The ABCs of Transforming a School Market

Amy Cortese and Kyle Kobel, Northwest Energy Efficiency Alliance

ABSTRACT

The Northwest Energy Efficiency Alliance ("Alliance") is undertaking a market transformation program to institutionalize energy efficiency in school design and construction. As a target market, schools are a high priority because of the desire to provide a healthy, sustainable learning environment while maximizing budgets. Energy efficiency is a critical element of a high performance school.

In Washington, the Alliance has targeted key school decision-makers including district officials, architects, engineers, utilities, the state funding agency, and sustainability non-profits. With Alliance facilitation support, a committee established voluntary criteria for sustainable schools. The Alliance will work with design teams selected by Washington in their $1.5 million pilot project to demonstrate how energy efficient, high performance schools improve the learning environment while saving money.

In Idaho, market research and stakeholder meetings disclosed that an appropriate strategy includes technical reviews of school designs and professional education focused on high performance schools. A general public relations campaign is necessary to transform the market as well.

This paper will discuss the process the Alliance has developed to transform the schools market and the results achieved thus far. Solutions to market barriers discussed later include consideration of energy efficiency at the earliest phases of design, integrated design, and "selling" high performance. Expected results include adoption of the criteria by Washington, review of existing high performance schools, and pilot project identification.

The program leverages the work of the Collaborative for High Performance Schools, the Advanced Building Guidelines, and Alliance services including daylighting/lighting laboratories, training, centralized marketing and advisor services.

Background

The Alliance is a non-profit corporation supported by electric utilities, public benefits administrators, state governments, public interest groups and energy efficiency industry representatives. These entities work together to make affordable, energy-efficient products and services available in the marketplace.

The Alliance's Commercial Sector Initiative ("CSI") aims to increase the awareness of and build demand for energy efficiency in terms the market understands and values. In 2001, CSI researched a number of business/building types and selected priority target markets (Narel et al. 2002). The goal of the target market approach is to identify decision-makers, their core business values, and opportunities to tie energy efficiency to these core values. This includes direct financial benefits along with benefits of productivity enhancements of advanced buildings systems, such as improved lighting and comfort.

The target market approach allows the Alliance to focus resources on developing and disseminating information to market decision-makers that is credible, reliable, and useful. By

dedicating resources to a limited number of building types, the Alliance has begun to understand more about how these decision-makers think, what their priorities are, and how they might be motivated to make decisions that support their own needs as well as energy efficiency. New school construction was one of the target markets selected by the Alliance.

What Is a High Performance School?

According to the Collaborative for High Performance Schools ("CHPS"), high performance schools are "facilities that improve the learning environment while saving energy, resources, and money" (CHPS 2004). CHPS marketing messages have been carefully refined so that they appeal to school construction stakeholders. Benefits of a high performance school include higher test scores, reduced operating costs, increased teacher satisfaction, reduced liability exposure, and reduced environmental impacts (Mills et al. 2002).

New School Construction Target Market Description

Timelines for new schools are short; they go from conceptual to occupied in three years or less. Priorities in new school construction are to maximize space, meet established budgets and keep first costs down. Creating community gathering places and tailoring school layout to promote advanced teaching theories are also important in new school construction.

New school planning is typically based on student population needs and projections. School districts prepare a design concept and capital budget estimate before they offer a bond measure. In the Northwest, bonds are supplemented with state subsidies including direct grants, interest buy-downs, competitive grants, and/or federal funds. The final budget is determined by work done in the pre-design phase. It is difficult to implement changes in direction, particularly toward higher-priced design elements, after the pre-design phase.

School construction is becoming increasingly subsidized by state funds. Each state process and influence over school construction is unique, thus a state-by-state approach is necessary in order to effectively transform new school construction. What is the same is that all state governments are dealing with severe budget deficits due to the economic downturn. This has caused major budget cuts for state funded entities including K-12 schools.

