior energy performance beyond prerequisite EE P1 (30%, 40%, or 50% better than 90.1 2001)
- **EE EC 2.** Incorporate daylighting and control at least 40% of the connected lighting load throughout the building with automatic daylighting controls.
- **EE EC 3.** Perform enhance building commissioning employing a third party commissioning agent throughout the design and construction process.
- **EE EC 4.** Design 90% of permanent classrooms without air conditioning.
- **EE EC 5.** Install VAV system with variable speed drives on appropriate fans and motors. Control air volume in response to indoor air quality needs
- **EE EC 6.** Install an energy management system (EMS) to monitor and trend the energy consumed throughout the school.
- **EE EC 7.** In addition to Credit 5, install a submetering system for lighting loads and plug loads, integrating the data collected from the submetering systems with the energy management system.
- **RE EC 1(A, B).** Install on-site solar thermal energy system.
- **RE EC 2 (A, B, C, D).** Install on-site photovoltaic system.
- **RE EC 3 (A, B, C, D).** Install on-site wind energy system.
- **RE EC 4 (A, B).** Install on-site biomass energy system.
- **RE EC 5.** Install on-site renewable energy system other than the types listed for credits RE EC 1-4.
- **RE EC 6.** Utilize on-site renewable energy system for charging of electric hybrid vehicles or maintenance equipment.
- **S EC 6.** Sustainable Site and Building Layout. Implement 4 of the following best practice site strategies:

    1. Orient the building(s) to take advantage of maximum natural daylighting and plot shadow patterns from surrounding buildings and place buildings to optimize solar gain (for urban-infill sites).
    2. Consider prevailing winds when determining the site and building layout. For example, consider how the shape of the building itself can create wind-sheltered spaces and consider prevailing winds when designing parking lots and driveways to help blow exhaust fumes away from the school.
    3. Take advantage of existing land formations and vegetation to provide shelter from extreme weather or to deflect unwanted noise.
    4. Plant or protect existing deciduous trees to block summer sun and allow winter solar gain. Plant or protect existing coniferous trees to block winter wind.
    5. Minimize importation of non-native soils and exportation of native soils. Optimize Cut & Fill (ideally 1:1) during clearing and excavation.

6. Create physical connections to existing bike paths, natural features, or adjacent buildings.
7. Design parking lots and driveways to limit student proximity to bus emissions. Design bus loading and unloading areas such that buses need not be lined up head to tail. Do not design bus loading and unloading areas such that bus exhaust is in proximity to any of the school's air intake vents.
8. Site the building to maximize opportunities for on-site renewable energy generation. For example, preserve or ensure availability of space for wood chip storage facilities for biomass heating, wind turbines (if wind resources are adequate), or other renewable energy sources.

Compliance Methodology

It has been a major concern of those working with the LEED and CHPS rating systems that project owners and designers tend to shift focus from designing a quality project to chase points in particular categories that might be easier for a particular project to comply with. In order to avoid this, the Protocol has more prerequisites than the other programs referenced in this paper. However, because there will be times when some prerequisites are impractical or impossible to meet, an appeal or variance procedure is being established that will allow the substitution of optional credits for prerequisites under special circumstances.

Also, the participating states are being asked to agree on a compliance methodology that requires a certain number of optional credits within each credit category. This methodology is similar to the college degree criteria that requires certain prerequisites and also requires a number of elective credits from educational categories.

Compliance methodology will vary from state to state depending on infrastructure. However, compliance documentation requirements are detailed in the Protocol and compliance responsibility is shared by the design community and school administrators.

Conclusion

School districts and communities in the Northeast are designing high performance schools by choice or mandate. Taxpayers are typically not willing to spend extra funds on what many perceive to be "green frills." Although reduced operating costs and productivity gains can be attractive to taxpayers, incentives that help to pay for incremental costs are needed for widespread acceptance. A design guide such as the Regional Protocol that is written in concert with energy efficiency programs, allows schools to be built to high performance "green" school standards and qualify for efficiency incentives provided through ratepayer programs. High performance buildings/schools programs and ratepayer funded efficiency programs share many common goals, and the constructors of new schools are likely to desire the benefits of both program types. Unfortunately the two program models have been developed separately and do not always complement each other. The Regional Protocol outlined in this paper, works toward establishing programs that work well together toward common goals.

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