Typically, larger school districts conduct master planning while smaller districts may move past conceptual into a programming or schematic design phase before a bond is passed. In many cases by the time a bond is issued, it may already be past the point of cost effectively changing some critical factors that impact energy efficiency and daylighting such as siting, building orientation and massing.

A growing trend in new school construction is the use of prototype school designs. Especially prevalent in high growth districts in Idaho, this practice allows for the same general building design to be used on multiple sites within the district. Typically, the district will buy parcels of land in advance of suburbanization of surrounding areas. Then, the same elementary, middle or high school building design is re-used on various sites. The practice allows for little consideration of site-specific features that impact daylighting and energy efficiency.

Table 1. Market Actors in New School Construction

School Districts	
School Board, Administration & Business Officials	Primary responsibility for administration of overall school operations, capital improvements, and local levy and bond measures within the district.
Facility Managers	Responsible for the day-to-day operations, maintenance and management of school facilities.
Construction Managers	Staff architects/project managers who oversee the hired design team.
Citizens & Community	Voluntary groups involved in the planning and design of school construction.
Design Team Members	
Architects, Engineers & Lighting Designers	School districts typically rely on a well-defined group of architects, engineers and lighting designers who specialize in school construction.
Commissioning Agents	Commissioning agents are becoming more involved in new school construction. The State of Washington requires commissioning from a third party authority and provides support to ensure its completion.
Education Trade Groups & Associations	
Collaborative for High Performance Schools	The Collaborative for High Performance Schools ("CHPS") aims to increase the energy efficiency of schools in California by marketing information, services, and incentive programs directly at school districts and designers. CHPS goal is to facilitate the design of high performance schools: environments that are not only energy efficient, but also healthy, comfortable, well lit and contain the amenities needed for a quality education.
Council for Educational Facility Planners International	The Council for Educational Facility Planners International ("CEFPI") is a trade association for those who use, plan, design, construct, maintain, equip, and operate educational facilities.
Others	Each state and/or region usually has a myriad of trade organizations and associations. These organizations include an Association of School Administrators, PTA, School Business Officials, Superintendents, Directors, Facility/Maintenance Professionals, etc.
Other Groups of Interest	
New Buildings Institute	The New Buildings Institute ("NBI") is a non-profit organization dedicated to making buildings better for people and the environment.
Rebuild America	Rebuild America is U.S. Department of Energy program involving a network of community-driven voluntary partnerships that foster energy efficiency and renewable energy in commercial, government and public housing buildings.
U.S. Green Building Council	The U.S. Green Building Council ("USGBC") is currently in the process of creating a Leadership in Energy & Environmental Design ("LEED™") Application Guide for school construction.
Cascadia Chapter of the USGBC	The Cascadia Chapter of the USGBC promotes building sustainability in Oregon, Washington and British Columbia.

Table 1. Market Actors in New School Construction (cont'd)

Utilities, Public Benefits & Energy Efficiency Organizations	Utilities, Public Benefits Administrators/Organizations and Energy Efficiency Organizations usually provide programs in the form of incentives and/or services applicable to new school construction.
State & Federal Government	
Various	Depending on the state and how it funds new school construction, there are many state and federal departments (such as department of education, health, energy, administration, etc., as well as legislatures) that may have an active role in new school construction.

Market Actors

As described in Table 1, a variety of market actors are involved in the financing, management, implementation and review of new school construction and major renovation.

Market Barriers

The CSI market transformation strategy aims to reduce or remove the real and perceived market barriers in the area of new school construction. A partial list of these market barriers include (ELI 2003):

- Lack of knowledge about the benefits of high performance schools;
- The term "high performance school" is insufficiently defined to address energy and educational priorities;
- Inconsistent interaction between school capital and operations – leveraging both budgets is difficult, even if capital costs will reduce operations costs;
- Disparate expertise by architecture and engineering firms with respect to energy efficient design;
- Misperceptions, poor past experiences and prejudices against some energy efficiency measures/designs;
- Fragmented decision-making that leads to value engineering; and
- Facility managers are reluctant to embrace the value of high performance.

Tools for Schools

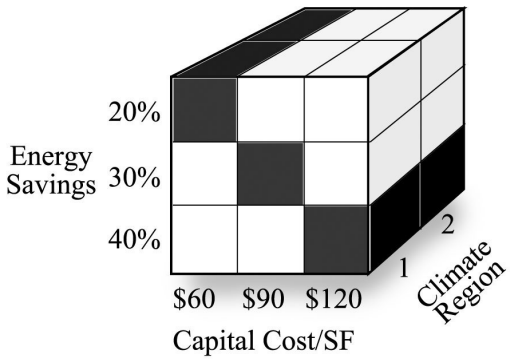
Implicit in each state's high performance school strategy, is the need for a comprehensive business case that encourages the design and construction of high performance schools. The business case is comprised of three distinct categories of tools. These include: (1) a definition of high performance schools, (2) sales tools that explain why these schools are desirable and (3) technical tools that simplify the process of building high performance schools for design teams.

Definition of High Performance Schools

The Alliance contracted with NBI to customize the CHPS Criteria for Washington with a focus on energy efficiency. By defining a high performance school, the criteria provide a way for school districts to clearly and easily ask for high performance from their design team.

While the criteria create a menu approach to sustainability, an additional definition of the technical description of a high performance school needs to be completed. Since classrooms are the basic element in all schools, technical advisors under contract to the Alliance are developing scenarios that identify energy savings opportunities (20%, 30% and 40% better than code) for three different initial cost price ranges ($60/SF, $90/SF, and $120/SF) in two climatic regions, temperate & mixed and cool & dry (NREL 2002). Figure 1 below illustrates this approach. Initially, Alliance technical advisors are creating scenarios for schools in the two climate regions that are 20% better than code at $60/SF initial cost, 30% better than code at the $90/SF level and 40% better than code at $120/SF as indicated by shaded boxes.

Figure 1. Energy Saving Opportunities by Price Range and Climate Region



For example, at the $60 / SF level, the Alliance investigated improving the base case by 20%. The base case is defined as:

- 90+ horizontal gas furnace per classroom with single supply and return, gas piping, venting, and condensate drains. (With Stainless Steel heat exchangers)
- Split system cooling with one 2-ton outdoor unit per classroom, cooling coil, refrigerant line sets, concrete pad, and electrical service.
- Insulated outside air duct with louver and motorized damper supplying outside air-to-air handlers.
- Economizer mixing box and controls at each air handler.
- Relief air grille, duct, and barometric damper per classroom.
- Programmable electronic thermostat per classroom.

The analysis suggests that energy savings are available when a strategy of daylighting and heat recovery ventilation is pursued. Results of this analysis are shown in Table 2 (Heller et al. 2004).

Table 2. Energy Use per Class Room

Case	Electric (kWh)			Gas (therms)	Total Utility Bills	
	Total	Lighting	Fan/Cool	Heat	Nampa Rates	Seattle Rates
Cool & Dry Climate						
Base Case	4823	2542	1474	502	$642	$742
HX	5228	2542	1880	196	$422	$518
HX w/ Daylight	3924	1261	1857	243	$394	$471
Temperate & Mixed Climate						
Base Case	4434	2542	1086	278	$457	$536
HX	4730	2542	1381	111	$335	$417
HX w/ Daylight	3495	1401	1287	146	$304	$369

This is only one of three technical analyses that will suggest conceptual approaches to classroom and corridor design, simulate, and cost the envelope, lighting heating and cooling systems for a prototype classroom and circulation space. These analyses of multiple systems can then become part of the sales and technical tools to encourage school districts to adopt high performance school policies.

Sales Tools

This technical analysis will be translated into sales tools that explain high performance school concepts and benefits to non-technical school officials in terms that they understand and value. Key messages of improved student performance, teacher retention, and lower operating costs will be stressed. These sales tools may include graphic descriptions of high performance schools and slide shows of actual schools that demonstrate these high performance concepts.

Technical Tools

The final element of the business case is a compilation of technical tools and resources available to help design teams build high performance schools. The exact nature of this information will be determined based on the results of the aforementioned technical work. However, presentation of these materials in terms that this technical audience understands is critical.

For architects and engineers, the focus of these tools will be on integrated energy design. Once the business case is developed the Alliance plans to work with high growth districts and their design teams to test and evaluate the effectiveness of the materials. The Alliance proposes a strategy of project responsive education, which combines educational presentations with design reviews and recommendations on specific project work. This method of combining education and design assistance is intended to encourage design teams to adopt these tools in their normal practice.

The Washington Approach

The Alliance chose the state of Washington as an initial target for its market transformation efforts in new school construction. Several leverage points in Washington generate high potential for market transformation including a centralized funding mechanism, interest from the school districts and design community, and state proposals to require green public buildings.

Washington Market Actors

Every state has a unique history towards funding school capital projects. And every state has a unique approach to the ever-growing problem of poor educational facilities that need to be modernized or replaced due to aged, failing infrastructures and increased student enrollments. In the state of Washington, the School Construction Assistance Program is a formal, centralized mechanism by which public K – 12 schools can apply for state assistance for school capital projects. This includes both funding and technical assistance for growth-related new construction, new-in-lieu replacement and modernizations funds. The program is administered by the Facilities section of the Washington Office of Superintendent of Public Instruction ("OSPI") under the rules and regulations as adopted by the State Board of Education (OSPI 2000). Informally, the School Construction Assistance Program is referred to as the D-Form Process, named after the forms and documents that are submitted to the state during the planning, design and development of state assisted projects.

There are criteria, a priority system and a regulatory formula by which school districts are equitably granted funds for their facility needs. Overall, funding is usually a combination of state and local funding. Besides outright allowances for eligible school district construction costs, examples of other various project costs that the state can match include architect and engineering fees, educational specifications, construction management, value engineering studies, constructability reviews, building commissioning, furniture and equipment, energy conservation reports, inspection and testing.

In addition to OSPI, there is another state entity that has an important role in state funded school construction. The Washington Department of General Administration ("GA") administers, reviews and approves the Energy Life Cycle Cost Analysis ("ELCCA"). Washington state laws and regulations require an ELCCA for all state funded public school projects over 25,000 square feet (GA 2004a). The ELCCA is also a requirement of OSPI's D-Form process and grants are available specifically for this analysis to be conducted. However, even though GA might recommend design alternatives to the submitted school plans, a district is not required to implement any of them.

While both of these state entities and their processes are important leverage points for high performance schools, school districts are still solely responsible for the origination and management of the capital process. Buy-in from the school districts and those immediately involved in the design and construction of a particular project are by far the most important market actors in achieving high performance goals.

A particularly strong association whose membership includes all the above-mentioned parties is the Washington Chapter of CEFPI. In June 2003, the Alliance, in partnership with CEFPI, brought together a broad based group of architects, engineers, school facility planners, utilities and state education officials. This committee would start addressing the important

market barriers of defining and understanding the benefits of high performance schools as they apply to Washington.

The Washington Sustainable Schools ("WSS") Process

The common bond with the CEFPI association, who had already been internally discussing the high performance school concept, proved to be invaluable in Washington. Besides CEFPI, the committee represented most all aspects of planning and design of new schools in Washington, and most members were familiar with each other and where they fit in the overall process. This familiarity helped create a group dynamic that was very respectful and cooperative.

Within the state, there had been many discussions and initiatives with regards to the USGBC's LEED™ Rating System as it applies to government and other state funded facilities. Governor Gary Locke signed and enacted Executive Order 02-03 that directs state agencies to establish objectives and plans that consider sustainable practices including facility construction, operation and maintenance (State of Washington 2002). The Washington Legislature has passed legislation that requires that a LEED™ Silver building be evaluated in GA's ELCCA process (GA 2004b). Other legislation has, at this date, unsuccessfully attempted to require that major state facilities use the LEED™ Rating System and for facilities over 50,000 square feet go through the LEED™ certification process (Washington State Legislature 2003). Elsewhere in Washington, the City of Seattle has adopted a Sustainable Building Policy that calls for new city-funded projects and renovations over 5,000 square feet of occupied space to achieve a Silver Rating using the LEED™ Rating System (City of Seattle 2000). Some Washington School Districts have perceived this legislative activity as unfunded mandates that restrict their flexibility. Some also prefer a standard that directly related to school construction.

The committee's vision was to create benchmarking tools and resources to enable Washington School Districts in the construction and/or modernization process to achieve and measure sustainability. The committee wanted criteria to support an enhanced learning environment, one that is climate responsive, affordable, inspirational, and integrates well into the existing Washington school construction process.

The timeline for creating a benchmarking tool for Washington was extremely quick. At the time, the Washington Legislature had recently allocated $1.5 million to OSPI specifically for the financial assistance of five pilot high performance schools. OSPI was looking for the benchmarking tool to be the criteria for the pilot program. In order for the $1.5 million to be allocated in the current budget cycle, the criteria needed to be developed quickly.

Fortunately, the CEFPI committee members were very educated on existing rating systems, which allowed the group to quickly start addressing how they would meet the above-mentioned vision. The Cascadia Region Green Building Council was well represented on the committee and most were very knowledgeable of the successful application of the LEED™ Rating System on specific schools in the region. Additionally, all were aware of the efforts by USGBC to make a LEED™ Application Guide specifically for schools.

The committee chose the CHPS Criteria as the basis for Washington. The primary reasons for the decision to license CHPS for Washington was the flexibility the criteria gave the group to quickly meet its mission. Some of the committee's goals were to create a tool that would be appropriate to Washington schools, could quickly be adapted and modified, and could inform and influence state policy, while not complicating the regulatory process as it related to

school construction. Licensing CHPS and adapting it to Washington climates, codes and regulations was the obvious choice.

Another reason for choosing CHPS was the perception amongst some in the group about the costs associated with the LEED™ Rating System and certification process. Since schools are very concerned about first costs, the perceived costs associated with the LEED™ process and paperwork were a considered a hindrance. The committee was looking to incorporate a simple, voluntary tool into existing state processes such as the D-Form Process and/or the ELCCA.

For six months the committee met on a monthly basis to systematically evaluate CHPS and how it would apply to Washington schools, taking into consideration all the goals of the committee. Beyond the meetings, committee members were expected to do additional reading and research to prepare for and contribute to the process. Every credit within CHPS was evaluated with regards to how it would apply to Washington schools. Most credits were applicable, but those that needed to be adapted for Washington were discussed and debated in depth. NBI, under contract from the Alliance, customized CHPS Criteria for Washington. Technical experts from various fields provided input by attending meetings to further inform committee members about certain high performance concepts.

Two sections in the CHPS Criteria that required the most significant changes for Washington schools were the Energy and Indoor Environmental Quality. Current Washington Energy Code is aggressive compared to other state codes and national standards. Through NBI and their E-Benchmark™, the Alliance funded some modeling specific to Washington climate types to create prescriptive energy approaches for Washington School Districts and their design teams to build energy efficient, high performance schools. Other energy areas that the WSS Criteria excels are with daylighting and the integration with electric lighting and lighting controls.

Throughout the process of establishing the criteria, a facilitator guided the group to a consensus about specific credits and their eventual incorporation into the finished product. This independent facilitator proved to be valuable in the development process of the WSS Criteria.

The Idaho Approach

While the market transformation goal of encouraging energy efficiency through the adoption and use of a high performance school standard is the same, the strategy in Idaho differs from the Washington strategy.

This variation in approach is necessary for a few important reasons. First, Idaho does not have central authority over school construction and funding. Second, the Idaho schools new construction market is focused on very few high-growth districts that rely on prototype school design. Finally, interviews with market actors revealed that other school districts around the state rely on high-growth districts to guide them through the new construction process. High growth districts share information such as request for proposals, list of architects, and suggestions on how to manage the process with other districts in the state.

The Idaho schools market presents a unique opportunity to focus limited market transformation resources on a defined set of market actors. By carefully researching the market, the Alliance hopes to identify and work with local opinion leaders in the construction of energy efficient, high performance schools. These carefully selected opinion leaders may be in a position to influence their peers and encourage widespread adoption on these energy efficient design practices.

Partnerships are critical to this effort. The Alliance is building on the established relationships that Idaho Power, Rebuild Idaho (through the Idaho Department of Water Resources), and the University of Idaho Urban Research and Design Center have with Idaho schools stakeholders.

Alliance efforts focused on evaluating the current state of school construction in Idaho. High growth school districts have sponsored design team meetings that include an opportunity for Alliance technical review of prototype designs and recommendations for energy efficiency improvements.

The results of these findings and a comparison to existing high performance school standards (such as CHPS and LEED™) was presented at a meeting with stakeholders involved in high performance school in mid-March 2004. The group identified professional and community education about high performance school concepts as the highest priority.

Status of Market Transformation To-Date

In Washington, the Alliance efforts with the CEFPI committee were successful in completing the WSS Criteria (OSPI 2004a) that defines a high performance school. The criteria directly address the market barrier of a definition to address both educational and energy priorities. OSPI has licensed the CHPS publications and now administers the criteria.

In addition to the criteria, a WSS Planning Guide (OSPI 2004b) is complete, also based on CHPS. The intention of the WSS Planning Guide is to be a tool for school districts hoping to implement the WSS Criteria. The guide helps to educate those involved with school planning and design about the benefits of high performance schools. The guide also provides sample integrated design goals and highlights Washington examples in case studies.

OSPI's School Facility Advisory Board has created a subcommittee to distribute $1.5 million to five pilot high performance schools based on the WSS Criteria. The results will be presented to the Washington Legislature in September 2004 and used to revise the criteria that are not cost effective over time. It is the Alliance's intention that the WSS framework not be limited to the pilot program and its associated funding, but that OSPI and Washington School Districts adopt these concepts as ongoing policies in their new and modified schools.

In Idaho, the Alliance has identified several high growth school districts that are considered opinion leaders in the Idaho schools market. Technical advisors are actively engaged with construction managers in these school districts as well as their design teams on reviewing and revising prototypical school designs. Additionally, a high performance schools toolkit is being assembled to clarify messages and promote the funding, design and construction of high performance schools in Idaho. Samples of the toolkit can be made available, to a limited extent, outside of the Northwest

The Alliance intends to leverage the lessons learns in Washington and Idaho into a strategy to address energy efficiency in new school construction in Oregon and Montana as well. These future strategies should be defined by the end of 2004.

Conclusion

Although it is too early to completely evaluate the effectiveness of the new school market transformation efforts, the Alliance has already validated some important hypotheses that can be translated into other programs. First, it is critical to speak to decision makers in terms that they

understand. School districts are in the business of educating students, not saving energy. Any strategy to make school buildings more energy efficient should be couched in terms that school stakeholders understand and value. This implies that different tools be developed (or existing materials be modified) that speak directly to various school stakeholders. For example, marketing materials for administrators and school boards should stress core business values like student learning rates, increased teacher satisfaction and lower operating costs. By speaking this common language, the barriers of leveraging construction and operation budgets as well as the importance of integrated design can also be addressed.

Second, partnerships should be leveraged in the schools marketplace. Trade groups, like CEFPI, and programs with existing relationships, such as Rebuild America, are invaluable in creating credibility and access to new school decision-makers. CHPS has materials have been carefully designed to speak directly to school stakeholders, and NBI is a national non-profit that is capable of effectively leveraging this important work into other states. These partnerships will be especially valuable in disseminating information and lessons learned that can be helpful with other national programs/standards and other states, districts and organizations that may be considering their own high performance schools programs and policies.

Finally, every state has a unique strategy for funding school capital projects. Therefore, a state-by-state approach that addresses high performance as defined by the local community of stakeholders is important. Moreover, if a state process for new school construction exists, this high performance approach must integrate with this already existing infrastructure. School capitol budgets are too tight to cover additional soft costs.

References

City of Seattle. 2000. Seattle's Sustainable Building Policy. Available online: http://www.cityofseattle.net/sustainablebuilding/policy.htm. Seattle, Wash.: City of Seattle.

[CHPS] The Collaborative for High Performance Schools. 2004. CHPS Overview: What is a High Performance School. Available online: http://www.chps.net/overview/overviewWhatIs.htm

[ELI] Environmental Law Institute. 2003. *Building Healthy, High Performance Schools: A Review of Selected State and Local Initiatives,* 101-103. Washington, D.C.: Environmental Law Institute.

[GA] Washington State Department of General Administration. 2004. Energy Life Cycle Cost Analysis. Available online: http://www.ga.wa.gov/eas/elcca/intro.html. Olympia, Wash.: Washington State Department of General Administration.

[GA] Washington State Department of General Administration. 2004. Leadership in Energy and Environmental Design (LEED). Available online: http://www.ga.wa.gov/ EAS/green/LEED.html. Olympia, Wash.: Washington State Department of General Administration.

Heller, J., C. deMontigny, J. Loveland, M.Lane 2004. *Daylighting and Heat Recovery Ventilation: Necessary Components of High Performance Schools.* First Draft.

Heschong Mahone Group. 1999. *Daylighting in Schools – An Investigation into the Relationship between Daylighting and Human Performance.* Pacific Gas & Electric.

Heschong Mahone Group. 2002. *Daylighting in Schools: Re-Analysis Report.* California Energy Commission PIER Program.

Mills, D., G. Ander, G. Duhon and C. Eley. 2002. "The Collaborative for High Performance Schools: Building a New Generation of Sustainable Schools" In *Teaming for Efficiency Proceedings of the 2002 ACEEE Summer Study on Energy Efficiency in Buildings*, 6.223-225. Washington, D.C.: American Council for An Energy-Efficient Economy.

Narel, T., D. Anderson, K. Blake, A. Cortese, D. Gatlin, D. Hewitt and R. Sauchelli. 2002. "Harnessing New Market Forces to Transform the Commercial Building Market." In *Teaming for Efficiency Proceedings of the 2002 ACEEE Summer Study on Energy Efficiency in Buildings*, 6.243-253. Washington, D.C.: American Council for An Energy-Efficient Economy.

[NREL] National Renewable Energy Laboratory. 2002. *National Best Practices Manual for Building High Performance Schools*, 2.

[OSPI] Washington Office of Superintendent of Public Instruction. 2000. *Schools Facility Manual.* Revised 4th ed. Available online: http://www.k12.wa.us/ SchFacilities/ pubdocs/ SFMANUAL/intro.pdf. Olympia, Wash.: Office of Superintendent of Public Instruction.

[OSPI] Washington Office of Superintendent of Public Instruction. 2004. *Washington Sustainable Schools Planning Workbook for High Performance School Facilities.* Available online:http://www.k12.wa.us/SchFacilities/SustainableSchools.aspx. Olympia, Wash.: Office of Superintendent of Public Instruction.

[OSPI] Washington Office of Superintendent of Public Instruction. 2004. *Washington Sustainable Schools Protocol for High Performance School Facilities.* Available online: http://www.k12.wa.us/SchFacilities/SustainableSchools.aspx. Olympia, Wash.: Office of Superintendent of Public Instruction.

State of Washington. 2002. *Executive Order 02-03 – Sustainable Practices by State Agencies.* Available online: http://www.governor.wa.gov/eo/eo_02-03.htm. Olympia, Wash.: State of Washington.

Washington State Legislature. 2003. HB 1171 – Establishing green building programs. Available online: http://www.leg.wa.gov/wsladm/billinfo/dspBillSummary.cfm?billnumber =1171. Olympia, Wash.: Washington State Legislature.